



Effect of *Azolla* Supplementation in the Fish Feed on the Growth of Climbing Perch, *Anabas testudineus*.

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Abstract: Climbing perches (*Anabas testudineus*) were subjected to three types of feeding schedule (I-fish feed alone, II-fish feed + *Azolla* and III- *Azolla* alone). Growth measured through correlation between body weight and length during 25 weeks of study revealed positive trend with second feeding schedule i.e. fish feed with *Azolla*. The other two feeding schedules did not reveal statistically significant result. It appears that *Azolla*, a good source of protein mixed with fish feed could be a cost effective method for improving growth of fish.

Keywords: *Azolla* -Fish feed –Growth-Climbing Perch.

I. Introduction

Various kinds of supplementary feeds have been tried to accelerate the growth and production of fish per unit area [9]. These attempts are done to make use of cost effective diets on the basis of nutritional requirement of species and is expected to yield success in aquaculture. Use of non conventional feed stuffs such as byproducts and wastes of animals and soft aquatic plants (*Lemna*, *Hydrilla* and *Azolla*) as feed ingredients on the growth and yield have been tried on a number of fish species ([3], [10], [6]). The results are variable based on feeding habit (herbivorous, carnivorous and omnivorous) and nutritional requirements. Therefore experiments are needed to find out the changes in a variety of species.

The present study concerns the use of *Azolla* as feed substitute for climbing perch, *Anabas testudineus* and its effect on the characteristics of growth (body weight and body length) of this omnivorous species.

In *Azolla pinnata*, the nutrient contents (% dry weight) are Dry matter - 90.8, Crude proteins - 25.78, Crude fibre - 15.71, Ether extract- 3.47, N-free extract- 30.08, Total Ash-15.76 [2].

It appears that *Azolla* is a good source of protein and may be used as a nonconventional feed ingredient at low price. *Anabas testudineus*, the climbing perch is a member of Labyrinth fish family adapted to living in oxygen depleted water or in dry land. It has both gills and labyrinthine chamber which are able to absorb oxygen from water and air respectively. This species is easily available in ponds and can be maintained in the laboratory. It is omnivorous in feeding habit.

II. Materials and Methods

Climbing perches of both sexes were collected from the CIFA (Central Institute of Fresh Water Aquaculture) ponds of Bhubaneswar during the month of August. Their average body weight and length (snout to tip of tail fin) were 5.17g and 6.1 cm respectively. They were transferred to laboratory and maintained in concrete tanks each having capacity of 30 liters of water. The fish were reared in conditioned tap water for three days for acclimatization to laboratory condition (water temperature-25°C). After acclimatization, the fish were divided into three groups and each group of ten was maintained separately. Fish of group I were fed with fish feed (white rose constitutes white fish meal, shrimp meal, soyabean meal, wheat flour, wheat germ meal, dried yeast, squid, *Spirullina* gluten, 16 vitamins and 8 minerals). Fish of group II were fed with 50% *Azolla* fresh weight (FW) and 50% fish feed. Group III were fed with pellets of *Azolla* (FW). The feed percentage of each fish was 3% of body weight. Feeding was done two times a day. Body weight (g) and length (cm) of each fish from three groups were measured weekly for a period of 25 weeks (Fig.1).

Correlation coefficient (r) was calculated following suggested method [5] to find out the relationship between the body weight and length during the experimental period.

III. Results

Weight loss was marked in Gr I and Gr III (Fig 2) whereas increase in length was marked in Gr I for the first fortnight and a gradual increase in length was marked in Gr II as compared to the other two groups (Fig 3).

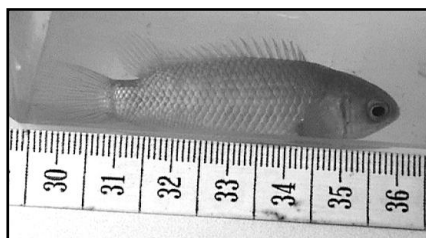


Fig 1 *Anabas testudineus*

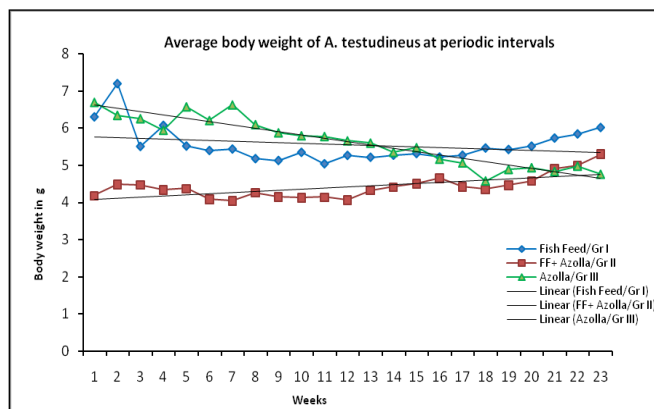


Fig. 2 Effect of *Azolla* as a feed substitute on the body weight of *A. testudineus*.

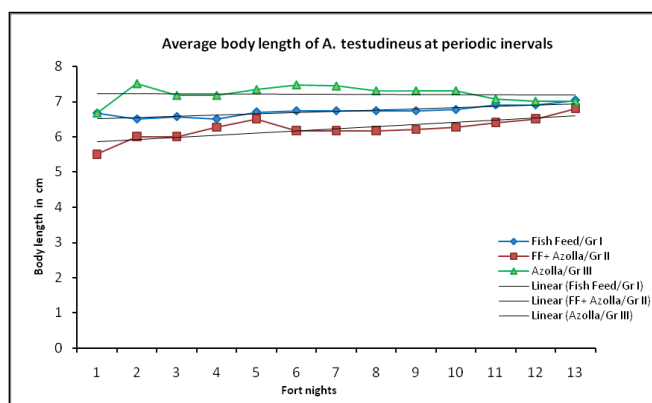


Fig- 3 Effect of *Azolla* as a feed substitute on the length of *A. testudineus*.

Digital value was taken for regression analysis. In regression table for weight (Table I) 'b' stands for the rate of increase. Fish Gr II showed positive growth. To measure the rate of change i.e. significant or insignificant, *t* was calculated. Probability value shows that the rate of change in weight in fish Gr II and Gr III is significant. Similarly, the increase in length is more in Fish Gr II. The rate of change in length in fish Gr I and Gr III were significant (Table II). Residuals show the change which is positive and negative. It is the difference between the predicted and actual value.

Table I Regression table between the weights of fish

Fish Group (Average weight)	b Coefficients	S.E. (b)	t	P value
I	-0.019	0.015	1.291	0.211
II	0.03	0.007	4.012	0
III	-0.09	0.007	12.817	0

Table II Regression table between the lengths of fish

Fish Group Average length	b Coefficients	S.E. (b)	t	P value
I	0.019	0.003	6.985	0
II	0.031	0.008	3.828	0.002
III	-0.003	0.009	0.363	0.723

Table III Correlation coefficient (r) between body weight and body length in *Anabas testudineus*

Group	Feeding schedule	'r' value	Level of significance
I	Fish Feed	-0.2382	ns
II	Fish Feed+ <i>Azolla</i> (FW)	0.5815	<0.05
III	<i>Azolla</i> (FW)	0.0856	ns

ns, not significant at 0.05 level

Individuals of group II (fish feed+ *Azolla*) showed positive correlation between body weight and length. The positive trend of growth was significant statistically (Table- III). In other two groups (G-I with fish feed alone and G-III with *Azolla* alone) the results were not statistically significant.

IV. Discussion

Many fish species currently cultured have a high protein requirement (30-50%) which vary from species to species and with stages of life of each species [1]. Due to rising cost, the use of conventional feed formula for fish meal have become difficult and forced scientists to find out non conventional, less expensive and alternative source. *Azolla* is consumed by many fish species which prefer it to other aquatic plants (*Tilapia rendalli*, *Ctenopharyngodon idella*, *Tilapia nilotica*, *Cyprinus carpio*)[4]. It has been reported that experimental fish (*Tilapia*)fed on a mixture of *Azolla* and rice bran grew slightly faster than those fed on *Azolla* alone (19%) and those fed on rice bran alone [7]. Our present findings in climbing perch exhibit almost similar type of results, using three types of feeding schedule (fish feed alone ,mixture of fish feed and *Azolla* and *Azolla* alone). That feeding of *Azolla* alone exhibited growth of fish in pond has also been reported [8].

V. Conclusion

Thus it appears that the plant protein of *Azolla* is not effective when fed alone but when mixed with rice bran or fish meal it has positive effect on the growth of fish. The use of such mixed feed material in cultured fish is desirable in view of less expensive and easily available plant protein in *Azolla* and other species of plants.

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