

## **Impact Of Live Feed Organism Mixed Diet On Growth Performance Of Freshwater Fish *Labeo rohita* (Hamilton, 1822)**

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### **ABSTRACT**

Alive freshwater fish *Labeo rohita* were collected from commercial fish farms in and around Thanjavur from June 2014 to October 2014. The fishes were fed with control and experimental diet and growth performance such as ABW, ABL, body weight gain and specific growth rate were thoroughly studied adopting standard procedures. The result indicating that there was significant variation in growth parameters of control and experimental diet. The fish fed with live feed organism mixed diet have higher increment in body weight, length, weight gain and specific growth rate. The study reveals the fact that the aqua feed with live organism is more suitable for fish culture practice.

**Keywords:** *Labeo rohita*, Live feed organism, Growth performance.

### **INTRODUCTION**

Fish is a fairly valuable item of human nutrition which gaining greater recognition. The fishes obtain their entire nutritional requirements through the food they consume (Pillay, 1990). The growth of the fish mainly depends on the nutritional quality of the diet provided to them (Jayaprakash and Euphrasha, 1997). Generally live feed is rich in protein, carbohydrates and fats along with various types of vitamins and minerals (Singh *et al.*, 1994). Protein is the most expensive component in fish feed and also the most important factor affecting growth performance of fish (Luo *et al.*, 2004). Reducing the feed costs and improve growth rate could be a key factor for the

successful development of aquaculture (Kaur and Bains, 2005; Kalsoom *et al.*, 2009; Muhamed Yagoob *et al.*, 2010; Ahmed *et al.*, 2012; Pankajkumar *et al.*, 2013; Durre Shahwar Ruby *et al.*, 2013). The impact of artificial diets and live feed on growth of fishes have been extensively studied by many workers (Yahya Bakhtiyar *et al.*, 2001; Manivannan and Saravanan, 2012; Javaid Iqbal *et al.*, 2013). The present investigation was aimed to study the effect of live feed organism mixed diet on the growth performance of freshwater fish *Labeo rohita*.

## MATERIALS AND METHODS

Alive freshwater fish *Labeo rohita* were collected from June 2014 to October 2014 at commercial fish farms in and around Thanjavur, Tamil Nadu, India. The fishes were brought to the laboratory in alive condition acclimated and reared in glass tank (75 × 24 × 40 cm) for 7 days. The fishes were grouped into two groups namely control and experimental group consist of 20 fishes each, one group fed with formulated feed and another with live feed organism mixed diet. Continuous aeration was done with help of aerator. The water in both aquaria were changed every alternate days. The experiments were conducted for 50 days in replicate.

### Experiment diet and feeding:

Rice bran, groundnut cake, fish meal and tapioca flour were used to prepare control diet. The ingredients were ground well to a fine powder and mixed thoroughly with of water to obtain smooth dough. This was extruded through a pelletizer, the pellets were dried and then stored in dry airtight container at 28°C. Along with formulated feed ingredients, 10 per cent of live feed organisms *Daphnia* biomass was added and mixed well then pelletized, this is considered as experimental feed.

### Growth parameters:

During the feeding trial, growth performance of the fish was evaluated using Halver's Procedure (1972). The fishes in each tank weighed individually to the nearest 0.1 mg at 10 days interval. The length of the fish was also measured and average body weight and length were calculated. From the data the following parameters were determined and tabulated.

$$\text{Body weight gain (BWG)} = \frac{\text{Final weight} - \text{Initial weight}}{\text{Initial weight}} \times 100$$

$$\text{Specific growth rate (SGR)} = \frac{\ln(\text{Final weight} - \text{Initial weight})}{\text{Number of days}} \times 100$$

### Chemical analysis:

The proximate composition of feed were analyzed for crude protein, carbohydrate and crude fat extracted according to the standard method of AOAC (1999).

### Statistical analysis

One way analysis of variance (ANOVA; SigmaStat v. 3.5, Systat Software Inc, San

Jose, CA, USA) was used to determine whether significant variation between the treatments existed.

## RESULTS

In the present study, the proximate composition of the food ingredients used during the experiments was analysed and given in the table 2. The proximate composition of control diet (F1) and experimental diet (F2) showed a slight variation. The growth performance of *Labeo rohita* fed with control and experimental diet is given in the table 3. The increase in weights and lengths were used as measures of growth. The growth parameters of fish showed significant variation in control and experimental diet. The fish fed with live feed organism mixed diet have higher increment in weight (ABW) ( $64.2 \pm 1.42$  g) when compared to the control fed fish ( $58.1 \pm 1.26$  g). The average body length (ABL) was found to be high ( $18.8 \pm 0.49$  g) in experimental diet (F2) and low ( $17.4 \pm 0.47$  mm) in control diet (F1).

**Table 1** Composition of ingredients in the control and experimental diet

Ingredient	w/%	
	Control feed	Experimental feed
Rice bran	40	35
Groundnut cake	35	30
Fish meal	15	15
Tapioca flour	09	09
Vitamin and mineral mixture	01	01
Biomass of live feed	-	10

**Table 2** Proximate composition of control and experimental diet

Feed ingredient	Control feed (%)			Experimental feed (%)		
	Protein	Fat	Carbohydrate	Protein	Fat	Carbohydrate
Groundnut oil cake	17.325	0.59	5.68	14.85	0.51	4.87
Rice bran	3.00	0.76	4.84	2.62	0.66	4.23
Fish meal	7.22	1.07	2.69	7.22	1.07	2.69
Tapiaco flour	1.35	1.17	6.75	1.35	1.17	6.75
Biomass of live feed	-	-	-	2.66	1.71	2.12

**Table 3** Growth performance of *Labeo rohita*, fed with control feed and experimental feed

	Days	Average body weight (G)	Average Total length (cm)	Body weight (G) increased in 10 days	Total length (cm) increased in 10 days	Body weight Gain	Specific growth rate
Control	Initial	13.9 ± 0.39	8.6 ± 0.24	-	-	-	-
	10 <sup>th</sup>	19.6 ± 0.54	10.4 ± 0.29	5.7	1.8	41.00	17.40
	20 <sup>th</sup>	27.0 ± 0.68	12.4 ± 0.35	7.4	2.0	37.75	20.01
	30 <sup>th</sup>	36.3 ± 0.79	14.2 ± 0.41	8.5	2.1	31.48	20.14
	40 <sup>th</sup>	46.9 ± 0.97	16.7 ± 0.46	10.6	2.2	29.20	23.60
	50 <sup>th</sup>	58.1 ± 1.26	19.0 ± 0.52	11.2	2.3	23.88	24.15
Experimental	Initial	14.1 ± 0.41	8.8 ± 0.23	-	-	-	-
	10 <sup>th</sup>	21.3 ± 0.68	11.1 ± 0.31	7.3	2.3	51.77	19.87
	20 <sup>th</sup>	29.5 ± 0.75	13.6 ± 0.43	8.2	2.5	38.49	21.04
	30 <sup>th</sup>	38.7 ± 1.05	16.1 ± 0.49	9.2	2.5	31.18	22.19
	40 <sup>th</sup>	50.6 ± 1.24	18.7 ± 0.55	11.9	2.6	30.74	24.76
	50 <sup>th</sup>	64.2 ± 1.42	21.4 ± 0.61	13.6	2.7	26.87	26.10

The body weight gain (BWG) ranged from 23.88 to 41.00 mg in control diet (F1) and 26.87 to 51.77 mg in experimental diet (F2). The specific growth rate (SGR) showed a slight variation in fish fed with both control (F1) and experimental diet. SGR in control diet fluctuated from 17.40% to 24.15% day<sup>-1</sup> and 19.87% to 29.54% day<sup>-1</sup> in experimental diet.

## DISCUSSION

In the present study, the differences in growth of fish *Labeo rohita* could be attributed to the quality of feed, ingestion and digestion. The experiment diet contain live feed organism *Daphnia* (10%) resulted in better growth than control diet. Similar observations reported by earlier workers (Jayaprakash and Enphrasha, 1997). Singh *et al.* (1994) stated that the live feed is rich in protein, carbohydrate and fats along with various types of vitamins and minerals. Protein is the most important factor affecting growth performance of fish and fish cost (Luo *et al.*, 2004). Kaur and Bains (2005) obtained better growth with zooplankton mixed diet for *Labeo rohita*. BWG and SGR were found to high when fish fed with zooplankton mixed diet. The feed conversion ratio was highest on blood meal diet than rice bran and wheat bran mixed diet (Kalsoom *et al.*, 2009). Mohamad *et al.* (2010) observed that floating feed had much lower value of FRC than sinking feed. Manivannan and Saravanan (2012) recorded significant variation in growth performance of fish *Labeo rohita* fed with different diet. A significant increase in average body weight, FCR and grass fish production of fish fed with Tokyo when compared with rice bran diet (Ahmed *et al.*, 2012). The plant fed ingredient soybean and sunflower meal mixed diet gave good growth performance in *Labeo rohita* (Rehman *et al.*, 2013). In the present investigation

indicated that the fish were fed with live feed organisms have better growth and weight gain. Hence it suggested that aqua feed with live feed organism is more suitable for fish culture practice.

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