

<http://www.pjbs.org>

**PJBS**

ISSN 1028-8880

**Pakistan  
Journal of Biological Sciences**

**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Effect of Fertilizer on the Growth of Carps Applied at 0.1 Gm N/100 Gm Fish Body Weight Daily under Semi-intensive Fish Culture

Kiran Shehzadi and Nasir Ahmad

Department of Zoology and Fisheries, University of Agriculture, Faisalabad, Pakistan.

**Abstract:** An experiment to assess the effect of fertilizer (nitrophos) on the growth rate of culturable carps viz., *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* was conducted in two earthen ponds. Average weight gain in control pond was 80.2, 106.6, 126.1 gm for three fish species, while the weight gain in treated pond was 310, 327.3 and 403.4 gm, respectively. Net fish production in treated and control pond was computed to be 296.3 and 950.0 kg ha<sup>-1</sup>, respectively. Treated pond showed 3.30 times higher net fish production than the control pond.

**Key words:** Culturable carps, fertilizer, growth rate

### Introduction

Of all the major issues, food supply with quality protein is of immense importance for the culturable fish species (Albinate *et al.*, 1983). Daniels and Boyd (1993) studied the effect of different N:P ratios on the phytoplankton abundance. According to them, nitrophos proved to be the best means for increasing the fish production under semi-intensive fish culture system. The use of urea fertilizer enhanced the growth rate of major common and some Chinese carps under the composite culture system and led to the maximum net fish yield of 7290.23 kg ha<sup>-1</sup> (Mahboob, 1992). The present study was aimed at knowing the impact of an inorganic fertilizer, the "nitrophos", applied at 0.1 gm N/100 gm dialy fish weight on the growth rate of culturable carps viz. *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* under semi-intensive culture system.

### Materials and Methods

An experiment to study the effect of fertilizer on the growth rate of culturable carps under semi-intensive culture conditions was conducted in two earthen ponds (0.048 ha) at the Fisheries Research Farms, University of Agriculture, Faisalabad for a period of nine months. One of the two ponds was designated as the control pond (without additives) and the other as treated pond (with additives). For the disinfection, both ponds were limed with calcium oxide by the dusting method. Both ponds were filled with water upto 1.5 m and this level was maintained throughout the study period. Both ponds were stocked in the ratio: 40 *Labeo rohita*, 30 *Catla catla* and 30 *Cirrhinus mrigala*. At the time of stocking, the fish body weights and lengths were also recorded. Fertilization of the treated ponds was done at the rate of 0.1 gm N/100 gm fish weight daily (Hassan *et al.*, 1996). The fertilizer

used in these studies was "nitrophos". Cultured fish species from the control and treated ponds were sampled every month to observe any change in the gain in the weight of three fish species. After making necessary observations, all three fish species were released back into their respective ponds. The growth data thus obtained was subjected to statistical analysis by using micro-computer IBM-PC. The comparison of mean values was made by using the analysis of variance through two-way classification (factorial experiment) with repeated sampling. A package from micro-statistics (mstat-c) was used for the data analysis (Steel and Torrie, 1980).

### Results and Discussion

**Average growth rate:** All fishes used in this study depicted an evident variation with respect to their growth rate. Initial and final average weight of *Labeo rohita* in control and treated ponds averaged 78.9, 185.5, 77.5 and 404.8 gm, respectively. For the *Cirrhinus mrigala*, initial and final average body weights were 102.6, 228.7 and 104.1, 507.5 gm respectively. For the *Catla catla*, the values recorded were 68.2, 148.4 and 68.6, 378.6 gm respectively (Table 1).

Maximum increase in weights of three fish species was noted in May for the control and in June for the treated ponds (Table 1). A minimum increase in the weight of all three fish species occurred during January and February. From the analysis of variance, it was evident that highly significant differences were found in the weight gains among three fish species for both the control and treated ponds (Table 2).

Seasonal and interpond differences in weight gain were found to be highly significant, whereas the interactions between species and treatments and between season and treatments, were also

Table 1: Fortnightly increase in body weights (gm) of culturable carps in the control and treated ponds.

Obs.date	<i>Labeo rohita</i>		<i>Catla catla</i>		<i>Cirrhinus mrigala</i>	
	Control	Treated	Control	Treated	Control	Treated
02.10.96	78.9	77.5	68.2	68.6	102.6	104.1
02.11.96	86.6	95.9	74.2	84.3	112.3	134.9
02.12.96	92.3	116.4	80.9	102.6	121.8	163.0
02.01.97	97.1	125.0	84.5	116.8	126.2	184.7
02.02.97	100.1	134.8	87.4	128.7	132.9	207.2
02.03.97	110.5	165.6	92.6	142.4	143.3	234.0
02.04.97	126.0	211.9	101.5	173.4	160.2	280.2
02.05.97	147.1	271.4	114.3	232.6	182.7	342.8
02.06.97	166.6	336.2	131.8	301.9	206.9	431.1
02.07.97	185.5	404.8	148.4	378.6	228.7	507.5

Shehzadi *et al.*: Effect of nitrophos on carps.

Table 2: Analysis of variance on body weight increments of culturable carps in control and treated ponds.

Source of variation	Degree of freedom	Sum of squares	Mean squares	F-values
Months	8	11638.230	1454.800	106.729**
Species	2	564.00	281.977	20.690**
MxS	16	311.74	19.470	1.480(ns)
Treatment	1	9809.127	980.912	719.660**
MxT	9	4056.623	507.780	37.20*
SxT	2	102.641	51.320	3.76*
Error	16	218.089	13.620	
Total	53	26700.140		

\* Significant at 0.05 \*\* Highly significant at 0.01

significant. However, the interaction between season and species were found to be non-significant. Similar results were reported by Boyd (1976) who found that by using the different ratios of N:P:K, an increase in fish production occurred. These studies are also in line with those of Wood and Shedden (1971). The best method of increasing fish production was described by Bishara (1978), who pointed out that by an addition of a dose of single superphosphate on monthly intervals at the rate of 20 kg/pond. In the present study maximum increase in fish weight was noted during May and June, while a minimum growth was recorded in January and February. Similar results were reported by Villaluz and Unggui (1983) while studying the impact of temperature on the activity, feeding, growth development and survival of young milk fish (*Chanos chanos*). According to them, lower temperature and hypoxial condition decreased the fish activity and food intake, whereas this ability was enhanced at higher temperature. Soderberg (1990) reported a highly significant and a positive correlation between temperature and growth rate of Blue Tilapia.

#### References

- Albinate, R.C.B. I.A.F. Veloso, G.C.A. Filho and F.L. Albinate, 1983. A gain in weight of *Serotherodon nilotica* and *Cyprinus carpio* in a polyculture system in tanks treated with chicken manure and superphosphate. Arq. Bras. Med. Vet. Zootec., 35: 669-708.
- Bishara, N.F., 1978. Fertilizing fish ponds: II-Growth of *Mugil cephalus* in Egypt by pond fertilization and feeding. Aquaculture, 13: 361-367.
- Boyd, C.E., 1976. Nitrogen fertilizer effects on production of *Tilapia* in ponds fertilized with phosphorus and potassium. Aquaculture, 7: 385-390.
- Daniels, H.V. and C.E. Boyd, 1993. Nitrogen, phosphorus and silica fertilization of brackish water ponds. J. Aquacult. Trop., 8: 103-110.
- Hassan, M., M. Javed and S. Hayat, 1996. Polyculture of major carps under broiler manure fertilization of ponds. Pak. J. Live Poul., 2: 65-71.
- Mahboob, S., 1992. Influence of fertilizer and artificial feed on the growth performance in composite culture of major, common and Chinese carps. Ph.D. Thesis, University of Agriculture, Faisalabad.
- Soderberg, R.W., 1990. Temperature effects on the growth of blue tilapia in intensive aquaculture. Progr. Fish-Culturist, 52: 155-157.
- Steel, R.G.D. and J.H. Torrie, 1980. Principles and Procedures of Statistics: A Biometrical Approach. 2nd Edn., McGraw Hill Book Co., New York, USA., ISBN-13: 9780070609266, Pages: 633.
- Villaluz, A.C. and A. Unggui, 1983. Effects of temperature on behavior, growth, development and survival in young milkfish, *Chanos chanos* (Forsk.). Aquaculture, 35: 321-330.
- Wood, G. and T.L. Shedden, 1971. Norris reservoir study: Effect of fertilizer on the food chain of organisms and fish production. J. Trans. World Am. Acad., 46: 81-90.