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Effect of Cow Dung on Growth of Major Carps in India

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ABSTRACT: Fisheries sector is very important not only as a main source of animal protein to ensure food security but also to improve employment and income for poverty elimination in developing countries like India. The most important freshwater culture able fishes of India are the major Indian carps like *Catla catla*, and *Labeo rohita*. However common combinations of fish for composite fish culture system are *L. rohita*, and *C. catla*. Fish production can be increased treatment by feeding and pond fertilization. Optimum fertilization rate is the amount of organic matter that can be cost effective and utilized in a pond ecosystem without having harmful effect on water quality as well as on fish growth. Supplementary feeding plays an important role in intensive and semi-intensive fish culture system. In India, cow dung is frequently used in commercial ponds due to its low cost and easy availability; it plays an important role in the enhancement of fish production by providing major nutrients for the augmentation of phytoplankton-zooplankton food chain. Among the organic manures cow manure is considered to be the best, which play a vital role in plankton production. Cow manure is now widely used in commercial freshwater aquaculture.

KEYWORDS: Fish ,Freshwater, Feeding , Cow, Dung and Growth.

I. INTRODUCTION

Pond fertilization is a common practice in aquaculture aimed at increasing the production of natural food for farmed fishes. Inorganic fertilizers are expensive and their use by smallholder farmers may be limited. Animal wastes are widely used in many countries to sustain pond productivity at a low cost. Organic fertilizers decompose and release nitrogen, phosphorous and potassium which are used by phytoplankton for growth and reproduction. In addition, they provide attachment sites for bacteria and other microscopic organisms. Judicious organic fertilization of fish ponds can eliminate the need for supplementary feeding. The use of manures such as, dung from cow is well established. In India, cow manure is frequently used in commercial ponds due to its low cost and easy availability; it plays an important role in the enhancement of fish production by providing major nutrients for the augmentation of phytoplankton-zooplankton food chain. Among the organic manures cow manure is considered to be the best, which play a vital role in plankton production. Cow manure is now widely used in commercial freshwater aquaculture.

Fisheries sector is very important not only as a main source of animal protein to ensure food security but also to improve employment and income for poverty elimination in developing countries like India. The most important freshwater culture able fishes of India are the major Indian carps like *Catla catla*, and *Labeo rohita*. However common combinations of fish for composite fish culture system are *L. rohita*, and *C. catla*. Fish production can be increased treatment by feeding and pond fertilization. Optimum fertilization rate is the amount of organic matter that can be cost effective and utilized in a pond ecosystem without having harmful effect on water quality as well as on fish growth. Supplementary feeding plays an important role in intensive and semi-intensive fish culture system.

Pond fertilization is a management protocol to enhance biological productivity using both organic manure and inorganic fertilizers. Fertilization of a fish pond actually increases the production of beneficial phytoplankton, microscopic free-floating algae that act as the basis of the aquatic food chain which, in turn increases the amount of harvestable fish. In some cases, one species enhances the food availability for other species and thus increases the total fish yield per unit area. When organic fertilizers decompose in the water, varying amounts of nitrogen, phosphorous and potassium (N, P, K) are released which serves as primary nutrients for the phytoplankton community. Organic fertilization also stimulates the growth of decomposers such as bacteria and fungi. Bacteria and fungi are critical to the breakdown of the toxic waste products that can accumulate with the use of prepared feeds. However, animal manure takes some time for its decomposition and release of nutrients in the body of water. Beside this, higher doses as well as high ambient temperature may make the water body unsuitable for fish culture by adversely altering its hydro-biological characteristics. The effects of cow-dung on plankton production and fish growth was evaluated. Both plankton production and fish growth (*C. catla* and *C. carpio*) were found to be highest in cow dung treatments.

Fish is one of the best and abundantly found aquatic animal that can provide good quality protein for human needs. Fish is considered as a principle source of animal protein for half of the global population. The manuring of fish pond is considered an important scientific discipline for increasing fish production. Cow manure can be used as a complete fertilizer in fish ponds. Organic matter in cow manure accelerates the development of large bacterial population as a result of decomposition. Cow manure treatment in major carps nursery ponds yield 50-60 percent more fish than untreated ponds (Saha *et al.*, 1980). Cow manure adds to fish pond at the daily rate of 3-4% of fish yielded fish 20-30 kg/ha/day.

II. REVIEW OF LITERATURE

Review of related literature is an important research effort as it provides comprehensive understanding of what is already known about the topic. It helps to avoid duplication of what has already been done, and provides useful directions and helpful suggestions for research work.

Majumder et al., (2002) Pond fertilization practices using animal wastes are widely used in many countries to sustain productivity at low cost.

Knud Hansen et al., (1991) Among manure used, chicken's is preferred because of its ready solubility and high level of phosphorus concentrations.

Sevilleja et al., (2001) Soluble organic matter supplied to ponds by using manure stimulates phytoplankton growth.

Atay and Demir, (1998) Moreover it increases biomass of zooplankton and benthic organisms.

Singh and Sharma, (1999) In India, however, cowdung is the most common organic manure applied to fish ponds.

III. MATERIALS AND METHODS

The experiment was conducted in two earthen ponds each measuring 25x8x1.5 m located at Darbhanga. Each pond was stocked at the rate of 20 *L. rohita*, 15 *C. catla*. One pond was kept as control, while remaining one ponds 1 was manured with cowdung at the rate of 0.1 g N/100 of wet fish body weight daily. The experiment was conducted for a period of five months. At the time of stocking, their body weight was measured and recorded. Netting was done at fortnightly intervals and a sample of fish of each species was captured randomly from each pond by using drag net. After obtaining data fish was released back into their respective ponds.

IV. RESULTS AND DISCUSSION

The initial and final average weight of *L. rohita* in control pond was 123.2 and 222.2g, in treated pond 1 was 165.3 and 385.8 g. The initial and final average weight of *C. catla* were 135.2 and 221.4 g in control pond, 136.3 and 355.4 g in treated pond. Analysis of variance shows that there was highly significance difference among the weight gained in fishes under control and treated ponds. The difference in average body weight of three fish species were highly significant which shows that there was a great difference in weight gain between control and treated ponds. Treated ponds shows higher growth than control pond.. The results of this experiment are related with the results obtained by Javed *et al.* (1990) who found that manure increases the weight, fork length and total length of *L. rohita*, and *C. catla*. The fertilization of pond with cow-dung stimulated the growth of phytoplankten. The same results were obtained by Garg and Bhatnagar (1999). They studied the effect of five different doses (5000, 10,000, 15,000, 20,000, and 24,000 kg/ha/year) of organic fertilizer (cow-dung) on pond productivity in term of plankton production for a period of 60 days. Highest plankton population, Zooplankton, fish biomass and specific growth rate (2.36% body weight/d) were observed in ponds which were treated with 15000 kg/ha/year.



Table: 1
Fortnightly increase in body weight of *Labeo rohita* in control and treated ponds

Date	Control		T1	
	Average wt.(g)	↑ in weight	Average wt.(g)	↑ in weight
01-04-2019	123.2	-	165.3	-
16-04-2019	130.3	6.0	178.6	11.0
01-05-2019	138.0	7.5	194.1	15.3
16-05-2019	145.0	7.0	219.6	24.8
01-06-2019	153.8	8.7	242.3	22.9
16-06-2019	163.4	9.3	270.4	26.9
01-07-2019	175.0	10.8	288.3	17.8
16-07-2019	183.8	8.7	301.6	11.5
01-08-2019	195.0	10.8	320.6	20.5
16-08-2019	210.0	14.9	355.7	34.6
01-09-2019	222.2	13.2	385.8	28.4

Table: 2
Fortnightly increase in body weight of *Catla Catla* in control and treated ponds

Date	Control		T1	
	Average wt.(g)	↑ in weight	Average wt.(g)	↑ in weight
01-04-2019	135.2	-	136.3	-
16-04-2019	142.3	6.8	147.3	9.2
01-05-2019	152.0	8.7	170.5	11.2
16-05-2019	165.4	8.4	186.3	12.2
01-06-2019	172.4	5.6	201.2	15.8
16-06-2019	178.4	6.3	222.3	14.3
01-07-2019	186.4	6.2	250.3	20.4
16-07-2019	196.2	8.2	281.2	25.1
01-08-2019	210.0	9.7	320.7	31.2
16-08-2019	221.4	11.9	355.4	38.2
01-09-2019		10.2		35.2

Supplementation of treated pond with organic manure cow-dung caused a marked increased in fish production. Gross fish yield of the control and two treated ponds were 26.76, 44.77 /pond/year. The fish production was computed to be 1338.16, 2238.80 g/ha/year,. Treated pond 1 showed 2.38 times greater net fish production as compared to that of control pond, respectively. The same results were obtained by Mahboob and Sheri (1997) who studied the growth performance of six fish species under the influence of artificial feed, broiler manure, buffalo manure, N:P:K (25:25:0) and a control pond was studied for period of one year. Broiler manure and N:P:K (25:25:0) fertilization remained the best treatment for maximum fish production of 9400 and 7300 kg/pond/year and the same results were also described by Costa and Keembiathetty (1993). The results of present experiment revealed that maximum weight gain in *L. rohita*, and *C. catla* in controls and treated ponds were observed during August due to higher water temperature.

V. CONCLUSION

The cow manure performed better. Cow manure contains easily decomposable components most of which are in the form of urea and uric acid. Cow manure had the highest levels of total N, P and narrowest ratios of C/N and C/P, suggesting superior mineralization of organic forms of N and P from it. The nutrient composition of cow dung is better performance.



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