International Journal of Entomology Research
ISSN: 2455-4758; Impact Factor: RJIF 5.24
www.entomologyjournals.com
Volume 1; Issue 6; September 2016; Page No. 01-03

Fish productivity study of Gangapur tank, Rewa district Madhya Pradesh

[1] Balbeer Singh, [2] Dr. Dayanand Pandey

[1] Research Scholar, Dept. of Zoology, Govt. S.K.N. P.G. College, Mauganj, A.P.S. University, Rewa, Madhya Pradesh, India
[2] Dept. of Zoology, Govt. S.K.N. P.G. College, Mauganj, Madhya Pradesh, India

Abstract
The fish production plays a significant role in the human economy. India has vast potential for development of inland fisheries. In the present study an attempt has been made to evaluate the fish productivity of Gangapur tank located in Rewa district. The Gross Primary Productivity of the tank followed a more or less similar trend of fluctuations and also exhibited an increasing trend through the rainy season towards summer season with distinct peaks during three years of study and lower values were observed during rainy season. It was clear that the Gross Primary Productivity changing significantly with seasons. Net primary productivity of Gangapur tank followed a more or less similar trend of fluctuations in all four stations exhibited an increasing trend towards a rainy season and winter season with distinct peaks while lower values of net primary productivity observed during rainy season. Community Respiration observation in the tank followed a similar trend of oscillation in all four stations lower values during winter season throughout the study period and exhibiting an increasing trend toward summer and rainy season.

Keywords: Fish productivity, Gangapur tank, Rewa

1. Introduction
Aquaculture has occupied a special status not only because of its contribution to food resources but also in view of its contribution to quality diet. Fish is one of the most important sources of animal diet. Fish is a valuable source of protein and occupied a significant position in the socio-economical fabric of South Asian countries. India has rich biological heritage that qualifies it as one of the twelve-mega diversity nations of the world (Gadgil, 1996)[1]. There are 24,600 species of known fishes, which comprises almost half the number of total vertebrates. In which only 400 species are commercially important. Among the available fish species of the world at least 20% of freshwater fish species are already extinct and in serious decline owing to the ecological degradation and mismanagement of natural resources and overexploitation
The measurement of the productivity are very essential for estimating the fish production potential and are one of the most important sources of energy input in fresh water ecosystem. The synthesis of basic food i.e. transformation of inorganic substances in to organic form is similar to that of terrestrial environment. It is of two types: Gross Primary Productivity (GPP) and Net Primary Productivity (NPP). During the past two decades there developed considerable interest in determining the values of primary production in global scale. The two important aspects of primary production are:
(1) The determination of phytoplankton biomass and
(2) Measurement of the rates at which the biomass converts inorganic carbon to cell materials.

The term primary production is frequently equated with primary productivity there by implying that is a measurement of the rate of the process. Estimations of the primary production of the inland aquatic systems are most difficult, most of the studies are based on the measures of the productivity of the phytoplankton, periphyton or macrophysics. Literature pertaining to the studies on the primary productivity of fresh water bodies such as lakes and reservoirs from Indian sub-continent is scanty (Dwivedy *et al.*, 1986; Sinha *et al.*, 1990 and Singh and Sharma 1999) [2, 4].

2. Materials and Methods
The present project will be visualized to report the diversity, density, role of plankton and fish productivity in Gangapur tank, Rewa. This historic geographical region provides Gangapur tank a unique environment available selblon in other Indian water bodies.
The present investigation are Gross Primary Productivity (GPP), Net Primary Productivity (NPP) and Community Respiration (CR) in Gangapur tank of Rewa district for a period of three years i.e., June 2015 to May 2016 were aimed at understanding the productivity potential of the tank for proper fish production. The time of exposure (incubation period) in the present studies was for a period of 4.0hrs. The initial dissolved oxygen was determined by using the sample form the third bottle. Later, after the completion of incubation period, standard procedure to dissolved oxygen analysis, i.e. fixing the samples with manganese sulphate and alkali-iodide at the site of the study and transferred to the laboratory for further estimations. The gross and net primary production and community respiration was calculated by using formula.

$$\text{GPP:} \quad gc/m^3/hr = \frac{DL - DD}{hr} \times 0.375$$

$$\text{NPP:} \quad gc/m^3/hr = \frac{DL - DI}{hr} \times 0.375$$

$$\text{CR:} \quad gc/m^3/hr = \frac{DI - DD}{hr} \times 0.375$$

3. Results and Discussion
Primary productivity is concerned with the evaluation of the capacity of an ecosystem, to the synthesis of organic matter.

Primary production in aquatic ecosystem is mainly controlled by the interaction of many factors like environmental and biotic factors and the nutrient status of the water body. Primary productivity is the most important biological parameter in. In aquatic ecosystem algae macrophytes and green bacteria are responsible for primary productivity.

Table 1: Shows Seasonal variation of Primary Productivity (gc/m^3 /hr) during year 2014- 2015

S. No	Parameters	Rainy	Winter	Summer	Avg.	SD
1.	Gross Primary Productivity	0.32	0.34	0.38	0.35	±0.031
2.	Net Primary Productivity	0.15	0.27	0.18	0.20	±0.062
3.	Community Respiration	0.24	0.21	0.38	0.28	±0.091

3.1 Gross Primary Productivity (GPP)

The Gross Primary Productivity (GPP) values of different stations from Gangapur tank during the year from June, 2015 to May, 2016 at all the stations ranged between 0.32 to 0.38gc/m^3/hr. As far as seasonal variation 0.32 gc/m^3/hr rainy season, 0.34 gc/m^3/hr winter season and 0.38 gc/m^3/hr summer season of the year 2015-16.

It was clear that the Gross Primary Productivity changing significantly with seasons, nutritional fluctuations and viability of the producers. High primary productivity in the present study depends on the light penetration has also observed by Sreenivasan (1967) [5]. Sarada and Wesley (2006)[6] have studied the Gross Primary Productivity of Mincoy lagoon of Lakshadweep, where the maximum GPP was recorded in premonsoon (23.14) followed monsoon season (17.8) and post monsoon period it decreased further. Several research reports are available on the relations between the productivity status and restoration of aquatic bodies (Zutshi and Vass, 1977 and Mandal *et al.*, 2005) [7, 8]. Higher range of primary productivity in pre monsoon and retreating monsoon might be due to less amount of rainfall and high density of phytoplankton population.

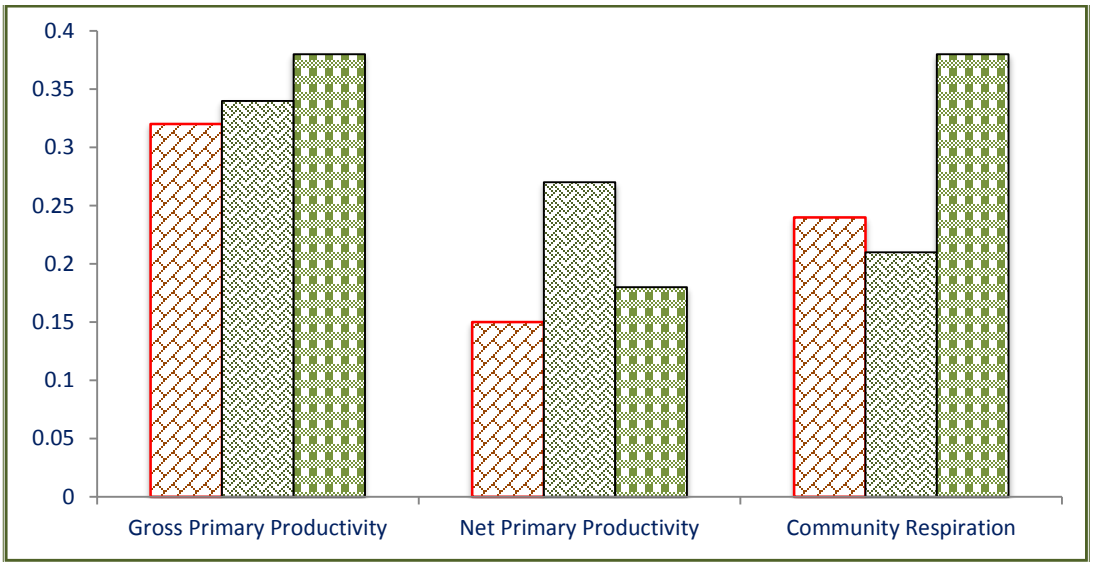

Fig 1: Seasonal variation of Primary Productivity (gc/m3 /hr) during year 2014- 2015

3.2 Net Primary Productivity (NPP)

The NPP values ranged between 0.15 to 0.27 gc/m^3/hr during the year 2015-16. The minimum NPP was recorded in the month of October and maximum in January. As far as seasonal variation 0.15 gc/m^3/hr rainy season, 0.27 gc/m^3/hr winter season and 0.18 gc/m^3/hr summer seasons of the 2015-16.

Net primary productivity of Gangapur tank followed a more or less similar trend of fluctuations in exhibited an increasing trend towards a rainy season and winter season with distinct peaks while lower values of net primary productivity observed during rainy season. There are quite number of reports on primary production of standing water bodies of India (Mandal *et al.*, 2005 [8] and Patil and Niranjana Chavan, 2010) [9]. Sarma *et al.*, (2007) [10] recorded the net primary productivity values fluctuated between 2.05 and 2.80 m^{-2}mgl^{-1}. Maximum range of net primary productivity in pre monsoon might be due to proliferation of phytoplankton as fresh rain helped in accumulation of organic matter from decomposed macrophytic vegetation. Ramakrishnayya (2000)[11] have studied the primary productivity in 10 reservoirs of south Karnataka and opined that the high primary productivity status yields the higher fish productivity in the reservoirs, similar observations of high primary productivity values were observed during present study period.

3.3 Community Respiration (CR)

The CR values of the tank ranged between 0.21 to 0.38 gc/m^3/hr. As far as seasonal variation 0.24 gc/m^3/hr rainy season, 0.21 gc/m^3/hr winter season and 0.38 gc/m^3/hr summer seasons of the year 2015-16.

Similar observations were reported by Synudeen Sahib (2002) [12] observed the highest values of CR in April and March at Parapper reservoir and Sasthamcotta lake respectively. Kulkarni *et al.*, (2008) [13] recorded the productivity of the Derala tank ranged between 100 and 275 mg/l. Patil and Niranjana Chavan (2010) [9] studied that the productivity increased from winter and attains the peak in summer and then declines in monsoon. Highest rate of productivity during

summer was probably due to bright sunlight and higher temperature. These observations also similar with the present findings on this tank. It is concluded that the water body is mesotrophic with moderate quantity of nutrients and can serve as a good habitat for fish productivity.

4. Acknowledgement
The authors are greatly indebted to Principal of Govt. S.K.N. P.G. College, Mauganj (M.P.) who permitted to carry out this work at the centre.

5. References

1. Gadgil M. Documenting diversity an experiment Current Science. 1996; 70:36-44.
2. Dwivedi RK, Karamchandini SJ, Joshi HC. Limnology and productivity of Kulgarhi reservoir, Madhya Pradesh. J Inland Fish. Soc. India. 1986; 18:65-70.
3. Sinha OK, Roy SP, Munshi JSD. Primary productivity of a Rivulet, a delelict and a managed fish pond of Dumka, Bihar. Envi and Ecol. 1980; 8(1):78-81.
4. Singh VK, Sharma AP. Hydrobiological characteristic and primary production in fish mannered with different organic manures. Indian. J Fish. 1999; 46(1):79-85.
5. Sreenivasan A. *Tilapia mossambica* - Its Ecology and status in Madras State, India. Madras. J Fish. 1967; 3:32-43.
6. Sarada, Godwin Wesley S. Primary productivity of Mincon Lagoon, Lakshadweep. Ecol. Envi and Con. 2006; 12(4):707-711.
7. Zutshi DD, Vass PK. Estimates of phytoplankton production in Manssballake, Kashmir. Trop. Ecol. 1977; 18:103-108.
8. Mandal OP, Sinha AK, Sinha KMP. Studies on primary productivity of a wetland. In: Fundamentals of Limnology. Edited by Arvind Kumar. 2005, 230-237.
9. Patil A, Niranjana Chawan. Primary productivity studies in some fresh water reservoirs of Sangli district, Maharashtra Nat. Environ. and Pollu. Tech, 2010; 9(1):101-103.
10. Sarma D, Dutta A, Choudhury M. Limnology and Fisheries Urpodbeel, Goalpara, Assam. J Inland fish Soc. India. 2007; 39(1):51-54.
11. Ramakrishana. Limnological investigation and distribution of micro and macro invertebrates and vertebrates of Pox Sagarlake, Hyderabad. Rec. Zool. Surv. India. 2000; 98(1):169-196.
12. Synudeen Sahib S. Primary productivity studies in some aquatic bodies of Kollam district, Kerala. Uttar Pradesh. J Zool. 2002; 22(3):247-250.
13. Kulkarni MY, Kulkarni AN, Somvamshi VS. A Study on some aspects of Reservoir Fisheries of Derala Tank, Dist. Nanded, Maharashtra. Proceedings of Taal 2007; the 12th World Lake Conference. 2008, 568-570.