



Short Communication

Assessment of Fish Culture in Some Fresh Water Ponds of Dhar Town, MP, India

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Available online at: www.isca.in

(Received 24th February 2012, revised 31st March 2012, accepted 3rd April 2012)

Abstract

Present Communication deals with the study of four fish culture ponds (two wild and two managed ponds) of Dhar town, MP. In these ponds water quality and fish production are correlated. Studies have revealed that the ponds are in trophic status. Chlorides, total hardness, alkalinity, BOD, pH and plankton population were high level in wild ponds in comparison to managed ponds. Due to these conditions dissolved oxygen and fish growth/yield was low in wild pond in comparison to managed pond. The net primary productivity was also in wild pond in comparison to managed pond. Hence the fish growth is not directly related with net primary productivity. The deterioration of water quality indicated that higher BOD, pH, and High planktonic diversity decrease the fish growth. Management of water quality in ponds may help in enhancing the fish production through aquaculture.

Keywords: Water quality, fish yield and BOD.

Introduction

Fishes constitute economically very important group of animals. The nutritional and medicinal values of fishes have already been recognized. Pond water is considered as the major sources for fish production. It also generates rural employment in the town.

Dhar town was famous for *Saadhe Barah Talab* (Twelve and half ponds) of different sizes but now a day's many of them destroyed by colonizers for construction of colonies. Due to increasing population, scarcity of food culture in ponds become common some of the fish farmers and fishery department, Dhar doing a good work of fish production. If the proper technology is followed and regular monitoring of ponds is done, scope of improvement may possible¹.

It observed that limnological aspects of ponds culture are not available no such studies on pond fish culture in relation to water quality have been carried out in Dhar, MP, India. Therefore the present studies have been to monitor water quality and fish food organisms in relation to fish growth productivity from the fish culture ponds.

Material and Methods

Dhar district is located in the Western region of the state of Madhya Pradesh at latitude between 22° 1' and 23° 28' N and longitude of 75° 42' E.

Four fish culture ponds were selected in Dhar town ,two are wild (where there is no restriction on cattle entry and sewage from non point sources are also entry in the pond) and two are managed and constructed ponds where cattle visit is limited and liming is a regular feature. Both types of ponds receive direct sunlight. The bottom soil of which contains clay.

Water sample were collected in plastic bottle of capacity two liters monthly. Physico chemical examination analyzed as per guidelines².

Plankton samples were also collected by planktonic net. Samples are preserved in small bottles with 5% buffered formalin (concentration sample) plankton number were estimated using the Sedwic Raffer cell, plankton species diversity index formula of Shannon and Weaver.

$d = \sum (ni/N) \log_2 (ni/N)$, Where d=species diversity, n= No. of individuals of ith species, N=Total no. of individuals.

Net and grass primary productivity were determined using light and dark bottle technique².

Table-1
Selected Station

S. No.	Pond Name	Pond Site	Source of Water	Character
1	Natnagra Pond	Under the Khande Rao Tekri	Natural	Managed Pond
2	Devi sagar Pond	Near kalika Temple	Natural	Managed Pond
3	Lendcha Pond	Near the Lath masjid	Natural	Wild Pond
4	Bramhakundi Pond	Near the PG college	Natural	Wild Pond

Fishes are collected with the help of local fisherman. Fresh fishes were brought to the laboratory and preserved in formalin solution. The identification of fish was done with the help of standard keys and books. The coefficient of correlation "r" between different water quality parameters was calculated.

Results and Discussion

Table -2 depicted the mean while water quality characteristics of wild and managed ponds respectively. PH value was high in wild pond in comparison to managed pond. It was alkaline in wild ponds throughout the study period.

Conductivity, alkalinity, hardness, chlorides, phosphates, Sulphates, nitrates, BOD, COD were significantly high in wild ponds in comparison to managed ponds.

NPP was significant high in wild ponds in comparison to managed ponds. But DO was low in wild ponds in comparison to managed ponds^{3, 4}.

NPP was significantly high in wild ponds, but fish yield showed higher values in managed ponds. In wild ponds fish yield production could not be reported due to highly polluted zone. In wild ponds BOD and COD are two important factors affecting the fish productivity, so the fish culture cannot be successful^{5, 6}.

Biological analysis of data further revealed that total plankton population was high in wild ponds, whereas species diversity was high in managed ponds⁷.

In the present study phytoplankton population was found to comprise of four major groups i.e. Chlorophyceae, Cynophyceae, and Bacillariophyceae and Euglenophyceae. Table-3 depicted the list of phytoplankton and zooplankton⁸.

In Zooplanktons community Cypris, Nauplius, Daphnia, Cyclops, Branchionus, Diptomus etc. reported.

There have been a number of attempts at correlating the fish yields with limnological factors influencing the productivity of water bodies⁹⁻¹¹. In the present wild pond water revealed that ponds are well buffered and high in trophic status. Water alkalinity is a measure of the buffering ability of the water this means that when pond water alkalinity is high generally the values were high during summer may be because of high evaporation rates and contents also indicate the pollution of animal origin. Chloride and hardness were much higher in wild ponds, where water was saline. High BOD in wild ponds. High BOD in wild ponds indicates the presence of high biodegradable organic matter which consumes dissolved oxygen. Thus high organic load because of excess entry of cattle and domestic sewage from the nonpoint sources in wild ponds may be responsible for high BOD. Similarly increase in phosphate in the wild pond may also be attributed to high organic load in these ponds.

No significant variation was observed in plankton population in wild as managed ponds. Since plankton production depends upon carrying capacity of environment and nutrient factors. Low zooplankton population was found in the ponds with highest fish growth rate. This decrease in plankton population may be attributed to grazing pressure exerted by the fishes¹². The phytoplankton and zooplankton interface is the crucial point where changes in the predators at the top of the food web are translated to changes in the property of ecosystem such as primary productivity and nutrient recycling¹³. In the present study net productivity was high in the wild ponds in comparison of managed ponds. Thus high fish yield is not directly related to net primary productivity. Since fish release various waste products such as carbon dioxide, ammonia and organic material containing nutrients while they remove oxygen and particulate organic materials (Plankton from the system). According to the effect of fish growth on water quality the positive effect is that they stabilize the food web and maintain steady production and negative effect is that leading with increase biomass a decrease in net production factor is observed. In the present study also deterioration of water quality as indicated by very high ammonia and BOD in wild ponds, which might have decrease the NPP in managed ponds but resulting in the high biomass¹⁴ have also reported similar result in poly culture manure ponds which shows low NPP at the end of the culture periods and high fish biomass.

Conclusion

Thus, the fish production efficiency varies over a wide range in the wild and the managed ponds. However, average conversion is more effective in managed pond. Therefore, by applying the simple management practices like management of water quality in terms of ammonia and BOD by managing the input of waste in water the production can be enhanced. The high fish nature and quantity of fertilizers such correlation.

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Table-2
Depicted the mean while water quality characteristics of wild and managed ponds

S. No	Physico Chemical and Micro-biological parameters	Name of the Ponds											
		1. Natnagra			2. Devisagar			3.Lendcha			6. Bramhakundi		
		Rainy	Winter	Summer	Rainy	Winter	Summer	Rainy	Winter	Summer	Rainy	Winter	Summer
1	2	3	4	5	6	7	8	15	16	17	18	19	20
1	Turbidity (NTU)	44.8	45	67.2	45.8	46.8	62.4	62.4	75.6	78.2	77.1	80.1	81.4
2	pH	8.3	9.4	8.2	8.03	7.79	8.01	8.84	8.17	8.27	8.23	8.17	8.12
3	Specific Conductvity	294	247	267	476	419	462	834	789	812	987	825	722
4	T.D.S. (mg/l)	225	260	240	327	322	300	764	753	739	752	736	726
5	Total Hardness (mg/l)	260	278	282	312	316	327	428	484	492	450	554	558
6	Total Alkalinity (mg/l)	219	225	260	230	275	292	512	672	685	449	525	546
7	Chloride (mg/l)	127	131	175	178	188	238	376	390	398	387	412	418
8	Flouride (mg/l)	0.35	0.5	0.34	0.46	0.48	0.52	0.47	0.51	0.56	0.42	0.52	0.62
9	Nitrate (mg/l)	1.2	1.6	2.6	1.06	1.04	1.8	2.9	2.6	2.7	2.6	2.8	2.7
10	Sulphat (mg/l)	56.8	52.6	54.4	68.2	65.1	63.9	66.3	64.7	61.3	58.6	54.3	52.4
11	Phosphate (mg/l)	1.26	1.8	1.48	1.6	1.3	1.21	6.1	5.8	5.6	8	7.26	7.12
12	D.O. (mg/l)	4.9	5.5	4.2	7	8.1	6.4	1.4	1.8	1.6	2.6	2.9	2.6
13	B.O.D. (mg/l)	4.8	4.3	5.2	4.8	4.1	5.4	5.6	4.9	6.2	6.6	6.2	7.1
14	C.O.D. (mg/l)	31.3	33	36.2	30	30.3	39.1	68.3	69.3	73.2	64.3	66.2	69.4

Table-3
The list of Phytoplankton and Zooplankton

PHYTOPLANKTON	ZOOPLANKTON
<u>Chlorophyceae-</u>	
1.Volvox sp.	1.Branchionus sp.
2.Closterium sp.	2.Monostylus sp.
3.Spirogyra sp.	3.Daphnia sp.
4.Chlorella sp.	4.Cyclops sp.
5.Chlorococcm sp.	5.Cypris sp.
<u>Euglenophyceae</u>	6.Nauplius sp.
1.Euglena sp.	7.Diptomus
2.Navicula sp.	
3.Synendra sp.	
<u>Cynophyceae</u>	
1.Anacystis	
sp. sp.	
2.Anabina sp.	
3.Oscillaria sp.	
4.Spirulina sp.	
Bacillariophyceae	
1.Fragillaria sp.	
2.Cyclotella sp.	
3.Surinella	