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Periodic Research

A study on seasonal primary productivity of Angoori reservoir, Datia (M.P.)

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Abstract

The present study deals with primary productivity during the period January 2009 to December 2009 at Angoori Reservoir, district Datia. The Datia district is located between 78.28 longitudes and 25.38 latitude. This reservoir caters the needs of agriculture, fisheries and drinking water supply. No limnological study has yet been made on this reservoir. Gross primary productivity, net primary productivity, community respiration, and net production efficiency were measured. Maximum gross primary productivity was *600.0* mg/cm^3/4hrs and minimum was *150.0* mg/cm^3/4hrs. The maximum value of net primary productivity was *375.0* mg/cm^3/4hrs and minimum was *75.0* mg/cm^3/4hrs, whereas the maximum community respiration value was *262.5* mg/cm^3/4hrs and minimum was *75.0* mg/cm^3/4hrs and the net production efficiency value was maximum *72.7* mg/cm^3/4hrs and minimum was *50.0* mg/cm^3/4hrs. The maximum seasonal average value of primary productivity was in summer season and minimum in rainy season.

Keyword: productivity, biologica, phenomenon, estimating, ecosys, temtitration

Introduction

Primary productivity is the most important biological phenomenon in nature on which the entire diverse array of life depends directly or indirectly. The primary productivity of a water body is the manifestation of its biological production. Its importance in aquatic ecosystem is well realized for estimating the productive capacity. It shows nature of ecosystem, its tropic level and availability of energy for secondary producers.

Studies on primary productivity have been carried out in many temperate and tropical regions of the world (Talling and Lemoalle 1998). Few studies have been conducted in man–made shallow fresh water lakes of South-East Asia. In India such studies have been made by many workers including Sreenivasson (1996), Sahib (2002), Hujare and Mule (2007) and Chattopadhyay and Banerjee (2008).

The present study is an attempt to examine monthly and seasonal changes in primary productivity in Angoori Reservoir, since there are no scientific data available on this reservoir.

Materials and Methods

Angoori reservoir is manmade reservoir located between 78^{0}28 longitudes and 25^{0}38 latitude. it has been made across the tributary of river Pahuj. The study was carried over a period of 12 month and samples were collected from the surface water of four selected sampling stations with the help of boat. The samples were taken between 9:30 am to 11:30 am in the last week of every month from January to December 2009. Primary productivity was estimated with the help of light and dark bottle technique (Gaurder and Gram 1927, APHA 1995, Adoni 1985). Water samples were collected in BOD bottles (300 ml each) and titration was completed at sampling site. The light and dark bottles containing reservoir water were suspended by iron wire frames having attached ropes and hung in reservoir water for 4 hours incubation followed by immediate detection of dissolved oxygen with the help of Winkler's method.

Where

LB = Dissolved oxygen content in the light bottle.
DB= Dissolved oxygen content in the dark bottle.
IB= Dissolved oxygen content in the initial bottle

Time of exposure = 4 hrs. Conversion factor was 0.375 and (Photosynthetic quotient (PQ) was 1

The Gross primary productivity, net primary productivity, community respiration and net production efficiency. Were estimated as follows

GPP= LB-DB/exposure time X 0.375/PQ X1000 $mgcm^3$ 4h

NPP= LB-BI/ exposure time X 0.375/PQ X1000 $mgcm^3$ 4h

CR= IB-DB/ exposure time X 0.375/PQ X1000 $mgcm^3$ 4h

NPE= NPP/GPP X100

Result and Discussion

The results of primary productivity of Angoori reservoir indicating Gross primary productivity (GPP), Net primary productivity (NPP), Community respiration (CR) and Net production Efficiently are shown in Table – 1

The Gross primary productivity of Angoori reservoir varied from *150* mg/cm^3/4hrs at station B in the month of August to *600* mg/cm^3/4hrs at station A in the month of June. Maximum seasonal average value of GPP was 534.5 mg/cm^3/4hrs at station A was in summer season and minimum value was 225 mg/cm^3/4hrs at station B in rainy season (Patil and Chavan 2010) found the maximum GPP in Bhambarde, Lengre and Atpadi reservoirs in summer season and minimum during rainy season. Similar results were recorded by Singh (1990) in North and South Tank at Jamalpur.

The Net primary productivity of this reservoir varied from *75.0* mg/cm^3/4hrs at station B in the month of August to *375.0* mg/cm^3/4hrs at station A,B in the month of June and at station C in the month of April and the maximum seasonal average value was 318.7 mg/cm^3/4hrs at station A in summer season, wehereas minimum seasonal average value of NPP was 140.6 mg/cm^3/4hrs at station B in rainy season. Hujare *et.al.* (2007) also recorded similar results in two perennial tanks from Kolhapur district.

The value of Community respiration varied from *75.0* mg/cm^3/4hrs at all sampling stations in the month of July, August, September and October to *262.5* mg/cm^3/4hrs at station A in the month of March 2009 and the maximum seasonal average value was 215.6 mg/cm^3/4hrs at station A in summer season and minimum seasonal average value was 93.7 mg/cm^3/4hrs at station A and B in rainy season. Similar observations were reported by Patil and Chavan (2010) in three fresh water reservoirs of Sangli district, Maharashtra.

The variation of net production efficiency of Angoori reservoir varied from *50%* at station A in November at station B August & September and at station C in the months of July and December to *72.7%* at station C in the month of March and the maximum seasonal average value of NPE was 65.6% at station C in summer season and minimum seasonal average value was 56.5% also at station C in rainy season

Conclusion

The maximum value of GPP in summer months corroborates with the high population of phytoplankton in the summer season.

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