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Zooplankton Diversity of a Desert Village Pond in Bikaner Rajasthan, India

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Abstract
Zooplanktons are the chief primary consumer and are of prime importance in aquatic ecosystems as the productivity of aquatic ecosystems is totally dependent on these. They form the basic link of the food chain for all aquatic organisms. The diversity of zooplankton components in the aquatic ecosystem serve as a reliable index for monitoring a water body. We examined the zooplankton diversity in Devi kund sagar village pond, which is situated 6 k.m. away from Bikaner (Rajasthan). Samples were collected monthly from Jan.2012 to Mar.2013. zooplankton population represents Protozoan's (mastigophora and ciliata) rotifers and arthropods (crustacean) From both village water bodies mainly Chilomonas Paramecium, Euglena, Spirogyra, euglena acus of mastigophora and Paramecium caudatum were noted
Keywords: Village pond, zooplankton, diversity, climate,

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STUDY AREA - DEVIKUND SAGAR POND

This pond is situated about 7 k.m. east of the Bikaner city, close to the Sagar village. The pond has a muddy basin and has much disturbance due to human and cattle activities in the littoral region. The pond is surrounded by brick walls on three sides while southern parts act as catchments. The pond is used for washing and bathing by village people and daily a number of tanks on a bullock and camel carts are filled and transported from here. It causes great disturbance in the shallow water region of the pond. The Colour of the water is sandy and *Hydrilla* is the only macrophyte recorded.

I. INTRODUCTION

Zooplanktons are important Organisms in the freshwater ecosystem since they occupy a central position in the food chain. Zooplanktons are small living organisms that float in the surface water column of water bodies and whose distribution is primarily determined by water waves and current. Zooplankton supports the economically important fish population. Zooplanktons play a pivotal role in aquatic food webs because they are important food for fish and invertebrate predators. They are the major mode of energy transfer between phytoplankton and fish. Zooplanktons are highly sensitive to environmental vibrations, sediment input, to other nonliving and living materials. As a result change in their abundance, species diversity or community composition can provide important indications of environmental change. The freshwater zooplankton comprise of Protozoa, Rotifers, Cladocerans, Copepods and Ostracods.

II. METHOD

The water sample was taken from the surface (secchi disc transparency zone) during morning between 7am to 12 pm. Plankton collected through the net was transferred into separate plastic bottles/containers. About 50 litres of surface water was sieved through plankton net to obtain zooplankton. Zooplankton net is made up of bolting silk (no. 25, mesh size 55µ) these were fixed and preserved in 4% Formalin. The formalin fixed samples were transferred into duly labeled bottles of 100 ml. and 1 ml of this sample transferred into a counting chamber in such a way they could be easily counted individually under a binocular research microscope. The identification of zooplankton organisms was done according to Edmondson (1966), Needham and Needham (1978), and Tonapi (1960). Since species turnover is expected during ecologically relevant time scales, and because transient taxa may also occur in single samples, believing that average of multiple samples provides a more robust representation of species diversity than do single observation. This approach also minimizes problems associated with unequal sampling periods and frequencies, even though the majority of time ponds were sampled uniformly.

III. RESULT AND DISCUSSION

From pond mainly *Chilomonas Paramecium, Euglena, Spirogyra, euglena acus* of mastigophora and *Paramecium caudatum* were noted. The average monthly population of protozoan's recorded between 45-100 No./l of which highest were noticed in Nov.2012 and least in Feb.2013 and Mar.2012, 2013. The protozoan's noticed average was 65.83 No./l in winter, 76.66 No./l in summer and 71.67 in monsoon season. The total annual average of these fauna calculated as 71.23 No./l during the investigated period.

Among Rotifers from village pond *Trichocera longiseta, Keratella cochlearis, Keratella quardata, Brachionus bidenteta* were noted during the investigation period. The average monthly population of all these individual members of rotifers fluctuates between 5-35 No./l. The total average monthly population of rotifer recorded between 45-110 No./l of which highest was noticed in Apr.2012 and least in Aug.2012 and in Jan.2013.

The rotifers noticed as average as 70.00 No./l in winter, 80.00 No./l in summer and 51.67 No./l in monsoon. The total average of these rotifiers noted as 67.22 no./l during the period.

Cructacean were noted as main zooplankton fauna in comparison to above both because their no. and species were found greater. In Arthropoda mainly the crustacean was noticed among which *Daphnia carinata, Diaptomus glacialis, Eubranchipus, Stenocypris malcomsoni, Cyclops sternus, Cypris, Moina and Bosmina* were present in both village ponds. All crustacean monthly average population ranges between 5-35 No./l in Devikund Sagar village pond. In Devikund Sagar pond the total monthly average population fluctuated between 55-160 No./l the highest were recorded in Oct.2012 and lower value in Mar. and Apr.2012.

The total average of seasonal and annual population of crustacean noted as 85.83 No./l in winter, 65.00 No./l in summer and 143.33 No./l in monsoon. The total average annual population of three crustacean noted as 98.05 No./l which were highest in congone to above both zooplankton (protozoan and rotifer).

Zooplankton constitutes the major group of an aquatic ecosystem. During the sampling pond the zooplankton population represents Protozoan's (mastigophora and ciliata) rotifers and arthropods (crustacean). The average value of the zooplankton population is represented in No./l. The data of Devikund Sagar village pond are shown in table no.1.

Table no. 1. Monthly average values of Zooplankton population (No. /l) in Devikund Sagar Village Pond, Bikaner during Jan.2012-Mar.2013.

Months Zooplankton	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**
Protozoa															
Euglena acus	15	10	10	25	NIL	NIL	NIL	20	30	25	30	20	15	5	10
Euglena spirogyra	10	NIL	15	20	NIL	NIL	NIL	15	30	15	20	10	15	NIL	10
Chilomonas (Param.)	30	15	10	15	NIL	NIL	NIL	30	15	20	15	20	30	20	15
Paramecium caudtum	25	35	10	40	NIL	NIL	NIL	15	20	30	35	15	30	20	10
Total Protozoans	**80**	**60**	**45**	**100**	NIL	NIL	NIL	**80**	**95**	**80**	**100**	**65**	**90**	**45**	**45**
Rotifera															
Trichocera longiseta	15	30	35	40	NIL	NIL	NIL	20	30	20	15	20	NIL	NIL	10
Keratella cochlearis	NIL	10	20	25	NIL	NIL	NIL	15	20	NIL	10	20	15	10	20
Keratell aquadrata	20	10	NIL	30	NIL	NIL	NIL	10	5	20	30	35	20	35	10
Brachinous bidentata	15	30	20	15	NIL	NIL	NIL	NIL	NIL	15	20	15	10	30	15
Total Rotifers	**50**	**80**	**75**	**110**	NIL	NIL	NIL	**45**	**55**	**55**	**75**	**95**	**45**	**75**	**55**
Arthropoda Crustacea															
Daphnia carinata	20	25	20	10	NIL	NIL	NIL	5	20	15	25	20	15	20	10
Diaptomus glacialis	5	10	NIL	5	NIL	NIL	NIL	10	15	10	20	15	10	5	15
Eubranchipus	5	15	5	10	NIL	NIL	NIL	NIL	NIL	20	25	30	10	20	25
Stenocypris malcomsoni	10	10	NIL	5	NIL	NIL	NIL	10	15	20	20	15	NIL	10	5

Cyclops sternus	15	20	10	10	NIL	NIL	NIL	20	30	35	25	20	15	15	10
Cypris	10	15	5	NIL	NIL	NIL	NIL	25	35	30	20	15	10	15	NIL
Moina	5	5	10	10	NIL	NIL	NIL	15	10	15	10	NIL	5	5	10
Bosmina	10	NIL	5	5	NIL	NIL	NIL	20	25	15	10	10	NIL	10	5
Total Arthropods	**80**	**100**	**55**	**55**	NIL	NIL	NIL	**105**	**150**	**160**	**155**	**125**	**65**	**100**	**80**
Total zooplankton	**210**	**240**	**175**	**265**	NIL	NIL	NIL	**230**	**300**	**295**	**330**	**285**	**200**	**220**	**180**

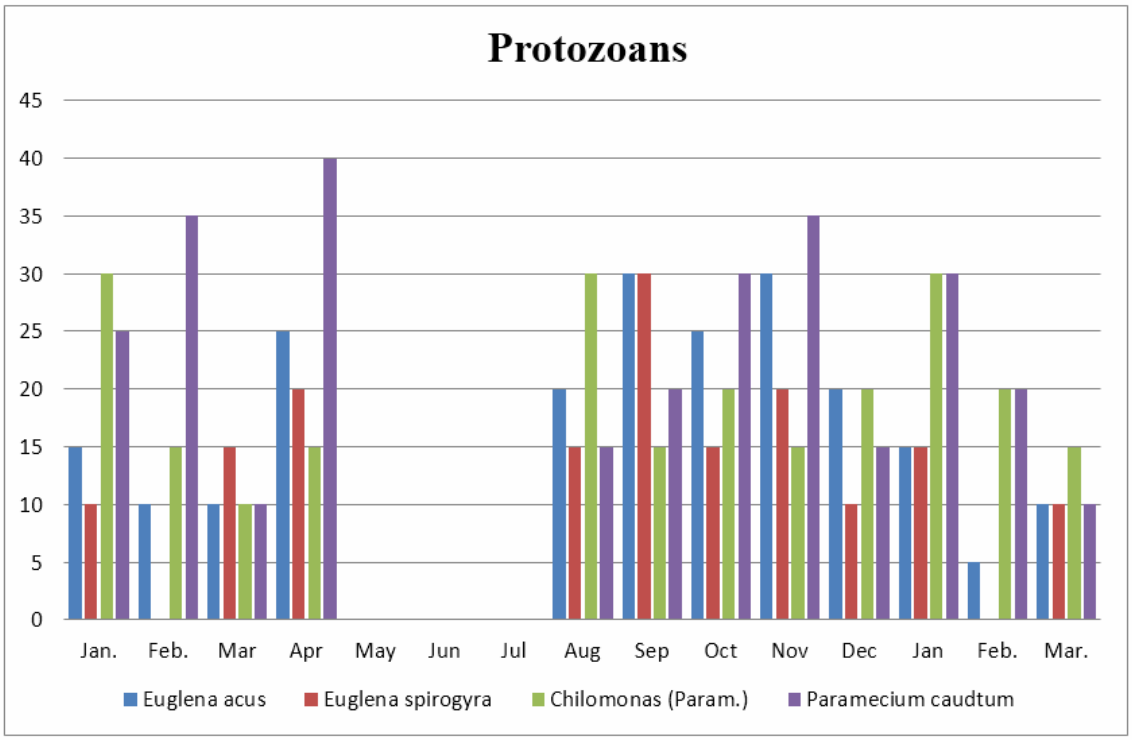

Figure-1: Total Protozoans (No. /l) in Devikund Sagar Village Pond, Bikaner during Jan.2012-Mar.2013

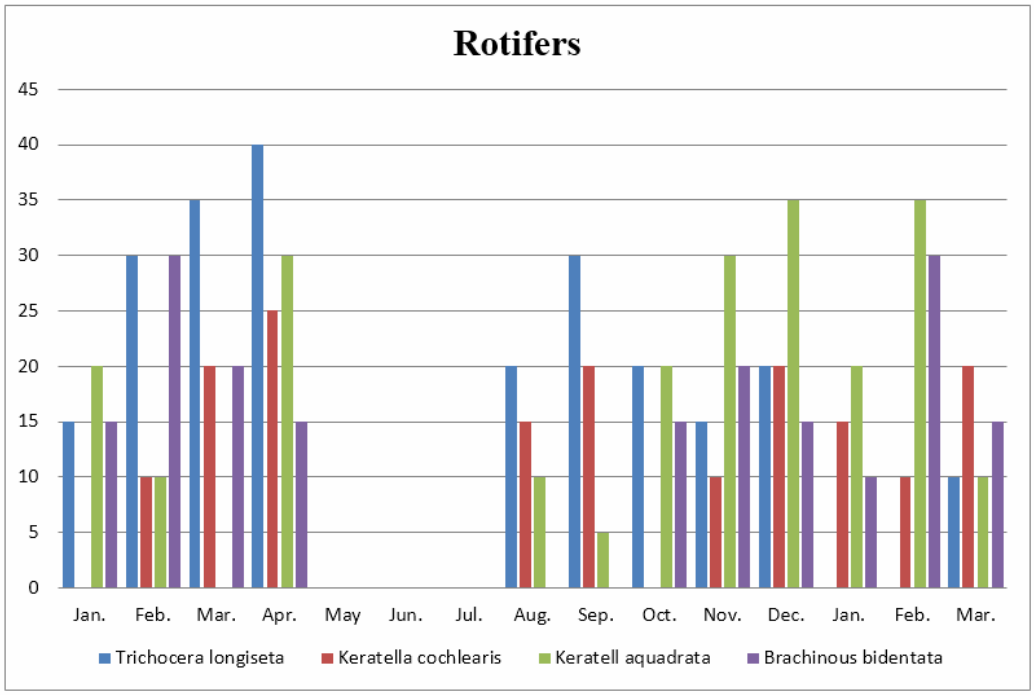

Figure-2 : Total Rotifers (No. /l) in Devikund Sagar Village Pond, Bikaner during Jan.2012-Mar.2013

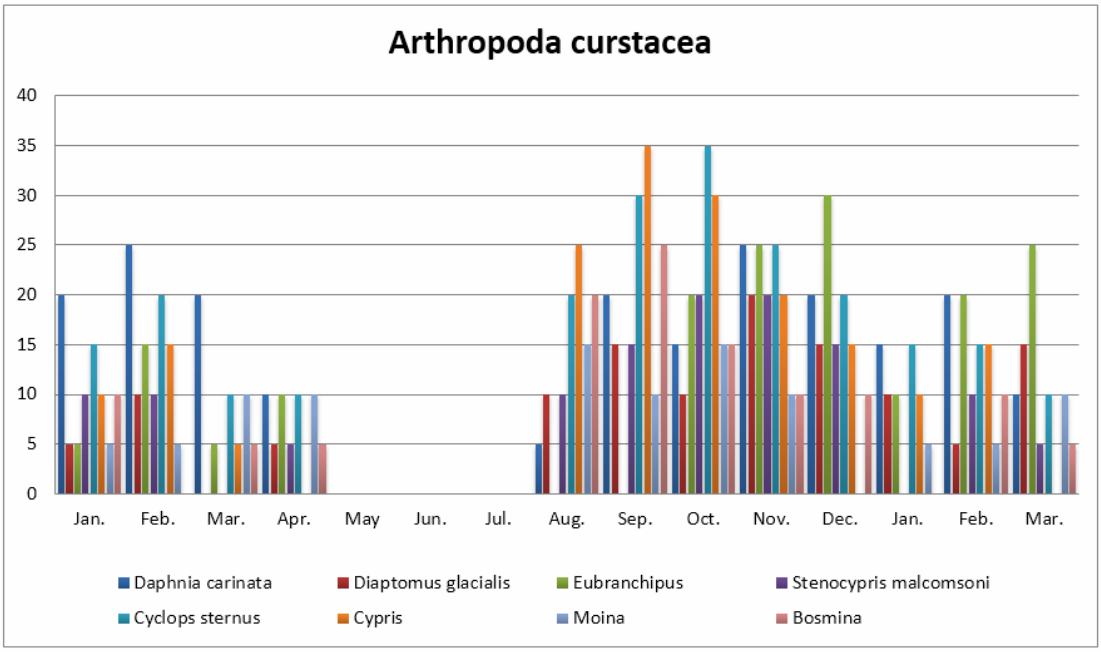

Figure-3 :Total Arthropoda crustacea (No. /l) in Devikund Sagar Village Pond, Bikaner during Jan.2012-Mar.2013

IV. CONCLUSION

It is concluded that the diversity and number of zooplankton communities were found in sufficient amount at Devikund Sagar pond, Bikaner. The diversity and number of zooplankton communities are dependent on favourable ecological conditions and suitable habitat. Since zooplanktons are the important living organism of aquatic ecosystem therefore conservation of the diversity and density of zooplankton should be considered as one of the major objective for proper management of a water body.

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