प्रथम अध्याय

Chapter - 1

INTRODUCTION & REVIEW OF LITERATURE

During last time to six decades modern civilization has created a serious threat on quality of environment. Rapid Urbanization, expanding industrialization and bulging population growth caused imepairable loss terrestial, aerial and aquatic environment. Due to such determination to environment has made all sorts of life viz terrestrial, aerial and aquatic life.

The massive attack on environment by rapid technological studies, "Green Revolution" deforestation and menace of. Urban densification have already inflicted appreciable damage on the quality of natural water resources. (Banerjee & Motwani 1960, Arora, 1966, Allan 1971, Saxena & Bhargava 1981, Shalini 1994).

Water is an absolute basic requirement for sustenance of healthy life, therefore it is consdened tobe 'Elixir' of life. First known life form has its existence in aquatic environment. It is used as uneversal soluet in domestic agricultural and industrial activities. Due to rapid civilization and excessive population growth, threat to all types of water bodies has developed.

The water constitutes approx. 70% of total area of the earth and rest is

occupied by the terrestrial area. Out of 70% of total area only a very small portion is freshwater which is mostly used for the human activities. Ocean contains about 97% water, 2.1% water is locked in the forms of ice caps and glaciers and called as bound water and the remaining 0.9% water is found in the rivers, lakes ponds and ground water reserves. (L'vovitz, 1978, Behura, 1981). Potable water is therefore an essential commodity with limited availability. Water is thus scare commodity and its getting scares everyday as the communities, industries and agricultural discharge their filth mack and harmful wastes into nearest aqatic ecosystems just like sink.

The interaction between human society and aquatic environment has become a quite a serious problems in contemporary world, the depletion of non- renewable resources like water are quite evident at all level, the global, regional and local. In recent past water pollution is posing a challenge to the scientists, engineers, technologists, economists and ecologists increasing population in India day by day is exerting a problem in control of pollution.

In India only 15 percent of the total population have clean, drinking water and the rest 85% quench their thirst from polluted takes and tanks, rivers and ponds. Due to failure in recharging of groundwater our potable water resources are depleting very fast. No wonder in very near future water shortage will evoke struggle among the people.

Modern civilization and lust for rapid urbanization aggravating situation fast. Human non scientific attitude is possing severe threat to aquatic bodies and in turn affecting aquatic fauna hand to survive. Population overload resulted rapid urbanization and industrialization which in turn generated huge garbage, toxic effluents and useless waste materials and all these toxic degradable and nondegradable materials are routed to nearby large or small water bodies making them almost impossible to survive therein. These pollutants change physico-chemical properties of water and affecting adversely all biological process.

In India rivers have played significant role in nurturing our civilization. Almost all big and important cities are established on the banks of some river and are being polluted heavily by the natives of these cities. River Gomati and Sai are the two important rivers of district Jaunpur and several riuvlets merge into these two rivers at different points. Industrial areas at Satharia, Siddiquepur, Kerakat, and Trilochan of Jaunpur have direct or indirect connection to these two rivers. Several studies on physico-chemical properties and flora of these two rivers have been doneby a little among of attention has been made to study the impact of urbanization on quantitative and qualitative survey of zooplanktons.

The ecologically unplanned urbanisation and rapid industrialization

are creating serious pollution problems in the country. Due to rapidly spanding industrialization and excessive population growth, most of our rivers and lakes, streams and other water bodies are being increasingly polluted industrial effluents containing chemicals of different types heavy metals from diversified factories, agricultural run off containing pesticides, domestic wastes containing detergents and numerous pathogenic and non-pathogenic arias the major pollutants which degrade the quality of our water bodies.

Many industrial by-products, wastes and pesticides are non-bio-degradable and get concentrated to toxic level in organisms of hightropic level through food chain. The range of industrial pollutants are very wide. On the basis of certain common characteristics they canbe broadly categorised to three major groups :

(i) Those containing solid matter in suspension but little or no polluting solid matter in solution.

(ii) Those containing solid matter in suspension and polluting substances solution such as waste water from tanneries diaries, fermentation alkaloid conducting industries etc. and

(iii) Those in which the polluting substances are mainly in solution eg. waste waters from gas works and electroplating industries.

The physico-chemical production and biological life of the water bodies receiving the effluents are changed drastically. The nutrient value of natural water is increased by addition of sewage, agricultural and organic industrial waste. The increased nutrient status of the water bodies is ecologically termed as Eutrophication of water quality for domestic, recreational and other uses. Survival growth and reproduction of aquatic fauna requires a fresh water medium (Kannan' 1991). The fresh water bodies may be used for drinking, washing, bathing, navigation, aquaculture, irrigation, industrial and domestic purpose.

Several water pollutants like industrial effluents domestic sewage and sludge, agricultural (runoff) chemicals wastes have their way to large water bodies. This results into pollution of river water. Polluted water play an important role in the transmission of diseases and also in reduction in oxygen contents of natural waters. Organic waste provide rich sources of nutrients for the growth of bacteria and fungi. The rapid growth of these causes O_2 depletion from water. Such depletion in O_2 content poses a serious health problem to aquatic organisms. More than half the population of our country depends largely on rivers or lake for their drinking water need. Therefore, legislations requires a pretreatment of industrial and sewage water prior to dumping into rivers or streams. However, these treatment plants never perform a 100% removal of pollutants from the effluents. This results into

irrepaidable damage to the aquatic life living there in.

In India all rivers intercepting densely populated cities have become polluted in segments. Major rivers like Ganga, Yamuna, Godawari, Narmada, Kauvery, Kalindi, Sone, Mahi, Mahanadi, Saryu, Gomati and Sai all are bearing a serious pollution problems (Sharma' 1994).

River Gomati & Sai at Jaupur is mainly polluted by municipal sewage & garbage fluents. Due to this on abundance growth , reproduction & development pattern of Zooplanktons that in deleterious health problems for aquatic fauna.

The alteration in physico- chemical properties of water and addition of organic and inorganic ingradients of pollutants may cause the depletion of dissolved oxygen (DO) content and recycling capacity of water enhances the organic load. Such physico- chemical alterations may change several biological properties and effect the biotypes qualitatively as well quantitatively. Their abundance, growth reproduction development patterns may greatly be influenced.

River and Wetlands i.e. lakes, Jheels, beels etc. have a variety of linkage for energy and nutrient exchange with surrounding watershed and air sheds. The inland fresh water ecosystem both lentic and lotic are being increasingly subjected to greater stress from various human activities.

(Wood & Gibson 1974; Hemasundaram 2003). The entrophication of water means enrichment and nutrients and the resulting degradation of its quality accompanied by luxuriant growth of micro and macrophytes is recognised as a major problem in the developed as well as in developing countries. The enrichment of nutrients occurs due to the disposal of domestic and farm sewage, industrial effluents and from the run off from surrounding areas. Vollen weider (1968) pointed out that the domestic sewage is a major source of entrophication.

The biology, ecology and Physico- Chemical characteristics of aquatic habitats have been studies in detail in India by Sharma et al (1978). A good amount of work has been done on different aspects of limnology of Himalayan lakes (Quadri & Yusuf 1978; Sharma & Pant 1979; Negi & Pant 1983, Sarwar and Wazir 1991; Sharma et al 2003; Sharma & Verma 2003) On the limnology of water bodies in southern India, the works of Ganpati (1957); Ramana and Sreeramalu (1994) and Sivkumar et al (2003) are worth mentioning. Limnological studies of polluted water bodies were studied by Sharma et al (1978) Bhatta and Pathak (1989), Das & Sinha (1994).

Although considerable investigations have been made by the researchers but a little information is known about the systematic limnological studies in Southern W.B. However, it is important to note that

no qualitative & quantitative or ecological study onlimnology was made so far from river Gomati and Sai. Of the two rivers Gomati & Sai received various types of sewage i.e. domestic sewage, Cattle shed sewage etc. hence on attempt to into the different physico- Chemical Characteristic of water of two rivers Gomati & Sai was undertaken in the present investigation for a period of two & half years (Dec. 2005 to July 2008).

OBJECTIVE OF PROPOSED WORK

In the proposed research study our aim is to investigate qualitative and quantitative distribution pattern of zooplanktons at different sites of river Gomati and Sai in Jaunpur District. It is also aimed to study the impace of municipal sewage and garbage load on abundance growth, reproduction and development pattorn of zooplanktons.

The changes in aquatic biota have been used as a criterion to estimate pollution (Palmer, 1967). The planktonic concentration in a river forms an importance parameter for pollution studies.

Zooplanktons are the integral part of lotic community and contribute significantly to biological productivity of fresh water ecosystems (Makerewiez and Likes 1979). The abundance of some zooplanktons as intermediates in aquatic food web is supposed to be an indicator of gradual eutrophication of the system. These organisme are good experimental tools

for ecotoxicological studies to determine the ecological health of the system. Seasonal variations profoundly affected the zooplankton population in Gomati and Sai water.

Thus the zooplankton represents one of the most important group of aquatic animals in relation to fish particularly with respect to food. The majority of economically important fresh water teleosts are known to pass through stager in their life history when they subsit on zooplankton for food. Besides many adult species of commercially important major crops are teported to feed selectively on these organisms.

About the knowledge of zooplanktons of fresh water in India a few contribution have been made by Sewell (1934), Philipose (1940), Ganpati (1943), Alikunhi et. al. (1955), Das and Srivastava (1965), Moitra and Bhattacharya (1966), Nayar (1968), Senayya (1971) and Patnaik (1973).

- Willingham and Anderson (1967) discussed about the passibility of monitoring the phototactic response of microcrustaceans like Daphnia and Altermia.

- Martimer (1941) found that the reduction of the mud (bottom sludge) surface and the associated increase in supply of solutes to the water may be expected to angment plankton production.

- Hynes (1960) points out that the reaction of different organisms to

different aspects of organic pollution varries considerably.

- Bilgrami and Datta Munshi (1979) have made the limnological survey and reported the impact of human activities on the river Ganga from Barauni to Farakka.

- Chandra (1985) has reported the river pollution problem and deteriorating impact on inland fishes and aquatic life in India.

- Green (1960) reported zooplankton of the river 'SOKOTO'.

- Hynes (1970) and Rai (1974) reported downstream loss of zooplankton due to adverse processes the control the influx of these from the source areas.

- Prakash (1993) has performed the Physico- chemical and biological study of four rivers of Bareilly.

- Rzoska (1976) reported strong influence of upstream reservoirs on the development of zooplankton in the Nile rever system.

- Shiel and Walker (1984) found alteration in the flow region of river regulate zooplankton in rivers.

- Saunders and Lewis (1988) observed the flow regim of river regrlate zooplankton in rivers.

- Unni and Naik (1997) have investigated the distribution and ecology of zooplankton in the headmaters of a tropi call river Narmada (Central India).

- A Khan et al (1986) investigated polluted pond at Aligarh with reference to population of zooplanktons in different seasons and got significant decreasing correlation of zooplanktonic population with pollution.

- The fluctuation in population density of surface zooplankton with some selected physio-chemical parameter are extensively studied (Ahmad and Ali Raja, 1992, Bhatt and Waghm 1992, Bist andChatto Raj 1992, Shegal et al. 1992).

1.   Physico-chemical properties such as pH, alkalanity, temperature, dissolved oxygen, free CO_2 and ions like $Na^+, K^+ Ca^{+2}, Cl^-, SO_4^{-2}$ and PO_4^{-3} , in water at different sites.

2.   Qualitative and quantitative analysis of zooplanktons sites.

3.   Seasonal variation in zooplanktons distribution.

4.   Statistical analysis of data obtained and comment for better understanding of causes and effects.

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