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Seasonal effect of Azolla powder supplementation on deep litter and mortality of Giriraja poultry birds

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Abstract

The present research entitled seasonal effect of Azolla (*Azolla pinnata*) supplementation on deep litter and mortality of Giriraja poultry birds, was carried out at Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The moisture per cent in deep litter in rainy season was observed 25.55 to 30.53 per cent in the different treatments of the Giriraja poultry birds and in winter season it was recorded from 19.27 to 22.01 percent with different treatments. In summer season which was very low i.e. 17.08 to 19.17 percent in treatments. The per cent of the mortality was more 4 per cent in summer season followed by 2 percent in rainy season and 0.67 percent mortality in winter season.

Keywords: Azolla powder, deep litter, season, mortality, chicks, Giriraja

Introduction

Poultry is one of the best farming for earning to the farmers. It is useful to the poor and specially for women population. It creates job opportunities and employment for the growing population of the country. The persons from low income group may also start the business on a small scale. The poultry is important because it is the significant source of protein role in meat. The poultry has exported 255686.92 MT of poultry products to the world for the ward of Rs. 651.21435.53 crores during the year 2020-21. The most importance of backyard poultry is well recognized by Government of India and special programs are formulated for its promotion. 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) [18].

However, poultry seems to be particularly sensitive to temperature-associated environmental challenges, especially heat stress. It has been suggested that modern poultry genotypes produce more body heat, due to their greater metabolic activity. Understanding and controlling environmental conditions is crucial to successful poultry production and welfare. Azolla is a free floating water fern that floats in water and fixes atmospheric nitrogen in association with the nitrogen fixing blue green alga, *Anabaena azollae*. Azolla is considered to be a potential biofertilizer in terms of nitrogen contribution to rice crop (Kannaiyan, 1992) [9]. Long before its cultivation as a green manure, Azolla was used as a fodder for domesticated animals such as pigs and ducks. In recent days, Azolla is very much used as a sustainable feed substitute for livestock especially dairy cattle, poultry, piggery and fish. Azolla contains 25-35% protein on dry weight basis and rich in essential amino acids minerals, vitamins and carotenoids including the antioxidant β carotene (Ivan *et al.*, 1989) [7].

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 pieces accumulate secondary plant compounds and therefore offer greater potential than many other types of leaf protein sources (Balaji *et al.*, 2009) [3]. 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. The fern provides nutrients and a protective cavity in each leaf to *Anabaena* colonies in exchange for fixed atmospheric nitrogen and possibly other growth-promoting substances.

It is this unique symbiotic relationship that makes Azolla, a wonderful “super plant” with high protein content, as it can readily colonize areas of fresh water and grow at great speed doubling its biomass every two to three days. It is also found to contain probiotics and biopolymers (Pillai *et al.*, 2005) [14].

Important features of Giriraja poultry 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. High nutritive value and rapid biomass production make Azolla a potential and effective feed substitute for livestock, particularly poultry birds. The objective of the research are as follows.

To study the moisture percentage of deep litter of Giriraja poultry birds under different seasons. To find out the mortality percentage of Giriraja poultry birds in three season

Methodology

Experimental site and climate

The research trial was carried out at Veterinary Institute of Poultry Unit, Department of Poultry Science, Post Graduate Veterinary Institute, MAFSU, Akola in the coordination with Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra State. The Akola city located at latitude on 20°41'32" N and longitude at 77°41'32" E with the height 307.4 m above the mean sea level. In summer season the maximum temperature reached upto 42 to 45 °C with the humidity ranges from 11 to 16%. With the annual rainfall of 750.0 to 900.0 mm. The experiment was conducted in three different season i.e Rainy, Winter and Summer season. The material used and methodology's that adopted in the course of experimentation were detailed in the chapter.

Drying and preparation of Azolla Powder

Preparation of green azolla will be collected from the demonstration unit of the department to dry in an air circulating oven at 50° C followed by 105° C until there were no further changes at these two temperatures. Grind azolla will be priced by the grinder in power form. The powder will be sieved through 300 µm mesh and store at air tight cellophane bag as stock sample till further analysis.

Procurement of DOC

In each season 150 number of day old chicks of Giriraja Poultry birds were purchase from Private supplier through Government Hatchery, C.P.D.O., Seminary Hill, Nagpur.

Immunization schedule

All the chicks were vaccinated as per the schedule carried out at Central Poultry Development Organization, Mumbai.

Treatments

The dietary treatment formulated were as T₁ + standard ration as control treatment, T₂ + standard ration + 4% Azolla powder, T₃ + standard ration + 5% Azolla powder, T₄ + standard ration + 6% Azolla powder, T₅ + standard ration + 7% Azolla powder. These all treatment carried in rainy, winter and summer season.

Observation recorded

Moisture

Moisture was determined as per AOAC (2012) method. One gram sample was transferred to weighed metallic dish which was then transferred to a hot air oven at 100±2 °C and dried

till a constant weight was obtained. The dish was kept in desiccators for cooling. After cooling, the loss in weight was determined to calculate moisture content and expressed as per cent.

$$\text{Moisture (\%)} = \frac{\text{Fresh weight (g)} - \text{Dry weight (g)}}{\text{Fresh weight (g)}} \times 100$$

Mortality

Group wise seasonal mortality was recorded during experimental period in all the replication under treatment group.

Result and Discussion

Composition of Azolla feed

It was observed from the table no. 1, showed that, Azolla supplementation powder was containing 21.56, 15.08 and 15.88 Crude Protein, crude fibre and ash on dry matter basis, respectively.

Table 1: Proximate composition of Azolla feed supplementation on percent

| | |
|---------------|-------|
| Dry matter | 89.91 |
| Crude protein | 21.56 |
| Crude fat | 3.37 |
| Crude fiber | 15.08 |
| Total Ash | 15.88 |

Seasonal moisture per cent on deep litter

In poultry production, the deep litter system of housing is very common in India. Litter is an important aspect of deep litter housing system. This poultry litter was the source of volatilized ammonia and its management was a key factor which affects the rate of its emission and health of birds. Keeping litter dry was a critical part of overall management of poultry farm. Litter conditions influence birds' performance, which in turn affects profit of producers and integrators. Dry litter helps control the ammonia level, providing a healthy flock environment, and reduces contaminations due to hock, footpad burns and breast blisters. Dry litter was also important for the health and welfare of birds, as well as for the labour working at poultry farms. In the experiment the moisture per cent in deep litter tabulated in table no. 2.

In rainy season was observed 26.34 to 30.53 per cent in the different treatments of the Giriraja poultry birds and in winter season it was recorded from 19.27 to 22.01 percent with different treatments. In summer season which was very low i.e. 17.08 to 19.17 percent in treatments. In summer season as the temperature was more hence it was observed less moisture percent as compare to winter and rainy season.

Sahoo *et al.* (2017) [15] reported that the moisture content in the deep litter was ranging 28 to 32 percent which was nearly equal to the results. Chavan (1992) [5] reported that the moisture percent in deep litter system was ranging from 19 to 33 percent which was similar to the observations.

Table 2: Seasonal effect of moisture per cent in deep litter on Giriraja poultry birds (%)

| Treatment | Rainy | Winter | Summer |
|----------------|-------|--------|--------|
| T ₁ | 25.55 | 19.27 | 16.09 |
| T ₂ | 26.34 | 22.00 | 17.18 |
| T ₃ | 27.63 | 22.01 | 18.21 |
| T ₄ | 29.30 | 21.00 | 19.17 |
| T ₅ | 30.53 | 20.30 | 17.08 |

Seasonal mortality per cent of Giriraja poultry birds

The seasonal mortality of Giriraja birds was showed in table no. 3. The mortality per cent was observed during the experiment period of seven weeks.

Table 3: Seasonal effect of mortality on Giriraja poultry birds (%)

| Season | No of bird dead | Percentage of mortality (%) |
|---------------|-----------------|-----------------------------|
| Rainy season | 03 | 2.00 |
| Winter season | 01 | 0.67 |
| Summer season | 06 | 4.00 |

In the rainy season the mortality was two percent whereas, winter season was only 0.67 percent and was very less among the other season. In summer season the mortality was 4 percent which was more among the other season.

The observations were reported by Shegokar (2019) [17] and Bajad (2017) [2] during their trial on Giriraja birds with supplementation of Neem leaf, Zinzer and Garlic powder, Shatvari, Ashwagandha herbal growth promoters respectively were observed 4-5% mortality in their study which is less in winter and rainy season and similar to summer season. The similar results were observed by Manas kumar (2017) [11] that the mortality pattern of Vanaraja male parent was similar in both summer and winter However, in Gramapriya male parent the mortality rate was significantly higher in summer than in winter. Whereas, Neupane *et al.* (2014) noticed 9.1% mortality in Giriraja birds without any herbal growth promoter supplementation. However Oguntuji (2015) was reported that zero mortality was recorded throughout the experimental period and there was no significant ($P>0.05$) effect of seasonal variation in performance of Muscovy ducks and prevailing meteorological indices on incidence of mortality.

Conclusion

In the experiment the moisture percent in deep litter in rainy season was observed 25.55 to 30.53 per cent in the different treatments of the Giriraja poultry birds and in winter season it was recorded from 19.27 to 22.01 percent with different treatments. In summer season which was very low i.e. 17.08 to 19.17 percent in treatments.

The percent during the experiment period of seven weeks observed that the mortality was more 4 per cent in summer season followed by 2 per cent in rainy season and 0.67 percent mortality in winter season.

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