Comparative Survey of Zooplankton in Wetlands of Junagadh

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Abstract: *Planktonic organisms are an important food resource of pelagic ecosystems, but they also serve as an integrator of hydroclimatic forcing. Zooplankton act as important components of food chain of any water reserviour and some specific species also act as an indicator for various habitat conditions or very suspteblie towards the change in the quality and quantity of any wetlands. The survey was carried through the collection and comparision of species and identifying them under microscopes through their movements and external features.*

Key words: *Ecosystem, Food chain, Indicators, Habitat, Zooplankton.*

1. INTRODUCTION

Zooplankton (Greek: Zoon, animal; planktos, wandering) are myriads of diverse floating and drifting animals with limited influence of locomotion. Majority of them are microscopic, unicellular or multicellular forms with size ranging from a few microns to a millimeter or more (S.C.Goswami., *et al* 2004). The study of freshwater zooplankton is known as Lemniology.

Planktons are also well-known as holoplankton and meroplankton; the earlier remain planktonic throughout their life and the latter for a short period of their life, e.g. **Glochidium** larvae of freshwater mussels. Planktonare occasionally referred to by their habitat. The Planktons from ponds are called heleoplankton, of lakes limnoplakton of running water potamoplankton (rheoplankton) and of salt water haliplankton. The pseudoplanktons are those which occupy the upper layer of water accidentally. In response to the physico-chemical changes of their environment, well-marked changes occur in the plankton populations in different seasons. Zooplanktons play a vital role in wetland ecosystems as part of food chain. There are many species of zooplankton which act as an indicator of water quality and wetland ecosystem as well as pollution markers. Individuals of the same species may develop different structures, e.g. spines and processes. In **Brachionus**, a rotifer, five different forms have been reported from the Punjab waters during different seasons. The helmet of **Daphnia** sp. is a very well-known example of this kind. Such seasonal changes occurring in the body form of a plankter are called "cyclomor".

The zooplankton plays an important role to study the faunal Bio-diversity of aquatic ecosystems they include representatives of almost every taxon of the animal kingdom and larvae (meroplankton). They Feed on phytoplankton and facilitate the Conversion of plant material into animal tissue and in turn constitute the basic food for higher animals including fishes, particularly their larvae (S.C.Goswami., *et al* 2004). Crustaceans are abundant practically everywhere in the sea. They are the aquatic counterparts of the terrestrial insect. It is indeed difficult to take a bucketful of sea water free of one Crustacean or another. The reason for this abundance is that crustaceans form a very important link connecting the primary carnivores.

2. STUDY AREA

Study was carried out in the March 2010 to April 2011 in two different wet lands in Junagadh city. During my study work I took sampling from two different wet land sites namely- Study Site I Narasih Mehta Pond and Study site II Sundersan Pond.

2.1. Study Site - I

Narasih Mehta Pond is situated near the Central Bus Stand in Junagadh. Its total area is divided into three parts by Municipal Corporation (Survey No. 43) of Junagadh. They were:

221(I) area 26 ha & 0.1 gutha

221 (II) area 14 ha & 24 gutha

221 (III) area only & 0.37 gutha

Maximum depth of this point is 6.5 meter approximately there are located many population of water hyacinths plants. The people used to water for bathing, washing and other purpose from Site – I, and Site – II

2.2. Study Site – II

Sudersan pond at Junagadh built (or repaired by emperor Chandragupt in 4th century B.C) to make the Girnar decorated and seen to be beautiful from Uparkot. The shape of the lake was seemed to be like the alphabet.

2.3. Temperature and pH:

During the period of 2007-2011 the mean monthly maximum temperature various from 43.5 Cº and the mean monthly minimum temperature from 11.4 Cº the highest temperature 43.5 Cº were in the month of May 2007 and the lowest temperature 11.3 Cº being in the month of January 2011. In the present study the maximum pH value was recorded as Sudersan pond and minimum was recorded Narasih Mehta.

3. MATERIALS AND METHODS OF COLLECTION

There are two main methods of zooplankton collection, which are as follows; through various gears and through hand collection of water sample by using bottle. The zooplankton collection involves primarily the filtration of water by net, collecting the water in bottles /water samplers or by pumps. I used the bottles to collects water sample. Then these samples of water were analyzed by using self illuminating microscopes for identification of zooplankton species. For identification of very common and abundant forms from a particular area, the live specimens are put in a drop of distilled water and examined under the microscope. To control the movements of the specimens narcotisation was done (S.C.Goswami., *et al* 2004). According to the movement and pattern of motion as well as various size and shape zooplankton were identified by using zooplankton guide "Zooplankton Methodology, Collection & Identification – a field Manual" (S.C.Goswami., *et al* 2004). The collection of sample was carried out during morning and evening monthly. The collection time or duration of sampling plays an important role to capture the zooplankton of noctournul and diurnal. The sampling success will largely depend on the selection of a suitable gear; mesh size of netting material, time of collection, water depth of the study area and sampling strategy. The gear should be used keeping in view the objectives of the investigation.

3.1. Fixation and narcotisation

The necessity of proper fixation and preservation of zooplankton needs no emphasis. The poorly fixed and preserved samples would render their subsequent analysis difficult. The whitish precipitate and ruptured exoskeleton can be seen in the improper fixed samples. The zooplankton deteriorates rapidly in tropics. After the sampling, the fixation of samples should be carried out, as early as possible, atleast within 5 minutes after the collection to avoid damage to animal tissue by bacterial action and autolysis.An ideal fixative should be cheap and which kills animals quickly. Again it should be non-corrosive or toxic in nature. The most common fixing and preserving reagent is (4-5%) formaldehyde (formalin).It is the cheapest fixative and zooplankton sample can be stored for number of years. Fixation was carried out to identify some zooplankton species which is more active in movement in live sample.

4. RESULT AND DISCUSSION

Total 11 species of zooplankton were recorded during my work of study, out of which four species belonging to phylum Arthropoda, six species belonging to phylum Protozoa and one species of phylum Annelida were recorded within two wetlands of Junagadh city.

It shows that the species of *Reussella spinulosa and Tintinid* were found only in sudersun pond and not in Narsih Mehta pond. The *Vorticella microstoma, Polychaete larva, Coscinodiscus marginatus, Ceratium* found only in Narish Mehta pond and not in Sudersun pond (table 1).

Table1. *Showing comparision of recorded species*

NO.	Species Name	Sudarsun pond	Narsih Maheta pond
(1)	Coscinodiscus marginatus	-	+
(2)	Reussella spinulosa	+	-
(3)	Globigerinoides sacculifera	+	+
(4)	Tintinid	+	-
(5)	Ceratium exiensum	-	+
(6)	Globigerina bulloids	+	+
(7)	Evadne	+	+
(8)	Polychaete larva	-	+
(9)	Vorticella microstoma	-	+
(10)	Daphnia pulex	+	+
(11)	Eucyclops agilis	+	+

(In table 1 + Presence and – shows absence of species)

Fig.1 No. of Common & Peculiar species found in both wetlands.
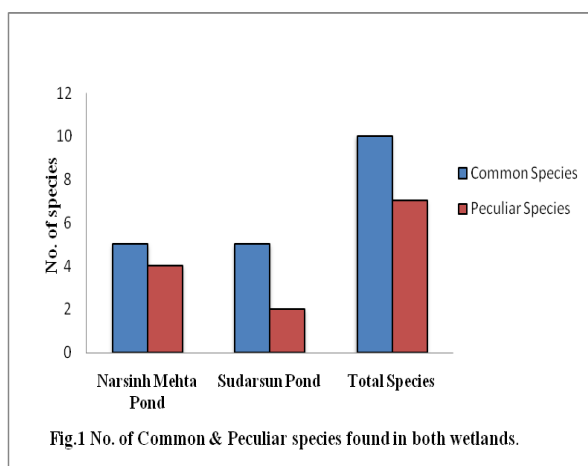
Figure 1 shows the Number of Common zooplankton species and peculiar zooplankton species in both the wetlands (Narsinh Maheta and Sudersun wetland). The most common five zooplankton species recorded in both wetlands. Wheras four peculiar zooplankton species recorded in Narsinh Maheta wetland and two in Sudersun wetland.
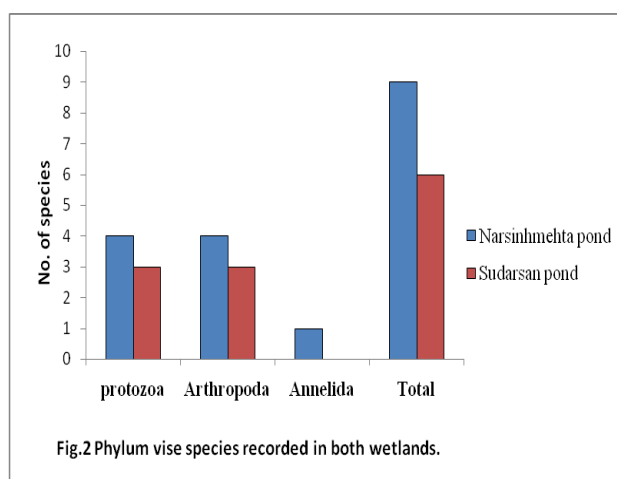

Fig.2 Phylum vise species recorded in both wetlands.

Figure 2 shows the phylum vise number of zooplankton species recorded in Narsinh Maheta and Sudersun wetlands. The maximum number of species found in narsinh Maheta pond including three different phylum namely protozoa-4, Arthropoda-4, Annelida-1. In Sudersun wetland three protozoa, three arthropodaspecies recorded. The total number of zooplankton species recorded in Narsinh Mehta wetland was nine out of eleven species where as in Sudersun pond six species of zooplankton were recorded.

5. CONCLUSION

In Narasih Maheta pond we found *Coscinodiscus marginatus, Globigerinoides sacculifera, Ceratium exiensum ,Globigerinabulloids, Evadne, Polycheatelarva, Vorticella microstoma, Daphniapulex,*

Eucyclopsagilis while in Sudersun pond we found some other different species like *Reussella spinulosa, Globigerinoide ssacculifera, Tintinid, Globi-gerina bulloids, Evadne ,Daphnia pulex, Eucyclops agilis. So,* it was concluded that the presence of *Reussella spinulosa and Tintinid species* in Sudersun pond indicates the suwage mixing in the water of this wetland. Wheras the presence of *Vorticella microstoma, Polychaete larva, Coscinodiscus marginatus, Ceratiumfound* only in Narish Mehta pond indicates algal bloome pollution in the water.

It was also concluded that the zooplankton plays a vital role in food chain of wetland ecosystems. It also observed that the presence of particular species act as an indicators for many environmental conditionas well as the water quality maintanence.

By this way the presence of some zooplankton shows particular quality and habitate condition and act as a Bio-indicator for that.Therfore due to the presence of these above species Narasih Maheta pond polluted by algal blume and hence four indicator species for that algal pollution were found which were absent in Sudersun pond. The presence of two suwage indicator species indicates the suwage mixing in the Sudersun pond. So these kinds of survey may helps in environmental management and water quality assesment for the sustainable use and maintainance of wetlands in future.

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I am **Vibhuti Raval,** and working in the field of research in zoology subject. I am Saurashtra University Rank holders through out in B.Sc and M.Sc Zoology. Currently, I am pursuing Ph.D. in Zoology from Saurashtra University, Rajkot. I am very much interested to work within the field of conservation of biodiversity and habitat management. I am very much passionate to do field work within any difficult lanscapes or forest habitats as I am a sport player. I am also able to create awareness to regional people for the biodiversity conservation.