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Comparison of Fresh and Dry Cowdung Manuring on Growth Performance of Major Carps

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ABSTRACT

The present project was planned to compare the performance of fresh and dry cowdung in major carps (*Labeo rohita, Catla catla* and *Cirrhinus mrigala*). The experiment was conducted for five months using three earthen ponds. Each pond was stocked with 20 *Labeo rohita*, 15 *Catla catla*, and 15 *Cirrhinus mrigala*. Manuring of treated ponds with fresh and dry cowdung was done at the rate of 0.1gN 100 g^{-1} of wet fish body weight daily. In control pond, in which no additive was used, the average weight gain of *Labeo rohita, Catla catla* and *Cirrhinus mrigala* was 98.0, 82.9 and 101.6 g, respectively. In treated pond 1, in which fresh cowdung was used, the average weight gain in *Labeo rohita, Catla catla* and *Cirrhinus mrigala* was 227.8, 156.7 and 165.9 g, respectively. While in treated pond 2, in which dry cowdung was used, the average weight gain was 218.3, 218.8 and 244.9 g for *Labeo rohita, Catla catla* and *Cirrhinus mrigala*, respectively. The treated pond 2, in which dry cowdung was used, caused a marked increase in the fish production than treated pond 1 which was supplied with fresh cowdung manure. The net fish production/ha/year was computed to be 569.13, 1127.23 and 1358.38 kg in control and two treated ponds 1 and 2, respectively. Treated pond 1 showed 1.98 times greater net fish production and treated pond 2 showed 2.38 times greater net fish production as compared to that of control pond.

Key Words*: Labeo rohita; Catla catla; Cirrhinus mrigala;* Growth performance

INTRODUCTION

In order to develop fresh water fisheries and get maximum economical fish yield from limited area, it is essential to use both organic and inorganic fertilizers. Javed *et al.* (1992) reported a net yield of 2928.54 kg/ha/year of major carps under polyculture conditions with adding cowdung at the rate of 0.10 g nitrogen (from cowdung) per 100 g of wet fish weight daily. The effect of treatment on fish weight, fork length and total length was highly significant. Doria and Leonhardt (1993) estimated the increase in weight and length from May to December in 189 carps reared in semi-intensive polyculture with *Collossoma macropomum*, *Piaractus mesopotamicus* and *Prochilodus scrofa* in a 900 m^2 earthen tanks fertilized with poultry litter 100 g/m^2 fortnightly. Fish were given a pelleted feed with 28% crude protein 5 and 1.5% of total biomass of the tanks in warm and cold months, respectively. Mean weight increase from 8.2 to 598.6 g and mean length from 7.6 to 30.94 cm. Mean daily gain in weight and length was 4.86 g and 0.018 cm, respectively. Gosh *et al.* (1994) reported that the growth of the fish species Java punti (*Puntius javanicus*) when reared alone and catla (*Catla catla*), mrigal (*Cirrhinus mrigala*) and Java punti reared together in the rice field was superior when organic fertilizer was applied either alone or in combination with an inorganic fertilizer. Balasubramanian and Bai (1996) reported that effluent collected from a KVIC model biogas plant fed on cattle dung was utilized in monosex (all male), monoculture of the fish *Oreochromis mossambicus* at field level in 0.002 ha ponds. Biogas-plant effluent was supplied at 0.15% (W/V) concentration level at 3-days interval. No supplementary feed was given to the fishes grown in biogas plant effluent. *Oreochromis mossambicus* attained a maximum weight gain of 0.67 g/fish/day. Total fish production was 4826 kg/ha in 125 days. Garg and Bhatnagar (1999) reported that the effects of five (5000, 10,000, 15000, 2000, 2400 kg/ha/year) different doses of organic fertilizer (cowdung) were studied on the pond productivity in term of plankton production and fish biomass in fresh water fish ponds. The grow out period was 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 fertilizer at the rate of 15000 kg/ha/year. However, at highest a decline in these parameters was observed. The above findings indicates that proper manuring with organic fertilizers have considerable importance in fish culture. Keeping in view the valuable importance of organic manure, a project was planned to compare the effect of fresh and dry cowdung on growth performance of major carps.

MATERIALS AND METHODS

The experiment was conducted in three earthen fish ponds each measuring 25 x 8 x 1.5 m located at Fisheries Research Farm, University of Agriculture, Faisalabad. Each pond was stocked with 20 *Labeo rohita*, 15 *Catla catla* and 15 *Cirrhinus mrigala*. One pond was kept as control in which no additives were used. The treated pond 1 was manured with fresh cowdung while treated pond 2 was

manured with dry cowdung. Both ponds were manured at the rate of 0.1 g N 100 g^{-1} of wet fish body weight daily. At the time of stocking, fish body weight was measured and recorded, Nettings were done at fortnight intervals and a sample of five fishes of each species was captured randomly from each pond by using drag net. After obtaining data, fishes were released back into their respective ponds.

RESULTS AND DISCUSSION

The initial and final average body weights of *Labeo rohita* in control pond were 125.4 and 224.2 g, while in treated pond 1 were 134.30 and 362.1 g and in treated pond 2 were 168.60 and 386.9 g. The initial and final average body weights of *Catla catla* in control pond were 137.4 and 220.30 g and in treated pond 1 were 137.4 and 293.7 g and in treated pond 2 were 138.8 and 357.6 g, respectively. While in case of *Cirrhinus mrigala* the initial and final average body weights in control pond were 122.7 and 224.3 g and in treated pond 1 were 115.4 and 281.3 g and in treated pond 2 were 125.6 and 370.5 g, respectively.

The higher fish production in three fish species was observed in treated pond 2, which was manured with dry cowdung than treated pond 1 which was manured with fresh cowdung. Analysis of variance shows that there was highly significant difference among the weight gain in fishes under control and treated ponds. The difference in average body weights of three fish species were significant which show that there was difference between control and treated ponds. (Table I)

The total fish production was greater in treated ponds than in control pond because cowdung manure provide best mean of increasing fish production. The result of this experiment was in accordance with the result obtained by Javed *et al.* (1990) who found that manure increases the weight, fork length, and total length of *Labeo rohita*, *Catla catla* and *Cirrhinus mrigala.* Similar results were obtained by Costa and Keemibiahetty (1993) who found that the use of cow dung manure resulted in an increase of gross fish production from 0.18 to 1.8 g/m/day in about 40 days.

Manuring of treated ponds with fresh and dry cowdung, cause a marked increase in fish production. Net fish production/ha/year was computed to be 569.132, 1127.231 and 1358.379 kg/ha/year in control, treated pond 1 and treated pond 2, respectively. Treated pond 1 show 1.98 times greater net fish production as compared to that of control pond and treated pond 2 show 2.38 times greater net fish production as compared to that of control pond. The results are in accordance with the results obtained by Mahboob and Sheri (1997) who studied the growth performance of six fish species under the influence of artificial feed, poultry dropping, cow manure, N:P:K (25:25:0) and a control pond for a period of one year. The net fish production under artificial feed, cow manure and control pond were recorded as 6200, 4400 and 1500 kg/ha/year, respectively. In present studies, the cowdung

Table I. Fortnightly increase in body weight of Labeo rohita in control and treated ponds

Date	Control		T_1		T_2	
	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight
01-04-2001	125.4	-	134.3	-	168.6	-
16-04-2001	131.4	6.0	141.5	7.2	179.7	11.1
01-05-2001	139.0	7.6	148.1	6.6	195.1	25.4
16-05-2001	146.0	7.0	156.4	8.3	220.7	15.6
01-06-2001	154.9	8.9	163.1	6.7	224.4	23.7
16-06-2001	164.6	9.7	174.7	11.6	272.2	27.8
01-07-2001	176.0	11.4	210.5	35.8	290.5	18.3
16-07-2001	184.9	8.9	245.6	35.1	302.2	11.7
01-08-2001	196.0	11.1	285.0	39.4	323.7	21.5
16-08-2001	211.1	15.1	327.5	42.5	358.4	34.7
01-09-2001	224.2	13.6	362.1	34.6	386.9	28.5

Table II. Fortnightly increase in body weight of Catla catla in control and treated ponds

Date	Control		T_1		T_2	
	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight
01-04-2001	137.4	-	137.4	-	138.8	-
16-04-2001	144.3	6.9	144.5	7.1	148.6	9.7
01-05-2001	153.1	8.8	153.8	9.3	159.0	11.4
16-05-2001	161.7	8.6	166.7	12.9	172.4	12.5
01-06-2001	167.4	5.7	176.5	10.2	188.3	15.9
16-06-2001	173.5	6.1	190.4	13.5	202.8	14.5
01-07-2001	179.9	6.4	208.8	18.4	223.3	20.5
16-07-2001	188.4	8.5	228.3	19.5	249.7	26.4
01-08-2001	198.6	9.8	249.9	21.6	282.0	32.3
16-08-2001	210.1	11.5	274.7	24.8	321.4	39.4
01-09-2001	220.3	10.2	293.7	19.0	357.6	36.2

Table III. Fortnightly increase in body weight of Cirrihinus mrigala in control and treated ponds

Date	Control		T_1		T_2	
	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight	Average weight (g)	Increase in weight
01-04-2001	122.7	-	115.4	-	125.6	-
16-04-2001	127.5	5.1	121.1	5.6	133.4	7.8
01-05-2001	136.3	8.5	128.4	7.4	144.9	11.5
16-05-2001	144.9	8.6	138.9	10.5	166.3	21.4
01-06-2001	155.4	10.5	151.1	12.4	194.8	28.5
16-06-2001	165.0	9.6	161.7	10.0	219.9	25.1
01-07-2001	173.6	8.6	175.9	14.6	244.6	24.7
16-07-2001	185.0	11.4	195.7	19.8	267.4	22.8
01-08-2001	198.0	13.0	219.1	23.4	297.4	30.0
16-08-2001	213.5	15.5	250.6	31.5	336.0	38.6
01-09-2001	224.3	10.8	281.3	30.7	370.5	34.5

manure has a positive affect on the growth performance of major carps, these results are in accordance with the results of Veerina *et al*. (1999) who reported that the three fish species, *Catla catla*, *Cirrhinus mrigala* and *Labeo rohita*, are farmed in polyculture system in the southern state of Andhra Pradesh, India. They found that buffalo manure, poultry droppings and groundnut oil cake, representing use of major organic fertilizer contribute to high fish yield. The same results are obtained by Garg and Bhatnagar (2000) who found highest values of fish biomass and specific growth rate of the ponds that were fertilized with cowdung at the rate of 208.3 kg/ha/week. The result are also in accordance with the findings of Yadav and Garg (1992) who found that the mean fish production, net primary productivity (NPP), plankton population and nutrients were greater in the ponds treated with organic fertilizer at the rate of 15000 kg/ha/year and given supplementary feed on alternate days than in ponds treated with organic fertilizer at the rate of 10000 kg/ha/year but with daily feeding. The result of the present investigation showed that the maximum growth in three fish species was observed in August because of the optimum temperature. These results are in accordance with the findings of Goolish and Adelman (1984) who recorded significantly positive increase in growth rate of the fish (*Cyprinus carpio*) with concomitant increase in temperature.

Table IV. Analysis of variance of body weight (g) of three fish species viz. *Labeo rohita, Catla catla* and *Cirrhinus mrigala* under three treatments

S.O.V.	d.f.	S.S.	M.S.	F. Value
Treatment	2	2748.68	1374.342	40.80**
Species	2	131.12	65.560	1.95^{NS}
TxS	4	238.13	59.531	1.77^{NS}
Fortnights	9	3489.34	387.705	11.51**
Error	72	2425.40	33.686	
Total	89	9032.67		

Table IVa. Comparison of means treatments

Control	T_1	T_2
18.83B	9.45C	22.73A
Species		
Labeo rohita	*Catla catla*	*Cirrhinus mrigala*
18.180A	15.253C	17.080B

****** Significant; NS Non-significant

REFERENCES

Balasubramanian, P.R. and P.K. Bai, 1996. Studied the effect of bio gas plant as an organic fertilizer in monosex, monoculture of fish (*oreochromis mossabicus*) Tamil Nadu India. *Biosource Technol*., 55: 119–24

Costa, H.H. and C.N. Keembiahetty, 1993. An experimental study on the culture of fry of *Oreochromis mossambicus* in a peaty swamp in Sri Lanka, using cowdung manure as fertilizer. *Resources and Conservation*, 13: 247–54

Doria, C.R.C. and J.H. Leonhardt, 1993. Analysis of growth of *Cyprinus carpio* in semi-intensive polyculture with artificial feeding and organic fertilizer. *Revista UNIMAR, 15 (Supplement)*: 223–31

Garg, S.K. and A. Bhatnagar, 1999. Effect of different doses of organic fertilizer (cowdung) on pond productivity and fish biomass in still water ponds. *J. Applied Ichthyol*., 15: 10–8

Garg, S.K. and A. Bhatnagar, 2000. Effect of fertilization frequency on productivity and fish biomass in still water ponds stocked with *Cirrhinus mrigala* (Ham.). *Aquaculture-Res*., 31: 409–14

Gosh, B.C., R. Gosh, B.N. Mitra and M.K. Jana, 1994. Influence of organic and inorganic fertilizers on the growth and nutrition of rice and fish in a dual culture system. *J. Agric. Sci.*, 122: 41–5

Goolish, E.M. and I.R. Adelman, 1984. Effect of ration size and temperature on growth of juvenile common carp (*cyprinus carpio). Aquaculture*, 110: 27–35

Javed, M., M. Hassan and M.B. Sial, 1992. Fish pond fertilization (iv) effect of cowdung on the growth performance of major carps. *Pakistan J. Agri. Sci.*, 29: 111–5

Javed, M., M.B. Sial and S.A. Zafar, 1990. Fish pond fertilization (ii) influence of broiler manure fertilization on the growth performance of major carps. *Pakistan J. Agri Sci.*, 27: 212–5

Mahboob, S. and A.N. Sheri, 1997. Growth performance of major carps and some Chinese carps under composite culture system with special reference to pond fertilization. *J. Aquaculture in Tropics*, 12: 201–7

Veerina, S.S. M.C. Nandeesha, M. Ahmed, and S.S. de Silva, 1999. An analysis of production factors in carp farming in Andhra Pradesh, India. *Aquaculture Res.*, 30: 805–14

Yadav, N.K. and S.K. Garg, 1992. Relative efficiency of different doses of organic fertilizer and supplement feed utilization under intensive fish farming. *Bioresource Tech*., 42: 61–5

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