

Original Research Article

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Performance of Azolla (*Azolla pinnata*) Meal on Body Weight Gain and Dressing Percentage of Vanraja Poultry Birds

Mohammad Jawad Tawasoli, P. A. Kahate*, R. R. Shelke,
S. D. Chavan, S. R. Shegokar and S. P. Nage

Department of Animal Husbandry and Dairy Science,
Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola 444104 (MS), India

*Corresponding author

ABSTRACT

The present investigation entitled Performance of feeding Azolla (*Azolla pinnata*) meal on body weight gain and dressing percentage of Vanraja poultry birds was carried out to assess the effect of feeding Azolla meal on body weight and dressing percentage of Vanraja poultry bird's production. One hundred and fifty chicks of day old straight run commercial Vanraja birds were procured Matoshri Distributors, Amravati Hatchery. They were randomly and equally distributed into five treatment groups T₁, T₂, T₃, T₄, and T₅ with 30 numbers of chicks in each group. Azolla meal was added in experimental ration at different levels. The dietary treatments consisted of one basal control (T₁) and supplemented with 3, 6, 9, and 12 per cent Azolla meal to the birds in T₂, T₃, T₄, and T₅ treatment, respectively. The corresponding average live body weights at the end of seven weeks of age were 991.30, 1036.04, 1128.59, 1079.22 and 1042.40 g in T₁ to T₅ treatment groups, respectively. The average weekly cumulative body weight gain at seventh week of age were recorded as in gram 958.1, 1003.39, 1095.14, 1047.28 and 1009.45 for T₁, T₂, T₃, T₄, and T₅ treatments groups, respectively. The average dressing percentage among the different treatment group varied between 69.07 to 64.11 per cent.

Keywords

Vanraja, Azolla (*Azolla pinnata*) meal, BW gain, Dressing percent

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Introduction

Poultry farming is the raising of domesticated birds such as chickens, Duck, Turkey, and Gees for the purpose of meat or eggs as food. Poultry industry is fast growing segment of the agriculture sector in the world. Modern intensive poultry industry demands more rapid growth in a confined housing environment which leads to greater

susceptibility to stress in broilers. Poultry industry has made a tremendous and remarkable progress evolving from a small scale backyard venture to the status of commercial, full fledged, self-sufficient and most progressive agro based industry and become an attractive enterprise particularly because of the small capital investment, more returns, quick turn over, comparatively less risk involved, low land requirement, easy to

production and high feed conversion efficiency. Poultry are much more prolific than other livestock and through careful scientific breeding policies; they have become efficient converters of vegetable protein into high quality animal protein food for human consumption.

Feed is the most expensive of all inputs and about 70% of production cost is accounted for feed alone (Ara *et al.*, 2015). Recently, there is an increased emphasis in the use of aquatic plants in poultry rations because the protein and other nutrient content in them are comparable to certain leguminous plants.

Aquatic plants species accumulate secondary plant compounds and therefore offer greater potential than many other types of leaf protein sources (Balaji *et al.*, 2009).

Among the aquatic plants floating fern *Azolla pinnata* can be used as unconventional high potential feed resource and it contains almost all essential amino acids, minerals such as iron, calcium, magnesium, potassium, phosphorus, manganese etc. apart from appreciable quantities of vitamin A precursor beta carotene and vitamin B12. *Azolla* have symbiotic relationship with the nitrogen-fixing blue-green algae.

Vanaraja is a dual-purpose chicken variety developed by the Project Directorate on Poultry in Hyderabad, India. These breeds grown fast and produce more number of eggs, require low input like feed, management, health care, housing etc. and sustain different vagaries of climatic and environmental changes (Thiruvankadan *et al.*, 2010).

Important features of this breed are multi-color feather pattern, immunity to disease, perform with less nutrition, grow faster and produce more eggs as well meat, produce brown eggs like local hens.

Materials and Methods

The present research work was carried out at livestock instructional farm, Department of Animal Husbandry and Dairy Science, Dr. PDKV, Akola and Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola, (MAFSU) during the year 2018-19. Which is one of the district of Vidarbha region in Maharashtra State. The environmental condition affects directly the performance of birds and indirectly of feeds which is available. It is therefore, necessary to described topographical and climatological situation of the place. Akola located at the latitude of 22.420 North and longitude of 77.020 East with height 307.4 Meter above mean sea level.

150 day old chicks of Vanraja breed were procured from hatchery. They were randomly and equally distributed in to five dietary treatments consisted of on basal control as standard ration (T₁), Standard ration + 3 % azolla meal (T₂), Standard ration + 6 % azolla meal (T₃), Standard ration + 9 % azolla meal (T₄) and Standard ration + 12 % azolla meal (T₅). The diet was fed *ad libitum* to experimental birds as per the treatments given as above. All the chicks were fed with ground maize for first two days of age. For the experiment, a commercial starter (0-3 weeks) and finisher (4-7 weeks) crumbles were used as per treatment during experimental period of seven weeks. The vaccination programme of experimental birds was scheduled weekly.

Before arrival of Vanaraja chicks the pens, waterer (Drinker), feeders, brooders floor were cleaned, washed, disinfected and fumigated. All the experimental chicks were reared on deep litter system of rearing with use of saw dust as a litter material in a well-ventilated house with identical management and environmental conditions. Proper

brooding of chicks was done by providing sufficient heat and light by using electric bulbs in each group for first three weeks of age. Afterwards, sufficient artificial light was provided during night hours throughout the experimental period. Fresh and clean drinking water was provided to the experimental birds ad-libitum.

The experimental chicks were weighted individually at weekly interval up to the seven weeks using electronic balance. Weekly feed consumption was calculated by the amount of feed offered at the beginning of week, minus left over at the end of week and cumulative feed consumption was worked out for all the treatment groups.

Azolla meal production

Fresh Azolla culture was spread over the water in the tank, after maturation of Azolla, harvested and collection. The harvested Azolla was washed with brine solution and dried in the shed. After drying the Azolla was grinded in form of powder with the help of grinder. Then powder was kept air tied in the polythene bags until used for experimental trial.

Statistical analysis

The data denoted on feed consumption and feed efficiency was analyzed by Completely Randomized Design described by Amble (1975).

Results and Discussion

In present study with an objective to study effect of feeding Azolla meal on performance of Vanraja poultry birds was recorded during the period of experiment, data obtained was analyzed statistically, presented and discussed in the light of finding of earlier researchers.

Effect of Azolla meal on average weekly overall live body weights of Vanraja poultry birds

The data obtained in respect of average weekly live body weight of vanraja poultry birds from day old to seven weeks age in all treatment groups are statistically analyzed, tabulated and presented in Table 1.

It was observed from present study that, the average live body weight of Vanraja poultry birds at day old stage were 33.20, 32.65, 33.45, 31.94 and 32.95 for the treatments T₁, T₂, T₃, T₄ and T₅ respectively. The initial body weights of Vanraja poultry birds were statistically non-significant in all dietary treatments indicating that the treatments were homogenous in nature.

The corresponding average live body weights at the end of seventh week of age were 991.30, 1036.04, 1128.59, 1079.22 and 1042.40 g T₁, T₂, T₃, T₄ and T₅ treatment, respectively. The significant difference in weekly body weight was found from third week and onward. The trend of significantly better growth was recorded in T₃ (1128.59) and followed by T₄ (1079.22) groups during seventh week. It indicated that the beneficial effect of feeding 6% Azolla meal than above level.

This might be due incorporation of azolla meal in feeding Vanraja birds. The findings observed by various research workers are also reported Shegokar (2017) was studied that 5% azolla meal is better by increasing body weight of Giriraja birds. The addition of Azolla in diet resulted in significantly higher body weight as compared to that of control group. Similar results were also reported by Ara et. al. (2015) feeding potential of Aquatic Fern-Azolla at the rate of 5 % Azolla in Broiler Chicken Ration, Bajad (2017).

Effect of feeding Azolla meal on average weekly body weights gain of Vanraja poultry birds

The data recorded on the average weekly live body weight gain was statistically analyzed, tabulated and presented in Table 2.

The initial body weight gain of Vanraja poultry birds for all treatments were almost similar showing statistically non-significant difference up to first week of age. Average weekly body weight gain at seventh weeks of age was 227.05, 225.93, 264.99, 247.62 and 215.39 g in T₁, T₂, T₃, T₄ and T₅ treatments, respectively.

The significant difference in weekly body weight gain was found on second and fifth week. The trend of growth was recorded in T₁ (227.05), T₂ (225.93), T₃ (264.99), T₄ (247.62) and T₅ (215.39) groups on seventh week.

Average weekly live body weight gain as treatment mean was calculated as 136.87, 143.34, 156.45 and 144.21 for T₁, T₂, T₃, T₄ and T₅ respectively, were denoted that supplementation of Azolla meal is beneficial and positively affected on live body weight gain. This is might be due to inclusion of 6 per cent azolla meal supplement in feeding of Vanaraja poultry birds.

The results recorded in the present investigation are also supported and in agreement with results recorded by other researchers like Islam and Nishibori (2017) reported that the body weight gain in bird were significantly improved by addition of 5% azolla meal than controlled diet.

Similarly, Ara *et.al.* (2015), Safa Eltazi (2014), Naghshi *et al.*, (2014) and Shegokar *et al.*, (2016), reported that increasing trend was observed in body weight gain in birds.

Effect of Azolla meal on average weekly overall live body weights of Vanaraja poultry birds

The data obtained in respect of cumulative live body weights gain of vanraja poultry birds from day old to seven weeks age in all treatment groups are statistically analyzed, tabulated and presented in Table 1.

The cumulative body weight gain was found to be statistically significant from third week onward. The average cumulative weight gain at seventh week of Vanraja poultry birds for treatments were 958.1, 1003.39, 1095.14, 1047.28, 1009.45 g for T₁, T₂, T₃, T₄ and T₅ respectively. The cumulative weight significantly higher observed for treatment T₃ (1095.14 g) and followed by T₄ (1047.28 g) T₅ (1009.45 g), T₂ (1003.39) and T₁ (958.1).

Treatment T₃ which can be denoted that the supplementation of Azolla meal at the rate of 6 per cent as feed supplement is beneficial and positively affected on live body weight gain.

The results recorded in the present investigation were also supported and in agreement with result recorded by some of following researchers. Islam and Nishibori (2017) observed that increased the BW gain of broiler with supplementation of Azolla. Similar results were also reported by Shegokar *et al.*, (2016), Ara *et. al.* (2015), Bajad *et al.*, (2017) and Abdul Hafis (2017) were found for feeding of azolla supplementation to Griraja poultry birds.

Effect of Azolla meal on mean value of dressing percentage of Vanraja poultry birds

Dressing percentage for all the treatment groups was calculated by slaughtering three birds from each treatment groups. The

dressing percentage was analyzed and tabulated in Table 4. The average dressing percentage among the different treatment groups was recorded as 64.11, 66.14, 69.07, 67.12 and 68.62 percent for treatment T₁, T₂, T₃, T₄ and T₅, respectively. The difference among all the treatment groups was found significant. Numerically higher dressing percentage was recorded in treatment T₃ (69.07) and followed by T₅ (68.62). It shows the positive and beneficial effects of herbals like azolla meal feeding on dressing percentage.

Results recorded by some of research worker as discussed below are in agreement with present results. Safa Eltazi (2014) conducted experiment on the effects of feeding different mixture levels of garlic and ginger powder as natural feed additives and results showed that significantly (P<0.05) heaviest body weight gain and highest dressing percentage with the highest commercial cuts percentages. Similar result was reported by researchers like Basak *et al.*, (2012), Naqshshi *et al.*, (2014).

Table.1 Average weekly live body weight of Vanaraja birds (g/bird)

Treatments	Initial weight	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week	7 th week
T ₁	33.20	90.50	142.6	263.87	456.75	642.94	764.25	991.30
T ₂	32.65	90.50	145.4	266.39	485.01	671.87	810.11	1036.04
T ₃	33.45	90.88	154.7	281.45	499.22	710.52	863.6	1128.59
T ₄	31.94	92.10	148.8	274.10	491.47	691.56	831.6	1079.22
T ₅	32.95	91.18	148.0	269.41	487.62	674.94	827.01	1042.40
‘F’ test	NS	NS	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)+	0.419	0.657	1.168	2.436	4.754	2.338	11.72	12.057
CD (at 5%)	--	--	3.681	7.676	14.98	7.367	36.93	37.992

Table.2 Average weekly body weights gain of Vanraja Birds (g)

Treatment	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	Treatment
T ₁	57.3	52.1	121.27	192.88	186.19	121.31	227.05	136.87
T ₂	57.85	54.9	120.99	218.62	186.86	138.24	225.93	143.34
T ₃	57.43	63.82	126.75	217.77	211.3	153.08	264.99	156.45
T ₄	60.16	56.7	125.3	217.37	200.09	140.04	247.62	149.61
T ₅	58.23	56.82	121.41	218.21	187.32	152.07	215.39	144.21
Week	58.19	56.87	123.14	212.97	194.35	140.95	236.20	
‘F’ test	NS	Sig.	NS	NS	Sig.	NS	NS	
SE(m) _±	0.716	1.254	1.669	30.288	5.303	12.198	19.511	
CD (at	--	3.952	--	--	16.711	--	--	

Table.3 Average weekly cumulative live body weights gain of Vanraja (Bird/ g/week)

Treatment	1 st week	2 nd week	3 rd week	4 th week	5 th week	6 th week	7 th week	Treatment mean
T ₁	57.3	109.4	230.67	423.55	609.74	731.05	958.1	445.69
T ₂	57.85	112.75	233.74	452.36	639.22	777.46	1003.39	468.11
T ₃	57.43	121.25	248	465.77	677.07	830.15	1095.14	499.26
T ₄	60.16	116.86	242.16	459.53	659.62	799.66	1047.28	483.61
T ₅	58.23	115.05	236.46	454.67	641.99	794.06	1009.45	472.84
Week mean	58.19	115.06	238.21	451.18	645.53	786.48	1022.67	
'F' test	NS	NS	Sig	Sig	Sig	Sig	Sig	
SE(m) _±	0.716	81.406	2.308	3.954	5.138	10.054	13.799	
CD (at 5%)	--	--	7.273	12.459	16.189	31.677	43.479	

Table.4 Mean values of dressing percentage of Vanraja Poultry Birds

Treatments	Mean dressing percentage
T ₁	64.11
T ₂	66.14
T ₃	69.07
T ₄	67.12
T ₅	68.62
'F' test	Sig.
SE(m) _±	0.58
CD (at 5%)	1.82

Table.5 Economics of Vanraja Poultry Birds rearing (per bird basis)

Sr. No.	Particulars	T ₁	T ₂	T ₃	T ₄	T ₅
1.	Cost of day old chick (Rs.)	27	27	27	27	27
2	Cost of feed consumed per bird (Rs.)	70.47	72.345	75.072	68.076	74.73
3	Rearing Cost per bird (Rs.)*	45	45	45	45	45
4	Average body weight at the end of 7th week (g)	991.3	1036.04	1128.59	1079.22	1042.4
5	Total cost of production (Rs.)	142.47	144.345	147.072	140.076	146.73
6	Average price realized @ Rs. 180 per kg live weight (Rs.)	178.43	186.48	203.14	194.25	187.63
7	Net profit per bird (Rs.)	35.96	42.13	56.06	54.17	40.9

*Including bedding material, labour, medicine, electricity, vaccination, work. The net profit per bird is calculated only for 150 birds, if number of birds increase net profit also increased and cost of production will be reduced.

Effect of Azolla meal on economics of Vanraja poultry birds rearing

The economics of Vanraja poultry bird rearing was estimated by considering the total amount of feed consumed by birds and other inputs such as cost of day old chicks, Azolla meal as feed additive, medicine, vaccines, litter material, labor, electricity, etc. was considered in calculating the economics of Vanraja poultry bird production in Table 5.

It is revealed that the cost of feed in T₂, T₃, T₄ and T₅ was increased in accordance with the level of addition of Azolla meal. Moreover, Vanraja poultry bird in treatment groups T₃ and T₄ gained higher body weight 1128.59 g and 1079.22 g per bird, respectively. The net profit per bird was higher in T₃ (Rs. 56.06) followed by T₄ (Rs. 54.17), T₂ (Rs. 42.13), T₅ (Rs. 40.9), and T₁ (Rs. 35.96).

Results recorded by some of the research workers as below are in agreement with present results as reported by Saikia *et al.*, (2014), Acharya *et al.*, (2015), Paudel *et al.*, (2015), inclusion of azolla meal in standard diet was decreased cost of production and increased the net profit.

The corresponding average live body weights at the end of seven weeks of age were 991.30, 1036.04, 1128.59, 1079.22 and 1042.40 g for T₁, T₂, T₃, T₄ and T₅ treatments, respectively. The significant difference in weekly body weight was found from the third week onward. The trend of significantly better growth was recorded in T₃ (1114.43) and followed by T₄ (1079.22) groups during the third to seventh week. This indicated a beneficial effect might be due to the incorporation of 6% Azolla meal in feeding. Also, it shows the positive and beneficial effects of herbals like Azolla meal feeding on dressing percentage. The net profit per bird was found to be higher in T₃ (Rs. 56.06) by supplementation of 6 per cent Azolla meal to

the birds. Hence, supplementation of Azolla meal 6 per cent was found to be more beneficial to improve BW gain, dressing percentage and net profit of poultry production.

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