THE THEORETICAL STUDY OF TROPICAL PADDY FIELDS IN SARAN DISTRICT

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ABSTRACT

The scope of plankton study is immense involving such diverse system as lakes, ponds, bogs, paddy fields, streams and rivers. Each has its own peculiarities and is populated with a community that has specific adaptations not only to cope with the prevailing condition but the entire life history of such organism is modulated in a way as to survive seasonal fluctuations and extreme conditions. Water is the essence of life on earth and totally dominates the chemical composition of all organism. The ubiquity of water in biota, as the fulcrum biochemical metabolism rests on its unique physical and chemical properties.

INTRODUCTION

A basic feature of the earth is an abundance of water, which extends over 71% of its surface to an average depth of 3800m over 99% of this immense hydrosphere is deposited in occur depressions. The relatively small amounts of water that ocean in freshwater bodies belie their fundamental importance in the maintenance of terrestrial life.

The real freshwater supply is in reality much smaller than the potential total because of many factors. First, rainfallis not evenly distributed over land surfaces and humans themselves are not distributed land in proportion to water availability. This disparity results in a great expanse of resources and energy for distribution system to move water from places of water abundance to places where it is inadequate to support human activities. Seconds total consumption has increased exponentially with demotechnic growth. Expansion of distribution systems to areas of low precipitation, such as for irrigation of semiarid regions, results in disproportionately high use of water because of very high losses by evapotranspiration.

Third, potentially the most serious factor stemming from demotechnic growth is the severe degradation from contaminants of water quality. The effect is a severe reduction of water supply available for other purposes.

Fresh waters of the world are collectively experiencing markedly accelerating rates of qualitative and quantitative degradation. Certain societies can cope, at least temporarily, with pollution and availability constraints and can even reduces freshwater degradation. In most of the world, however human population growth continues without Significant reduction rates. Until human growth and consumption is stabilized, one hopes by the mid twenty first century, either by intelligence or catastrophes, further loses and partially on a global basis. Control and reversal of degradation requires a proper economic and social valuation of fresh waters. With proper valuation methods for effective utilization of existing, finite supplies can be applied to agricultural, industrial and residential uses.

Freshwaters still save purposes other than water supply, such as recreation, transportation systems, asthetics, and others. However, .the demands of exponential demotechnic growth clearly receive total precedence over uses of fresh waters for other purposed. The most fundamental laws of resource utilization may be recognized by most agencies and industries, but they are not being implemental significantly. The remarks above, although pessimistic, accurately assess existing pattern of utilization of our water resources. It is clear that demotechnic growth will continue to impose increasing demands upon freshwater supplies either until inefficient utilization creates a disastrous situation threatening the survival of a major segment of human race or until the expenditures of energy needed to obtain water exceed tolerable operational levels. Looking back at the repetitions history of responses to impending environmental disasters, we can be optimistic about the future only until such time as our understanding of the operation of the biosphere and our knowledge of freshwater ecosystems in particular, is adequate to allow us to recognize the joint of irreversibility. As one reflects on the progress that has been made in freshwater biology since its inception a century ago, It becomes apparent that the time available for understanding freshwaters is disconcertingly limited. We need to intensify study of and time to understand freshwater in systems sufficiently to judge their resiliency and capacity for change in response to exponential demotechnic utilization and loading of contaminants. Existing understanding of freshwater ecosystems must be extended to a greater percentage of the population being educated so that this information can be effectively fused into the population at all levels.

It is of the utmost importance, therefore that we understand the structure and function of freshwater ecosystems. Humans are a component of these ecosystems, and this effects on them will increase markedly until demotechnic growth is stabilized. Emotionalism and alarmist reactions to the momentum of exploitation of the finite biosphere by the technological system accomplish little and as has been demonstrated repeatedly, are often antagonistic to improvement strict. Conservation and isolation of resource Parcels, in the belief that such areas are exempted trom technological alterations of the atmosphere and water supply, are native and little to solution of the overall problem understanding the metabolic responses of aquatic ecosystem is essential in order to confront and offset the effects of these alterations and in order to achieve maximum, effective management of freshwater resources. All waters of course, cannot be managed directly, Rather, an integration of human growth and utilization with the metabolism of fresh water is required to minimize detrimental changes. A well documented effect of human impact upon aquatic ecosystem is eutrophication, a multifaceted term associated with increased productivity, simplification of biotic communities, and a reduction in the ability of the metabolism of the organisms to adapt to the imposed loading of nutrients. These conditions lead to reduced stability of the ecosystem. In this condition of eutrophication excessive inputs often exceed the capacity of the ecosystem to be balanced. In reality however, the ecosystem are out of equilibrium only with respect to the freshwater chemical and biotic characteristies that are desired by humans for specific purposes. In order to have any hope of effectively integrating humans as a component of aquatic ecosystems, and of monitoring their utilization of these resources, it is mandatory that we comprehend in some detail the functional properties of freshwaters.

Bihar is land-locked state situated on the eastern part of India. It is situated between 83°-30' to 88''-00 longitudes. The state is roughly quadrilateral in shape situated on the north-east side of India. It share international border with Nepal in its north, Uttar Pradesh on its west, West Bengal in the east and newly carved state of Jharkhand on its south. The entire state lies in the very Fertile Gangetic Plains and covering an area of

94163.00 sq. Kms. The mighty river Ganga divides Bihar into Patna i.e. northern and southern Bihar.

The population of the state is about 828 million Per 2001 census with a population density of 880 persons per Sq. Km which is over two times of the national average of 325 persons/Sq. Km. many major rivers like Ganga, Kosi, Sone Bagmati, Gandak and Punpun flow across the state. The state has been facing challenges on account of poverty, unemployment, literacy, malnutrition inadequate health services and rapid degradation of national resources. Bihar is also prone to recurrent natural disasters like flood and drought, heated spells and cold wave. About 80% of the population live in rural areas and about 90% of the population works in the agriculture and allied activities like fisheries, dairy, poultry etc. The number of the people living below poverty line in Bihar is about 42% against the national average of 26%.

PHYSIOGRAPHY

Physiography of rural Chapra

The Rural area of Baniapur lies in northern most part of Saran and has unique geographical stature. Saran district occupies an area of 2641 sq. kms. And stretches between 25°36' longitude to 26°13' middle north. The district is divisible into 3 sub divisions and 20 CD Blocks. Baniapur is one of the block in Saran district with contrasting physiographic features and thus, accordingly impart great vibrancy to existing Icthyofauna and flora Baniapur rural areas with very rich inland water resources, add to the splendour of unsurpassed beauty besides, presenting an unrivalled biotic component. Baniapur block of Saran (Chapra) district is situated at the bed of the Ganga, Ghagra and Gandak.

Variability in temperature ranging from 9.2 - 41.3° C in some paddy fields of rural Chapra. Permanent water loging area including various ponds, puddles, wetland (chawar) is approximately 32639 acre and 58 decimal.

The average rainfall of Saran district is 109.3 mm. This wide range of physiographic and climatic differentiation provides sustainability and diversification of resident flora and founa.

The paddy fields of rural Chapra (Baniapur) not only add upto fish fauna diversity but are also a source of allochthanous food supply to the inhabiting fish fauna along the different lentic systems. Paddy fields of Baniapur, Basanhi, Bahiara, Hafizpur, Basantpur. Dadibadi, Sahajitpur, DhaneshChapra, ShambhuChapra, Kolhua, Dhangarha, Pandey Tola, Moujegaon has been investigated for its fish faunal diversity, biotic and abiotic component.

PADDY FIELDS

The rural Chapra constitute large no. of paddy fields which are permanent flood plain wetland.- Due to its separate ecological features it is considered as chewar. (A low-lying area with permanent water logging zone). Therefore, these areas tend to be cultivated with late maturing variety of paddy, probably with a taller growth habit. At the extreme level of flood, fauna often cultivated floating rice, with long stems that grow with the rise of water. Use of larger stemmed and longer maturing traditional variety allow a higher water table and an extended fish farming. An opportunities for further increased production in the flood prone ecosystem is the fish paddy culture. These areas of the rural Chapra are seasonally flooded during the monsoon and remain submerged annually. Hence, in this concern the fish cum paddy production further ecological conservation with safe guarding agro-biodiversity (both paddy and fish fauna).

Table 1

Survey Areas of paddy fields water (Flood plain wetland) of rural Chapra

S.N.	Paddy Fields	Water Logging (Flood Plain Wetland)	Panchayat	Location	Survey Area (in hectare)
1.	Kolhua	Permanent	Sahajitpur	West to NH 101	83
2.	Basantpur	,,	Dhangarh	Besides Pond	47
3.	Baniyapur	,,	Block HQ	Besides Gas Godam	53

4.	Hafizpur	,,	Sahajitpur	Road Side	45
5.	Sambhu Chapra	,,	Basanhi	Road Side	127

Habitat Characters

The paddy fields of low laying areas of different part of rural Chapra has been divided into three zone. They are littoral, limnetic and profaundal zones.

The shallow water region with light penetration to the bottom, typically occupied by rooted plants is termed as **littoral zone**. The area of free water away from the influence of the shore and the bottom substrates is known as the **pelagic zone**. The dominant physico-chemical features of the littoral region are abundant light, fluctuating water levels and wind generated waves with their mixing effect on dissolved materials and disturbance of bottom sediments. In the littoral benthic region, light intensity is adequate for rooted macrophytes and attached algae. The extent of water movement determines the type of substrate and vegetation. The open water zone to the depth of effective light penetration (termed the compensation depth-depth at which photosynthesis just balance the respiration) is termed as the **limnetic zone**.

The limnetic zone experiences gradiations in the physical and chemical characteristics much more than the other two zones. The littoral and limnetic (pelagic) together constitute the **euphotic zone**. Conditions prevailing in the upper pelagic region include high light intensities, regular contact with air and there are no waves or currents. Lower pelagic region light is absent, there is no contact with air and there are no waves or currents.

The bottom and deep area which is beyond the depth of effective light penetration is termed as the profaundal zone. The characteristics physico-chemical conditions dominating paddy fields profaundal areas are the absence of light, long periods of uniform temperature, presence of fine sediments, absence of higher plants and any form of cover.

The food available in the form of plankton or the rain of detritus from the upper layers, and the low levels of oxygen during stratification and stagnation. In the profoundal benthic region waves have little effect and the substrate consists of fine silt or clay covered by layers of organic matter. The only motion at the mud surface is due to return currents. Chemical conditions vary according to stratification and other factors, with periodic deoxygenation. In paddy fields, the littoral zone is larger than the limnetic and profoundal zones. It is shown that the littoral zone is the chief producing region for paddy fields.

A diverse range of microhabitats were found in the standing water of rural Chapra. An interesting habitat was found in all investigated paddy fields, is the water surface itself, and the organism linked with this layer are known as **neuston**. Those associated with the upper surface of the water is known as **epineuston**. Those with the lower surface of the film as **hyponeuston**.

The benthic areas consists of the greatest number of microhabitats substrates. The littoral benthos comprises the basic materials which compose the shore itself, modified by the action of water, by drift materials, by plant growth, and bv organic deposits of more origin.

The organism associated with the free surfaces of objects submerged in water are termed as **periphyton**, while organisms living in or on the bottom are termed as benthos.

Plankton

A large number of organisms ontribute to the formation of the plankton community in freshwaters. The phytoplankton include representative from the photosynthetic algae, Bacillariphyceae, cyanophyceae, chrysophyceae, Xanthophyceae, Euglenophyceae and chlorophyceae some common phytoplankton found in the paddy fields water of rural Chapra.

The chief groups contributing to the freshwater zooplankton are the protozoans, rotifers, cladocerans, copepods and ostracods.

The zooplankton of the littoral zone is rather characteristics and differ from that of limnetic zone in the preponderance of heavier, less buoyant crustaceans which often cling to plants or rest on the bottom. Most of them have devices ' which prevent them from sinking.

SUMMARY & CONCLUSION

The water temperature ranged between 9.2 to 41.4 degree Celsius. The minimum water temperature of 9.2 degree Celsius was recorded during January, 2009 in the Kolhua paddy fields water whereas the maximum temperature of 41.4 degree Celsius was recorded at the DodewalTola paddy fields water during June, 2010.

The Turbidity was the lowest i.e. 29.8 cm at Bahiara paddy fields water during April, 2009 and its highest value of 180 cm was recorded at the same paddy fields water during November, 2009.

The lowest value of pH was recorded 6.0 at Kolhua paddy fields water during the month of October, 2010 and the highest value of 9.9 at Hafizpur and Kolhua paddy fields water respectively during the month of May and April 2009.

The lowest chloride was recorded 55 mg/L at Kolhua paddy fields water during the month of September 2009 while maximum value of 189 mg/L was recorded at Basantpur, SambhuChapra and Basanhi paddy fields water respectively during the month of May, July and May, 2010.

The alkalinity was recorded highest 235 mg/L at Kolhua paddy fields water during May, 2010 whereas the lowest value of 69 mg/L in Basanhi paddy fields water was recorded during January, 2009.

The minimum value of phosphate was.32 mg/L in Kolhua and Basantpur paddy fields water respectively during the March and February 2010 and the maximum value was .91 mg/L at the SambhuChapra paddy fields water during October 2010.

The highest value of D.0 was recorded 9.6 mg/L in the Kolhua paddy fields water during March, 2009 whereas the lowest value was recorded 4.4 mg/L in the paddy fields water of Kolhua and Bahiara during September 2010.

The highest BOD level 8.6 mg/L was recorded in Kolhua paddy fiels during July, 2009 whereas the lowest 2.9 mg/ L was found at Basantpur and Dhangarha paddy fields water during October and November 2010.

The highest value of FCO_2 was recorded 7.4 mg/L at Kolhua paddy field during August 2010 whereas the lowest value of .89 was recorded at Bahiara paddy fields water during January 2009.

The minimum value of TDS was recorded 188 mg/L at Sambhu Chapra paddy fields water during Decemnber, 2010 while the maximum value was observed at Kolhus, Baniapur and Hafizpur paddy fields water respectively in the numbers of months of 2010.

The highest value of EC was recorded 630 Mhos/ cm at Kolhua and Baniapur paddy ficlds water during March and July, 2009, While minimum value 264 Mhos / cm was recorded fromnKolhua paddy fiedis during Obetober, 2010.

The highest number of Protozoa was recorded 56 at Kolhua paddy fields water during May 2009 whereas the lowest value of protozoa was recorded 5 at the same paddy fields water during February 2010.

The highest diversity of rotifera were recorded 87 at Kolhua paddy fields water during 2009, whereas the lowest value was recorded 3 from Kolhua paddy fields water during February 2010.

Maximum number of cladocera were recorded 53 at the minimum number Kolhua paddy fields water where recorded 2 at the same habitat during September 2010.

The maximum number of copepod were observed 51 at Kolhua paddy fields water while minimum observed 4 at the same paddy fields water during September 2010.

The highest value of ostracodda were recorded 17 at Kholhua paddy fields water during May 2009 while lowest value observed 2 during February 2010, The zooplankton population showed Bimodel pattern of distribution i.c. two. mazima and two minima in a year.

The highest number of Bacillariophyceae were recorded 101 at Basantpur paddy fields water during February 2010 while lowest number was observed 5 at Kolhua paddy fields water during November 2010.

Maximum value of chlorophyceae were observed 79 at Kolhua paddy fields water during February 2009 and minimum number was observed 6 at Pandey Tola paddy fields water during November 2009.

The highese number of cyanophyceae were recorded 51 at Fumber of paddy fields during February 2010 while minimara was observed 4 at Dhangarha and Pandey Tola during November 2010.

Maximum value of xanthophyeae were recorded 27 at Basantpur and Moujegaon paddy fields water during Petruary and March 2010, while minimum number was recorded 4 at Baniapur during June 2010. The phytoplankton showed Bimodel pattern of distribution i.e. two maxima and two minima were observed throughout the study period.

Dihhophycea showed its maximum number at Hafizpur paddy fields water during 2010 while minimum number was recorded 2 in the numbers of mnonth 2010.

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