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PERFORMANCE OF COMMERCIAL BROILER ROSS 308 FED DIFFERENT BRANDS OF COMMERCIAL FEEDS

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ABSTRACT: A study was conducted at the National Poultry Research and Development Centre, Sarpang to evaluate the growth performance of commercial broiler Ross 308 fed with two different brands of broiler feed. A total of 330 unsexed Day-Old Chicks (DoCs) were randomly allocated into two groups with three replicates of 55 birds each. Two concentrate feeds labeled as Feed A and Feed B were used**.** The broiler birds were fed ad libitum at day zero and twice daily from day one to 56 days of age. The data were tested for normality using Shapiro-Wilk test and independent t-test was administered to evaluate the effects of feed on FCR and growth**.** The result indicated a significant differences ($p < .05$) in the Average Daily Gain (ADG), final body weight and Feed Conversion Ratio (FCR) of the birds fed with two different feeds. The live body weight of birds fed with Feed A was comparatively higher than the birds fed with Feed B. Further, the birds fed with Feed A had better growth and FCR when compared to the birds fed with Feed B. In this research Feed A was conclusively superior to Feed B in terms of broiler birds' performance. The slower ADG in birds after 42 days of experimental period suggested that the broiler birds should not be fed and reared beyond the recommended duration for a viable farming business. A need is felt to advocate farmers on the recommended rearing period of broiler for better farm profitability and high returns**.**

Keywords: Broiler; feed conversion ratio; average daily gain; mortality.

1. INTRODUCTION

In many parts of the world, the poultry industry is a leading agricultural industry, as it is the main supplier of animal protein for human population (Balogun et al. 2013). Poultry farming is one of the easiest means to generate income mainly due to the quick recovery of return from investments when compared with other livestock farming (Sanusi et al. 2015). Poultry products such as egg and meat have been recognized as the fastest way to fulfill the protein requirement to the human within a short period (Osti et al. 2017). Moreover, poultry products are considered as the cheapest source of protein for rural communities.

In poultry industry, broiler farming is practiced in many parts of the world as the chicken meat contains high quality of essential nutrients such as proteins, minerals, and vitamins that are required for improving human nutrition (FAO 2013). In most of the developing countries, poultry production is considered as an important foundation for the livelihood of many households as it provides family income and employment opportunity throughout the year (Guèye 2005). Broiler farming has fast returns from the investment with better FCR, converting feed into meat (Mbuza et al. 2016). In terms of meat production, the poultry industry is the fastest growing livestock sector especially in developing countries (Portugaliza and Fernandez 2011).

Feed is a major component in broiler production accounting for about 60 – 70 % of the production cost (Amao et al. 2015). As such, it is vital to determine FCR in broiler production. According to Ravinadan (2009), for maximum performance and good health, the broiler birds need a steady supply of energy, protein (essential amino acids), minerals, vitamins, and most importantly, water. The feed quality is the most important factor that affects the broiler performance. However, Acamovic (2002) reported that because of commercial confidentiality, in most of the countries it was not possible to get the details of

the nutrient contents in the feed. For a profitable poultry farming, the commercial broiler or layer bird must perform to its maximum genetic potential. Apart from breeding and housing, nutrition or feed plays a vital role in achieving this goal. The broiler bird should be fed balanced feed for proper growth and better performance.

In Bhutan, 46.61 % of the chicken meat consumed is imported (DoL 2020). With the increasing trend in chicken consumption, rearing of broilers has gained its momentum over the years, especially in southern Bhutan. About 90 % of the broiler farms are located in six southern Dzongkhags. The poultry farm inventory in 2021 conducted by the National Poultry Research and Development Centre (NPRDC) in Sarpang recorded a total of 393 numbers of broiler farms. The broiler farms are categorized as; subsistence farms (≤ 500 birds), semi-commercial (501-1000 birds) and commercial farm (> 1000 birds).

The poultry farm inventory record revealed that the majority of the broiler farmers are at subsistence and semi-commercial level. Ross 308, is the recommended commercial broiler strains in Bhutan and is widely reared by the farmers for meat production in the country. This commercial strain is produced and supplied from government farms. In recent years, private firms have also started importing and supplying commercial DoCs of the same strain.

Amongst many feeds, the farmers commonly procure Feed A (large scale animal feed producer) and Feed B (medium scale animal feed producer) for feeding their broiler birds. The practice of feeding concentrates feeds from these firms have been going on for many years. However, at the moment, very limited information is available and there is no scientific evidence on the efficiency and FCR of Ross 308 using Feed A and Feed B. Thus, this study was conducted to evaluate the performance of Ross 308 commercial broiler strain fed with Feed A and Feed B at the government farm conditions.

1. MATERIALS AND METHODS

1.1 Study area

The study was conducted at the NPRDC, Sarpang Dzongkhag (district) from 14th April to 9th June, 2018. The study area is located at $26^0$52'N, $90^0$16'E with elevation of about 492 meters above the sea level. The area has a wet tropical to humid subtropical climate characterized by hot summer and moderately cool winter. The average annual temperature recorded was 22 degree Celsius, with average annual rainfall ranging between 1200 mm to 2500 mm.

1.2 Experimental design

A total of 330 unsexed Day-Old Chicks (DoCs) of commercial broiler strain Ross 308 was used as experimental birds. The birds were randomly allocated into two groups with three replicates of 55 birds each. Two groups were fed different commercial feed – Feed A and Feed B. Similar conditions and standards were maintained for both groups as per the standard management guidelines of commercials Ross 308 (2015).

On day zero, chicks were fed *ad libitum* and from day one to 21days, the birds were fed with chick starter in accordance with standard management guidelines of Ross 308. On the 22nd day, 70% chick starter (crumble) and 30% broiler finisher (mash) were fed. This was mainly done to acquaint the birds with the shift in new feed category. On the following day, birds were provided 50% each of starter and finisher feeds. On the 24th day, birds were fed with 30% starter and 70% finisher feeds accordingly. From 25th day, the birds were provided with finisher feeds until 56 days of age which was considered the end of the rearing period. Same feeding regimes were practiced using Feed A and Feed B. The birds were provided with 23 hours of lighting for the first week. In the subsequent weeks, 20 hours of lighting was provided until 56 days. In order to prevent diseases incursion in the experimental birds, strict biosecurity measures meeting national standards were observed during the entire study period. All the birds were vaccinated as per the recommended vaccination schedule.

1.3 Management of birds during brooding stage

The DoCs were vaccinated against Marek disease at the hatchery. Feed and water were provided *ad lib* at day zero. From day one to seven, chick plates were used for feeding and round drinkers were provided. After one week, feeds were provided in round feeders and heights

of the feeders were adjusted according to the height of birds. The average temperature and humidity at birds' level were 31.9 ˚C and 78 % respectively. Fresh, clean and sun-dried sawdust was used as bedding materials. Liquid petroleum gas and electric brooders were used for brooding.

1.4 Data collection

The data was collected for 56 days from 14th April to 6th June, 2018. The body weights were measured (Phoenix with 0.001g precision) weekly and mortality was recorded on a daily basis. FCR, mortality and Average Daily Gain (ADG) were determined on a weekly basis by using the following formula.

$$FCR = \frac{Total\ feed\ intake\ (g)}{Final\ weight\ gain\ (g)}$$

$$ADG = \frac{Final\ weight - Initial\ weight\ (g)}{Age\ (Days)}$$

$$Mortality = \frac{No.of\ death\ birds}{No.of\ initial\ birds}\ x\ 100$$

The birds having highest FCR value is regarded as a poor performer than with lower FCR value.

1.5 Data analysis

The data were entered into Microsoft Excel 2010 and tested for normality using Shapiro-Wilk analysis. The effects of feed on FCR and growth of broiler were tested with an independent t-test. The independent variables were feed and dependent variables were FCR and body weight. The differences in independent variables were considered significant when *p* values were below .05. The Statistical Package for Social Science (SPSS) version 23 was used for analyzing the data (IBM n.d.).

2. RESULTS AND DISCUSSION

2.1 Growth rate

Significant difference was observed between two broiler feeds (P<.05) in the final body weight. Body weight gain of birds fed with Feed A was found to be significant when compared to birds fed with Feed B. The final average live body weight of experimental birds fed with Feed A had comparatively better growth rate than birds fed with Feed B. This could be attributed to the better quality of Feed A which had higher protein percentage when compared to Feed B. The final live body weight recorded was 2900.33 ± 41.50 g and 2471.89 ± 46.85 g for the experimental birds fed with Feed A and Feed B, respectively (Figure 1).

Figure 1: Weekly body weight gain of Ross 308 using Feed A and Feed B

The study recorded comparatively better final average live body weight for the experimental birds fed with Feed A as compared to Feed B. The difference in body weight gain was also observed by Jahan et al. (2006) when different feeds were provided to broiler birds. Bolukbasi et al. (2005) observed a divergent result but with insignificant difference. The findings of this study are in line with the results of Nidup & Wangchuk (2007) which indicated that birds fed with Feed A performed better in terms of final body weight gain when compared to other commercial feed types. This could be again attributed to superior quality of Feed A when compared to other feeds. A study by Berres et al. (2010) demonstrated that supplementing low crude protein diets with essential amino acids improved broiler performance.

2.2 Average daily gain

A significant difference (P<.05) in average daily weight gain of Ross 308 up to third week of age was observed when two different feeds were provided. Thereafter, no significant difference (P > 0.05) was observed until 56 days of age after changing feeding regimes from starter to finisher feeds. This result was in agreement with the study done by Jahan et al. (2006) who observed a significant difference in daily weight gain when birds were provided with the different dietary

groups. In contrast, no effect in body weight gain was observed by Bolukbasi et al. 2005 when feeding different feeds.

The maximum daily weight gain of 72.98 ± 3.90 g and 77.60 ± 2.94 g respectively was observed for Feed A when compared to Feed B at the end of six weeks of feeding. The ADG of 49.28 g and 43.33 g of Ross 308 was observed for Feed A and Feed B, respectively. The result of current study is in concurrence with Namakparvar et al. (2014) who reported average daily weight gain of 46.1 ± 0.6 g for Ross 308. However, Pascalau et al. (2017) observed a slightly higher average daily weight gain of 51.83 g for Ross 308. Similarly, Nidup & Wangchuk (2007) recorded average daily weight gain of 52.28 g at 42 days of age, which is slightly higher than the findings of the current study. The lower ADG of the birds in the current study could be due to the birds being reared up to 56 days of age. Goliomytis et al. (2015) reported a decline in growth rate of broiler reared beyond 44 days of age, and if feeding is continued the growth rate approached zero at maturity.

ADG for birds fed with Feed A was found better than the birds fed with Feed B (Figure 2). The current study revealed that the ADG decreases after birds attending the age of seven weeks indicating that it is not advisable to rear the broiler for longer period.

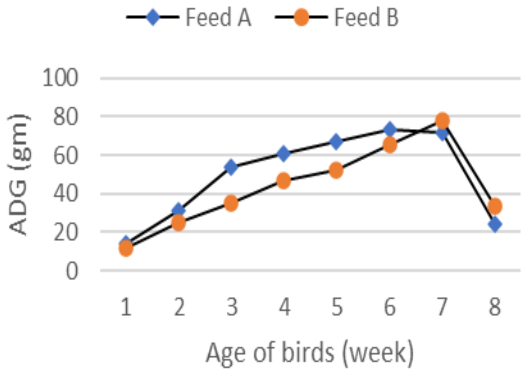

Figure 2: ADG of Ross 308 fed different feeds

2.3 Feed conversion ratio

In general, the feed types affected the FCR of Ross 308 during the study. This finding was supported by Beg et al. (2011) where a feeding regime had affected the FCR value. In contrast, Bolukbasi et al. (2005) revealed no effect on FCR by feed types. The final FCR value of 2.79 and 3.14 was recorded for Feed A and Feed B, respectively at 56 days. Birds fed with Feed A showed significantly (P<.05) superior FCR than the birds fed with Feed B (Figure 3). Pascalau et al. (2017) reported FCR value of 1.88 for Ross 308 which is much better than the current result. However, current FCR finding was found comparable to the findings of 2.17 for the broiler Ross 308 in Pakistan (Iqbal et al. 2016).

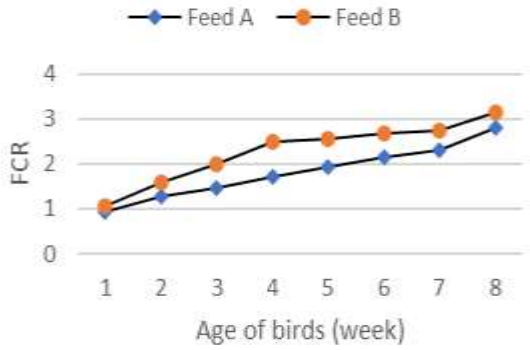

Figure 3: FCR from two different feed types.

2.4 Mortality

At the end of the experimental period (56 days), 15.15 % and 12.73 % of mortality were recorded for birds fed with Feed A and Feed B respectively. However, no significant difference (P>.05) was observed in mortality of experimental birds fed with either type of feeds during the study period. This finding is in agreement with Beg et al. (2011) where no significant difference was observed among different feed types on birds mortality. For both the feeds, the highest mortality was recorded within the final week of age. This could be attributed to heaviness of their body owing to prolong rearing period, reduced feed and water intake. Goliomytis et al. (2015) observed that broiler had reduced access to feed and water because of leg lameness when slaughter age was prolonged.

3. CONCLUSIONS & RECOMMENDATION

ADG and FCR of commercial broiler strain Ross 308 birds fed Feed A is found comparatively better than Feed B. As other factors such as housing and farm management conditions were maintained same, Feed A would have been of superior quality as compared to Feed B. The

present study also revealed that the ADG of the commercial broiler Ross 308 declines after 42 days of age. Rearing commercial broiler Ross 308 more than 42 days is associated with lower ADG, high rearing cost and mortality. This clearly indicates that rearing of commercial broiler Ross 308 after 42 days of age is not advisable. There is a need to provide advocacy to the farmers on the recommended rearing period of broiler which primarily contributes to better farm profitability and high returns.

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