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Short Communication

Growth Performance of *Catla catla* Fingerling at Different Dietary Protein Levels

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ABSTRACT

Experiments were conducted to study the growth performance of *Catla catla* fingerling on whole feed basis. Fingerling were raised on diets containing low (40%), medium (45%) and high 50%) levels of protein. The ratio of animal to vegetable protein in the diets was maintained at 70:30 and 30:70 in experiment I and II, respectively. In both the experiments, the final body weight of fingerling *C. catla* was better on low protein diet than medium and high protein. The protein and energy conversion efficiency was also higher on low protein diet as compared to medium and high protein diets.

Key Words: *Catla catla*; Fish; Fingerling

INTRODUCTION

The commercially important indigenous fish species of Pakistan are extensively cultured under semi-intensive culture system. The need for commercial producer of major carps has created interest to obtain maximum growth of fingerlings during the first year at high stocking densities. The intensive culture system is the first step towards industrial production methods offering several advantages (Meshe, 1983). This system is exclusively feed based and is expected to be main stay for increasing fish production in the years to come (Sinah, 1991). Before following this system, it is essential to work out specific whole feed based nutritional requirements of each species of major carp as each species has different dietary protein requirements (Chaudhry & Sheri, 1999).

This study was, therefore, carried to work out the dietary protein requirements of *Catla catla* fingerling.

MATERIALS AND METHODS

The experiments were conducted to study the growth performance of *C. catla* fingerling on whole feed base in cemented tanks. The fingerlings produced by induced breeding were kept in cemented tanks and under went two weeks conditioning period to adjust to the experimental diets (25% crude protein). After acclimatization, 30 fingerlings were randomly stocked in each tank (average weight 1.52). The study was completed in two phases and under each phase two experiments were performed. Each experiment was run for 12 weeks. In phase I, the ratio of animal to vegetable protein in the diets was maintained at 70:30. Three diets having low (40%) medium (45%) and high (50%) levels of protein were offered in dry and powdered form @ 2 and 4% of wet body weight of fingerling twice a day i.e. 8.00 and 16.00 h). In phase II, the ratio of minimal to vegetable protein in three above diets was changed to 30:70. Each treatment had three replications. Dissolved oxygen and pH of water in each tank was monitored by changing water three times a day at 7.00, 1500 and 21:00 h.

Water temperature during study period remained almost constant. Ten fingerlings from each tank were taken on fortnightly basis after removing water and released in water immediately after weighing. The feed was stopped a day before the weight was recorded. The mean weight of fingerling in each tank was calculated to work out the feeding rate for the next fortnight. Feed and protein efficiency, protein and energy conversion efficiency were worked out according to Gatlin *et al.* (1986) and Fagerlund *et al.* (1983).

The data were tabulated and analyzed according to procedures described by Steel and Torrie (1986).

RESULTS AND DISCUSSION

Under phase I and II, the final body weight of fingerling *C. catla* was better on low protein diet than medium and high protein diets. The body weight on low protein diet was statistically significant; whereas, on medium and high protein diets the body weight was similar however, the difference was non-significant (Table I). The findings of the study support the results of Renukaradhya and Varghese (1986). At 4% feeding level, fingerling had

Table I. Weight of fish kept on feed having different dietary levels of protein

Feeding levels (%)		Low	Medium	High
Phase I	2	2.98 a	2.31 b	2.23 b
	4	3.05 a	2.51 b	2.59 b
Phase II	2	2.91 a	2.79 b	2.63 b
	4	2.08 a	2.66 b	2.26 b

attained higher growth than at 2% feeding level. The results suggest that 4% level of feeding is more suitable for better growth of fingerling. The results reported by Seenappa and Devaraj (1991) confirm the findings of the study.

The best feed and protein efficiencies were on low protein diet at 2% level of feeding in phase I and II. At 4% feeding level, the values of feed and protein efficiencies were decreased (Table II). The statistical analysis revealed that fingerling had utilized the feed and protein significantly more efficiently at 2% level of feeding. These findings coincide with the results of Gatlin *et al.* (1986). The feed and protein efficiencies at 2% feeding rate possibly be due to maximum utilization of small amount of available diet.

Table II. Feed and protein efficiency of different feed formulations

Feeding levels (%)		Feed efficiency			Protein efficiency		
		Low	Medium	High	Low	Medium	High
Phase I	2	0.20a	0.15b	0.15b	0.50a	0.31b	0.31b
	4	0.10a	0.8b	0.8b	0.26a	0.19b	0.17b
Phase II	2	0.17a	0.15b	0.29b	0.43a	0.34b	0.29b
	4	0.9a	0.6b	0.7b	0.21a	0.15b	0.17b

As regards, the protein and energy conversion efficiencies, the higher values were also observed on low protein diet as compare to medium and high protein diets, (Table III). Similar trend was shown by Chaudhry and Sheri (1999). However, the results were contradictory to the findings of Fagerlund *et al.* (1983). They reported that the values of protein and energy conversion efficiencies were higher at higher protein level.

Table III. Protein and energy conversion efficiency of different feed formulations

Feeding levels (%)		Protein conversions efficiency			Energy conversion efficiency		
		Low	Medium	High	Low	Medium	High
Phase I	2	6.78a	4.51b	4.43b	8.11a	5.88b	5.99b
	4	4.04a	2.72b	2.51b	6.26a	3.44b	3.46b
Phase II	2	5.91a	3.89bc	4.51b	7.66a	5.52b	6.51b
	4	3.23a	2.35b	1.88c	4.35a	2.93b	2.63b

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