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## Efficacy of *Azolla pinnata* as an adjunct to increase poultry weight, egg production and egg weight

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### Abstract

The water fern *Azolla* spp. is found to be rich in protein and minerals. *Azolla* (*Azolla pinnata*) is being assessed for feeding value in laying hen diets. The feeding value of *Azolla* in laying hens was studied in this trial. *Azolla* meal was included at a level of 200 g kg<sup>-1</sup> feed diet. A total of 60 poultries were selected for study which, were randomly divided into 3 groups. In gr 1, the poultry was fed with household feed, gr 2 was fed with a nutritional poultry feed grain rich in protein along with the diet. In gr 3, 200 g kg<sup>-1</sup> feed *Azolla* meal was included in diets. The performance of gr 3 was compared to that of the gr 1 and 2, on the basis of body weight and the egg production and its weight. There was a significant increase in the egg production and weight in egg. Poultry in gr 1 produced green shell egg. The greenish pigmentation of egg shell is giving the farmers double the rate of a normal egg.

**Keywords:** *Azolla*, small & marginal farmers, growth and profitability

### Introduction

Despite the fact that poultry industry in India has created exceptional progress throughout last three decades, nonetheless the raising expense and inaccessibility of the feed ingredients are the significant hindrance for target production. Almost 30% eggs and 35% meat are produced with the aid of the rural poultry production system in India [5]. Feed is that the costliest of all inputs and concerning 70% of manufacturing cost is accounted for feed alone [6].

*Azolla* is incredibly wealthy in proteins, fundamental amino acids, vitamin A, vitamin B12, Beta Carotene, growth promoter intermediaries, calcium, phosphorous, potassium, ferrous, copper, magnesium etc. *Azolla*, is established of 25-35% protein, 10-15% mineral and 7-10% a mix of amino acids, bio-active substances and biopolymers on a dry weight basis. *Azolla* are very low in carbohydrate and oil content [4].

This experiment was designed with the view to reduce the cost of feed and increasing the poultry weight and egg production rate for increasing the income of farmers by addition of *Azolla pinnata* in the poultry feed. The dose of 200 g kg<sup>-1</sup> feed *Azolla* meal in the diet is said to be sufficient for a good egg production rate and poultry weight growth. Feeding studies with chickens revealed that inclusion of fresh *Azolla* in the diet can replace about 20% of commercial feed [7]. This experiment was conducted at Sonaraitari block, Deoghar District (Jharkhand). In the villages under investigation, 25.31% population was landless followed by marginal (32.25%) and small farmers (42.44%). The average family size of 7.1 with average annual family income of Rs.14567/.

### Materials and Methods

Pure breed of Kadaknath were crossed with crossed with Divyayan Red breed brought from R. K. Mission, KVK Ranchi and distributed to farmers by KVK Deoghar.

***Azolla* cultivation:** *Azolla pinnata* was cultivated in small pits of 2 x 1 x 0.2 m (L x W x D) dimensions and in village ponds. The pits floor was lined with synthetic resin sheets and around two-kilogram fresh cow dung and two kg soil was blend in a exceeding bucket of water and poured within the pit. The pits were full of fresh water and around 0.5 kg of fresh *Azolla* was inoculated within the pit with the aid of spreading on the surface. The pits were created close to the poultry house. The water was supplanted at month to month spans.

**Experimental layout:** A total of 60 poultries were selected for study which were divided into 3 groups, randomly. For the purpose 3 groups of farmers were identified as:

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Group I: No supplementary feeding; only household feed grazing in backyard was practiced.

Group II: Grazing in backyard + 0.5-1 kg feed grains/50 birds/day was supplemented.

Group III: *Azolla pinnata* was provided @200 g kg<sup>-1</sup> feed to the birds

The following data has been collected:

The body weight of birds was collected on 8, 20<sup>th</sup> and 40<sup>th</sup> week of their age.

The egg weight and their egg production were taken on the 40<sup>th</sup> week of their age.

**Results**

*Azolla* cultivation: Jharkhand has 3 distinct seasons viz., summer, rainy, autumn and winter season. The temperature during summer reaches 38-40 °C and during winter months may drop to 5-7 °C as lowest peak. The growth of *Azolla pinnata* was optimum for 9-10 months but decrease was seen during mid-December to January and June months. In peak season when the ideal temperature was available (15-30 °C), 4-6 kg fresh fern was harvested per week from each pit.



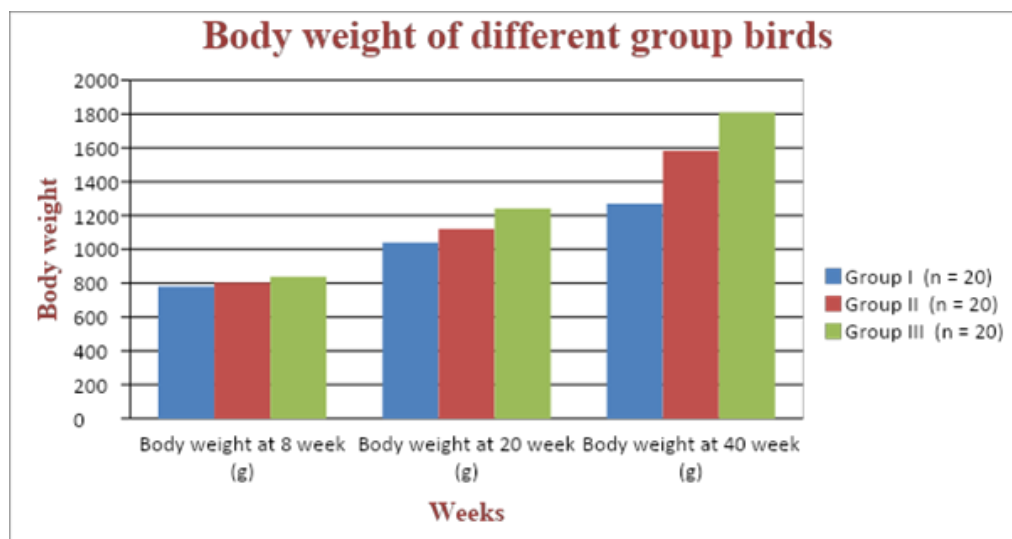
Effect on growth: There was significant difference in the body weight gain among the treatment groups from 20<sup>th</sup> week of age. The weight gain of poultry in different groups were given in the table-1. The body weight gain in *Azolla* fed group (gr

III) was 1.81 kg at 40<sup>th</sup> week which were significantly higher as compared to 1.582 kg in Group-II and 1.269 kg of Group-I.

**Table 1:** Efficacy of *Azolla* feeding on body weight

Group	Body weight at 8 week (g)	Body weight at 20 week (g)	Body weight at 40 week (g)
Group I (n = 20)	781 ± 10.20	1039.5 ± 11.90 <sup>a</sup>	1269 ± 12.93 <sup>a</sup>
Group II (n = 20)	802 ± 11.20	1121.5 ± 12.25 <sup>a</sup>	1582 ± 13.99 <sup>a</sup>
Group III (n = 20)	838 ± 13.21	1241 ± 14.10 <sup>b</sup>	1810 ± 14.86 <sup>b</sup>

(n = number of birds)

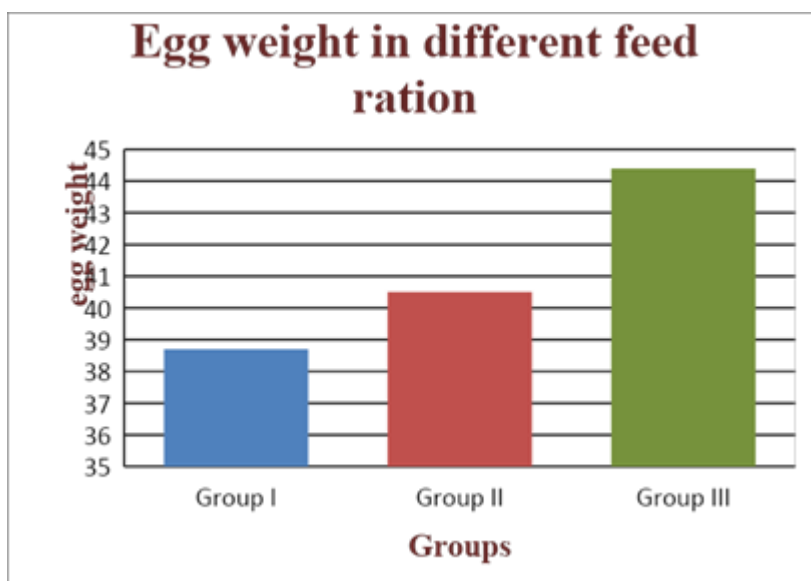


**Chart 1:** Diagram showing the comparative weight gain on different feed type at different week intervals.

Status of egg production and effect of *Azolla* feeding were observed in the egg laying birds in the all groups. The results are conferred in the table-2. Egg weight of group III was significantly higher than the other groups. The Group-III birds produced 46.71 gm eggs which was lower in Group-I (40.06) & II (42.93).

**Table 2:** Effect on egg weight

Group	Weight of egg (g)
Group I (n = 20)	40.06 ± 0.7 <sup>a</sup>
Group II (n = 20)	42.93 ± 1.2 <sup>a</sup>
Group III (n = 20)	46.71 ± 0.9 <sup>b</sup>



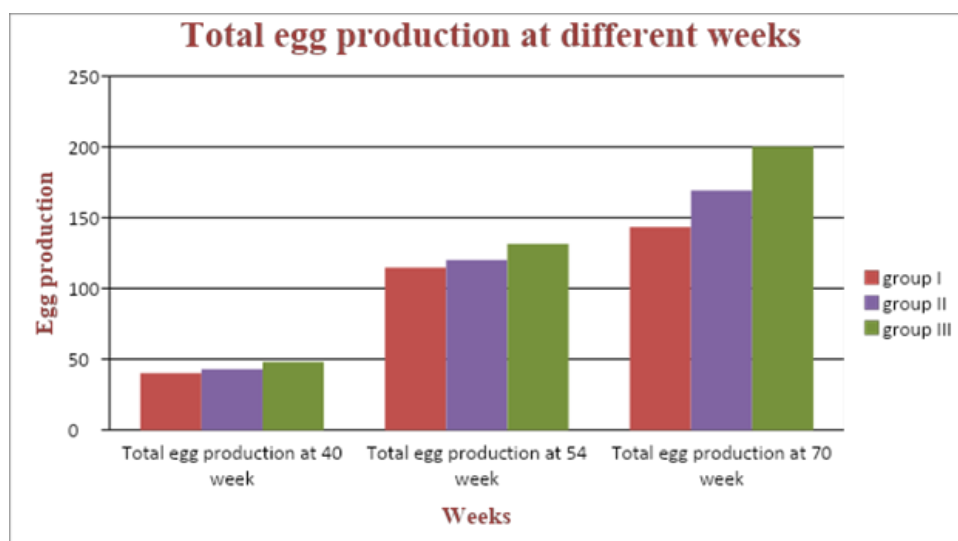
**Chart 2:** Egg weight after 40 weeks

Total egg production was significantly higher in gr III as compared to gr I and gr II on 54 week and 70 weeks of age (table 3). On an average 203 eggs have been produced by layers from gr III upto 70 weeks of age. The higher growth

rate, egg weight and egg production were also reported by workers [1] [2] [3] [8] which may be due to higher protein content of *Azolla* which meet the major requirement of the body. The reports are in conformity with other workers [2].

**Table 3:** Effect on egg production

Group	Total egg production at 40 week	Total egg production at 54 week	Total egg production at 70 week
Group I (n = 20)	40.05 ± 2.79	114.75 ± 3.02 <sup>a</sup>	143.45 ± 3.37 <sup>a</sup>
Group II (n = 20)	42.95 ± 2.78	120.1 ± 3.09 <sup>a</sup>	169.1 ± 3.16 <sup>a</sup>
Group III (n = 20)	48.15 ± 3.68	131.55 ± 3.96 <sup>b</sup>	200.25 ± 4.05 <sup>b</sup>



**Chart 3:** Egg production indifferent week intervals

The smaller size of leaf of *Azolla pinnata* is worthy for intake by the chicks and also by grower/adults. In the present study integration of *Azolla* cultivation and feeding to birds under semi-range saved the feed cost by more than 80%.

Evaluation of return and livelihood: Almost 90% farmers sold

birds when they attained body weight between 1.5 -2 kg. Due to the higher body weight, increased egg production and greenish colour egg due to *Azolla* feeding gave the better income in gr III as comparison to other groups.

### Conclusion

Rural poultry production system, particularly semi range-based technology, can be a viable tool for poverty alleviation among landless and small land holder masses. This doesn't need higher level of technical competency. Based on the consequences obtained, it may additionally be concluded that dietary substitute of 20% protein source through *Azolla* has effective influence on enchantment in terms of body weight and net returns per bird. Therefore, 20% *Azolla* may be incorporated in the diets of birds to make the poultry production more profitable. *Azolla* technology will be taken up in a big way by the poultry farmers, especially, by those who experience higher feed cost.

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