Effect of Fish Feed Combinations on Growth Performance and Survival Rates of Long Fin Banner Fish: *Heniochus acuminatus*

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Introduction

Aquarium keeping is amongst the most popular of hobbies with millions of enthusiasts worldwide and European Union is the largest market for marine ornamental fish (Chapman, 2000). Growth is one of the factors considered in export market and is influenced by many factors. Feed composition, quality and quantity of the feed and ration size are among the most important factors (Jobling, 1998). In marine aquariums, growth and survival rates of fish are not in satisfactory level. Survival rates are decreasing with the time and fish become slim unless they received a balanced diet. This research was carried out to find the better feed combination for *Heniochus acuminatus* using shrimp flesh and granulated feed for increasing their growth and survival rates. When their size and coloration is in excellent condition they can fetch a higher price at the export market.

Methodology

The experiment was conducted in a marine aquarium using 12 glass tanks (length 90 cm × width 70 cm × depth 70 cm). Fish were transported from Kinniya estuary, Trincomalee to the aquarium and acclimatized for five days in cement tanks. Hundred and twenty *Heniochus acuminatus* fish with same size were selected for the experiment by considering their healthy behavior and strong colorations. Initial weights (g) and standard lengths (cm) of each fish were recorded and then they were stocked in 12 tanks allocating 10 fish per tank. Every two weeks, standard length and weight of the fish were measured and surviving number of fish were counted in each tank.

Salinity, pH and temperature levels were monitored and recorded regularly. Feed treatment was designed with 2 feed types; fresh shrimp flesh and commercially available marine granulate. Feed type 1was granulate only (100%), feed type 2 was 25% shrimp and 75% marine granulate, feed type 3 was 50% shrimp and 50% marine granulate and feed type 4 was 75% shrimp and 25% marine granulate. Fish were hand fed twice per day in the morning (0900 hrs) and evening (1600 hrs) at 7% of body weight of fish. After feeding, tank bottoms were cleaned in order to remove excess feeds.

Specific growth rate (SGR), weight gain, length gain and survival rates were calculated. All data were subjected to one way analysis of variance (ANOVA) and differences between means were compared by the Turkey's test at a 95% confidence interval($p<0.05$).

Results and Discussion

There was a significant difference ($p<0.05$) in final wet weights, standard lengths and specific growth rates of fish among the 4 treatments. The highest mean wet weight (Figure 1), highest mean standard length and the highest mean SGR (Table 1.) were 7.492 g, 5.91 cm and1.698% respectively and all were recorded in the treatment 4 where fish were fed with 75% shrimp flesh and 25% marine granulate. Lowest mean wet weight, lowest mean standard length and the lowest mean SGR were 6.594 g, 5.188 cm and 1.404% respectively and were recorded in

treatment 1,where the tank was treated with 100% marine granulates. There was a significant difference in wet weight gain among the treatment 1 and 4. Length gain of the fish during the study period also significantly differed among all 4 treatments. Survival rates also significantly differed among treatment 1and treatment 4. Highest mean survival rates (96.67 ± 5.77) of fish were observed in the tanks treated with 50% and 75% shrimp flesh fed tanks (Table 1).Mean water temperature, salinity and pH levels were ranged between 25-28 °C, 23-28 ppt and 8.1-8.4 respectively.

Table 1. Effect of different feed treatments on weight gain, length gain, SGR and survival rates of the fish.

Feed Type	SGR	Weight Gain	Length Gain	Survival Rate
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
1 – Granulate only (100%)	6.6831±0.0101 [a]	1.9008 ±0.068 [a]	5.0861 ± 0.010 [a]	83.33 ± 5.77 [a]
2 – 25% Shrimp flesh& granulate	6.8403±0.1212 [b]	2.1732 ±0.052 [ab]	5.1944 ± 0.139 [b]	90.00 ± 0.00 [a]
3 – 50% Shrimp flesh& granulate	7.1339±0.1943 [b]	2.4356±0.1493 [bc]	5.5822 ±0.073 [c]	96.67± 5.77 [ab]
4 – 75% Shrimp flesh& granulate	7.4759±0.0254 [b]	2.6282 ± 0.245 [c]	5.8583 ± 0.045 [c]	96.67 ± 5.77 [b]

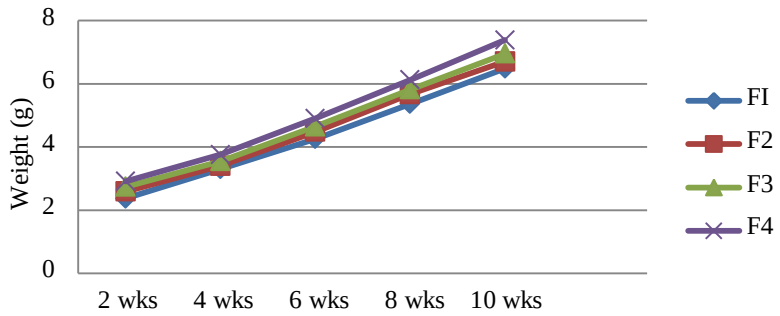

Figure 2. Effect of different feed treatments on the body weight.

Fresh shrimp flesh was more preferred and palatable for the carni-omnivorous fish *Heniochus acuminatus* than the dried granulates. On the other hand shrimps are one of their preferred feeds in their natural environments and nutrition compositions of the shrimp flesh (41.3% CP) (Ravichandran S., *et al.,* 2009) was superior than the marine granulates (35% CP).These reasons govern the best performances of the treatment 4 over the control.

Conclusion

Results have suggested that treatment 4 where fish were fed with 75% shrimp flesh and 25% marine granulate was the best that has given best growth performances and survival rates for the *Heniochus acuminatus* fish among four treatments.

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