

# AZOLLA SUPPLEMENTATION: FEED COST BENEFIT IN DUCK RATION IN ANDAMAN ISLANDS

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## ABSTRACT

*A 13 weeks experiment was conducted to study the production performance and feed cost benefit with fresh Azolla supplementation in the feed of native local ducks. Forty indiscriminate local ducks of 20 weeks age were randomly divided into two groups with two replicates of each. Two replicates were assigned to each of the two dietary treatments in a completely randomized design, in such a manner that standard layer mash (control group) and commercial Layer mash + 200 gm fresh Azolla (Azolla group). The feed consumption was considerably low with Azolla supplementation as against control group. Results revealed that there was no significant difference in egg productivity between Azolla supplemented and control group. A significant amount of 30 per cent feed savings lead to reduced feed cost. Egg weight and other quality parameters were similar to control group. However, Roche fan colour score increased with Azolla supplementation in the diet*

**Key words:** Fresh Azolla supplementation, Duck, feed and feed cost savings

## INTRODUCTION

Duck constitutes as an important component in pond based models existing in Andaman and Nicobar group of Islands. There is high demand for duck meat and egg in the market. However backyard duck farming is having lower production level and less profitable due to shortage of feed and high cost involved in the procurement and transport of raw materials or readymade feed materials from mainland. Thus it is a critical need for an

alternative to directly replace the existing commercial feed thereby to reduce the feed cost and to improve performance of duck. Azolla is fairly a good source of protein and contains about 24-30% crude protein (on dry weight basis) since it is capable of assimilating atmospheric nitrogen due to the presence of symbiotic blue green algae, *Anabaena azollae* in its leaves. Hence considering the qualities of Azolla, a study was planned to evaluate Azolla as a direct feed supplement by replacing a portion of commercial feed in laying ducks.

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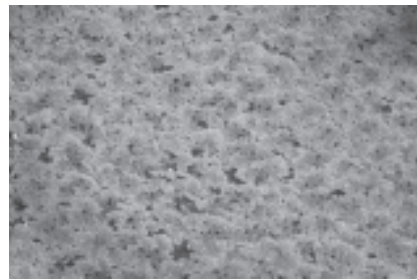
## MATERIALS AND METHODS

An experiment was conducted for a period of 13 weeks to study the production performance and feed cost benefit with azolla supplementation in native local ducks. *Azolla pinnata* seed material received from Tamil Nadu Agricultural University, Coimbatore was used as inoculum and was cultivated in a 27 m<sup>2</sup>-cemented tank in Animal Science division farm complex of the institute. Concrete tank contained a layer of soil and 10 cm of standing water supplemented with cow dung @ 1 kg and 30 gms of superphosphate per 10 litres of water for every 2 m<sup>2</sup> area with inoculums of 7 kg fresh Azolla. Fresh Azolla was harvested, washed four or five times thoroughly to remove the mud, sand, small roots and cow dung smell from the leaves. Fresh samples were sun dried immediately after collection and were analyzed for proximate principles as per the method of AOAC (1990).

Forty undisruptive local ducks of 20 weeks age were randomly housed in four pens with ten birds in each in a open sided house with a floor space of 4 sq ft per duck. They were divided into two groups with two replicates of each. Two replicates were assigned to each of the two dietary treatments in a completely randomized design. The two dietary treatments consisted of standard layer mash (control group) and commercial Layer mash + 200 gm fresh Azolla (Treatment /Azolla group). Fresh Azolla was offered to ducks in a separate container. Ducks were fed with commercial layer mash adlibidum from 20 to 33 weeks of age. The performance of ducks for the 13 weeks period was recorded. The chemical composition of commercial layer mash is shown in Table 1. The data on feed consumption, Hen

day egg production percent, egg weight were collected. Two eggs from each replicate were collected on the last day of every week for assessing egg qualities. Feed consumption, percent feed and feed cost saved by azolla supplementation were assessed. The feed cost: benefit ratio in terms of feed cost saved over control group was calculated.

## RESULTS AND DISCUSSION



Azolla biomass doubled in a week. Azolla yielded approximately 700-800 gms/ m<sup>2</sup>. The proximate composition of *Azolla pinnata* is given in Table 2. It contained dry matter, crude protein ether extract, crude fibre, and the total ash 6.6, 21.17±0.57, 3.39±0.11, 14.6±0.54, 19.91±0.98 per cent respectively. The calcium content was generally high. The calcium, phosphorus ratio was 2:1. Proximate compositions of Azolla grown under island condition were similar to various authors. The dry matter content obtained on proximate

analysis of sun dried Azolla used in this study is similar to Subudhi and Singh (1978). The crude protein is similar to Querubin *et al.* (1986). The same percent ether extract fraction of Azolla pinnata used for this study was obtained by Subudhi and Singh (1978) and Taklimi *et al.* (1993). Querubin *et al.*, (1986) has also reported the similar crude fibre content and average percent total ash of Azolla utilised for this feeding trial. The similar calcium values reported by Singh (1978) and Querubin *et al.*, (1986). The nutrient constitution of Azolla was found to be ideal for supplementation in duck ration.

The effect of Azolla supplementation on heday egg production percent, feed consumption and percent feed saved are tabulated in Table 3. The cumulative layer performance is given in the Table 4. The average daily intake of feed was 153g for ducks due to Azolla substitution and 219g for control group. The feed consumption was considerably low with Azolla supplementation as against control group. More importantly significant amount of 30 per cent feed savings lead to reduced feed cost. By considering the average cost of the commercial feed as Rs.16 per kg feed, a 30 percent saving in the consumption of commercial feed due to Azolla supplementation resulted in feed cost savings of Rs.1 per duck per day. Accordingly, Escobin (1987) recorded significantly improved production efficiency with azolla supplementation in duck ration. Khatun *et al.*, (1999) assessed Azolla for nutrient content and feeding value in laying hen diets. Azolla was included at a level of 50, 100, 150 and 200g kg<sup>-1</sup> at the expense of sesame meal and was found that azolla meal could replace sesame meal on a digestible protein and

digestible aminoacid basis up to 200g kg<sup>-1</sup> diet for better egg mass out put and FCR at a level of inclusion of 200g kg<sup>-1</sup>. The similar better productive performance has been obtained by Kannaiyan and Kumar (2005) in terms of higher egg yield and saved feed of 20 per cent and cost of 10.0 paise per day per bird with Azolla supplementation @ 100gm fresh per bird per day.



The total number of eggs laid in the control group was 41 and 40 for Azolla group. Average hen day egg production percent of Azolla fed group (38.88 per cent) was comparable with control group (39.22 per cent). The number of eggs laid and the hen day production did not vary much among the two Azolla supplementation and control groups. The variation noted in production performance is very small. Thus the results revealed that there was no significant difference in egg productivity between Azolla supplemented and control group. It indicates that Azolla supplementation in the feed of laying ducks did not affect egg production adversely.

Egg weight and other quality parameters such as shape index, Albumen index, and Yolk index and shell thickness of fresh Azolla

substitution group were similar to control group. However, Roche fan colour score increased with Azolla supplementation in the diet. The eggs in the control group of ducks had a yolk colour score of 6.0 that increased to 7.4 with Azolla diet. Thus, the pigmenting ability of Azolla group was clearly demonstrated by its higher Roche fan colour score and this could be due to ability of Azolla to pigment the yolk as it is rich in beta carotene pigment. Similar influence on yolk colour due to inclusion of Azolla in layer ration was reported by Bastian (1987). It indicates that fresh Azolla substitution used in this study was not lowering the production efficiency of ducks.

In view of these results and considering the high price of commercial feed, Azolla has a very good future in duck feeding. A backyard duck farm having 50 ducks will require about 10kg fresh Azolla per day to replace 30 per cent of commercial feed. To meet out the daily need of fresh Azolla, the cultivation of Azolla in a shallow pond of 68 m<sup>2</sup> or 17 shallow tanks of each of 4m<sup>2</sup> with 30 cm depth is required. Thus approximately fifty rupees could be saved in a day towards feed cost. A water body can be made under the shade of tree with the help of silpauline sheet which is highly suitable and preferable for island geographical location.

It is concluded that fresh Azolla could replace commercial feed up to a level of 30 percent with the savings in feed cost of Rs.1 per duck per day by supplementing fresh azolla in the feed of backyard ducks at the rate of 200g per duck per day. Azolla could be considered as a promising suitable feed substitute for backyard duck farming and a boon to island farmers.

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**Table 1: Proximate analysis of commercial layer feed (per cent - on dry matter basis)**

Crude protein	18.0
ME (Kcal/kg)	2600
Calcium	2.75
Available phosphorus	0.50
Lysine	0.50
Methionine	0.25
Crude fibre	8.0
Salt	0.5

**Table 2: Proximate analysis of Azolla (percent on dry weight basis)**

Moisture	6.62
Crude protein	21.17
Crude fiber	14.6
Ether extract	3.39
Total ash	19.91
Calcium	1.05
Phosphorus	0.52
Iron	0.49
Manganese	0.2

**Table 3. Effect of Azolla supplementation on layer performance**

Age in weeks	Henday Egg production percent		feed consumption (kg per bird per day)		per cent feed saved over control
	Control	Azolla	Control	Azolla	
20	12.86	12.50	0.214	0.1501	30
21	28.57	26.79	0.214	0.152	29
22	32.86	39.29	0.214	0.154	28
23	31.43	71.43	0.214	0.150	30
24	35.71	57.14	0.214	0.152	29
25	37.14	55.36	0.214	0.154	28
26	55.71	30.36	0.214	0.146	32
27	58.57	62.50	0.214	0.141	34
28	62.86	50.00	0.224	0.150	33
29	57.14	50.00	0.214	0.152	29
30	44.29	38.43	0.214	0.148	31
31	28.57	24.57	0.240	0.163	32
32	32.86	22.29	0.233	0.165	29
33	25.71	18.57	0.231	0.157	32
	<b>38.88</b>	<b>39.94</b>	<b>0.219</b>	<b>0.153</b>	30.43

**Table 4. Effect of Azolla supplementation on cumulative layer performance**

<b>Criteria</b>	<b>Control</b>	<b>Azolla</b>
Number of eggs laid per duck	41	40
Hen day egg production per cent	39.94	38.88
Egg weight (g)	65.83±0.11	65.68±0.15
Shape Index	71.20±0.86	70.22±1.12
Albumen Index	0.094±0.0052	0.085±0.001
Yolk Index	0.42±0.0045	0.42±0.005
Yolk colour	6.22±0.14	7.41±0.16
Haugh Unit	78.20±5.11	80.41±6.11
Shell thickness(mm)	0.336±0.008	0.337±0.005
Total feed consumed per duck (kg)	21.5	15.00
Average feed consumed per duck per day (g)	219	153
Feed cost saved/duck/day (Rs)		1

Feed cost: Rs.16/kg