PERFORMANCE OF THREE STRAINS OF BROILER STARTER CHICKENS FED SAME DIET

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ABSTRACT
Ninety (90) day-old broiler chickens of three different strains fed with same diet were used in this study, which lasted for 28 days. The same diet containing 2950kcal/kg of metabolizable energy and crude protein of 22% was formulated for the study. Each strain of the broiler, namely Abor Acres (T1), Ross 308 (T2), and Cobb 500 (T3) formed the three treatments of 30 birds per treatment, which were replicated three times with ten birds per replicate using Completely Randomized Design. The data collected were subjected to ANOVA, where the means were different, Least Significant Test was used to separate the means. The initial weight of birds in T3 is significantly ($P<0.05$) higher than the T1 and T2 strain of birds. The result of the final weight, weight gained, total feed intake, average daily weight gained, and average daily feed intake had the same level of significance ($P>0.05$) across all the strains. Though there were numerical increase in the final weight (546.67g), weight gain (9183.33g), and average daily weight gain (57.04g) of T3 when compared to the T1 and T2. The result of the feed conversion ratio showed that there was no significant ($P>0.05$) difference across the treatment groups. It can be concluded that Cobb 500 strains of broiler could be raised for performance traits due to it higher weight gained. Although, Arbor acre and Ross 300 also have the potential to be used for same trait at the starter phase for farmers feeding the same diet.
Keywords: Arbor Acres, Ross 308, Cobb 500, performance

INTRODUCTION

Over the years, Nigeria has witnessed the introduction of different broiler strains to meet the increasing demand for poultry meat and products. Some of these broiler strains include Arbor Acres, Marshall, Hubbard, Anak, Cobb, Ross, etc. These strains have been selectively bred over time to achieve desirable traits such as increased growth rate and body weight gain, superior feed efficiency, and enhanced carcass characteristics (Olawumi *et al*., 2012). At the market, live body weight is the most critical trait in determining the price of birds. Heavier birds at market age translate into higher meat yield, generating higher sale prices for poultry farmers (Marcos *et al*., 2023). This has resulted in the development of broiler chickens that grow at an increasingly fast rate with a high carcass yield that meets the demands of consumers (Ikusika *et al*., 2020). The growth (body weight, weight gain, and feed intake and feed conversion ratio) and carcass traits performances depend on strain, nutrition, age, sex, and management of the birds (Sam *et al*., 2019). That is why different strains of birds exhibit unique characteristics, and understanding these differences is crucial to optimizing poultry production and profit maximization.
Improvement of poultry birds by genetic principle is one of the most important aspects in developing the poultry industry. Growth is the most important trait for evaluating different livestock species, especially in meat-producing animals and birds. Strain selection plays an important role in determining the growth performance of broiler chickens. Different broiler strains exhibit varying growth rates, feed conversion efficiencies, and carcass qualities (Al-Dawood and Al-Atiyat, 2022). This variation is often a result of genetic differences and how each strain responds to the same dietary conditions. These are some of the problems that farmers often face when deciding which strains of broiler chicken to stock. Aside from strain selection, the diet of broiler chickens plays an important role in their growth. Based on the above, there are differences among strains of broiler chickens available in the market.Hence, the aim of this present study is to evaluate the effect of feeding same diet on three different broiler strains, namely: Abor Acre, Ross 308, and Cobb 500.

MATERIALS AND METHODS

This study was conducted at the Poultry Unit of the Teaching and Research farm of the Faculty of Agriculture and Agricultural Technology, Benson Idahosa University, Benin City, Edo State.

Experimental Birds and Management

Ninety (90) day-old broiler chicks of different strains, namely Arbor acre (strain A), Ross 308 (strain B), and Cobb 500 (strain C), were purchased from reputable hatcheries and raised on deep litter in nine separate units for 28days, with three replicates, each having ten birds per replicate. The chicks were brooded using coal pots and electric bulbs alternatively to supply heat for the first two weeks of life. Standard management procedures for raising broilers were strictly followed. The birds were given water and feed *ad libitum*. Proper sanitation and routine medication, were maintained to forestall any outbreak of disease.

Experimental Diet

The same diet was formulated for all the broiler strains such that the energy was 2950kcal/kg, Metabolizable energy, and 22% crude protein. The composition of the diet used and the calculated analysis are shown in Table 1.

Table 1: Percentage Composition of Experimental Diet

Ingredients	Percentage (%)
Maize	61.40
Soya bean meal	19.00
Brewers Dried Grain	7.60
Fish meal	10.5
Dicalcium Phosphate (DCP)	0.25
Bone Meal	0.25
Salt	0.25
Lysine	0.20
Methionine	0.25
Premix	0.20
Toxin Binder	0.05
Enzyme	0.05
Total	**100**
Calculated Composition	
ME (Kcal/kg)	2950
Crude protein (%)	22.00
Crude Fibre (%)	4.61
Calcium (%)	0.84
Phosphorus (%)	0.69

Data collection

Growth Performance

Growth performance estimated include the feed intake, weekly weight gain, and feed conversion ratio. The initial body weight of the chicks was assessed by weighing the birds at the beginning of the study using a single-pan electronic balance (Scientech Inc. USA). The final body weight (g) was assessed by weighing the birds at the end of the experimental period using triple beam balance (Ohaus, New Jersey). There was no record of mortality during the period of the study.

Growth Performance Traits: The body weight of the birds was taken at the beginning of each week and weekly thereafter.

$$\text{Weekly Feed Intake} = \text{Feed Given (g)} - \text{Leftover (g)}$$

$$\text{Feed intake/bird/day (g)} = \frac{\text{Feed Given} - \text{Leftover}}{\text{No. of birds} \times 28 \text{ days}}$$

$$\text{Daily weight gain/bird (g)} = \frac{\text{Final live weight} - \text{Initial weight}}{\text{No. of birds} \times 28 \text{ days}}$$

$$\text{Feed Conversion Ratio} = \frac{\text{Average Weekly Feed Intake}}{\text{Average weekly body weight gain}}$$

$$\text{Mortality (\%)} = \frac{\text{Number of dead birds}}{\text{Number of initial stock}} \times \frac{100}{1}$$

Data Analysis

Data collected were subjected to Analysis of Variance (ANOVA) in a Completely Randomized Design (CRD), and significant means were separated using the Least Significant Difference (LSD).

RESULTS AND DISCUSSION

Table 2 shows the growth performance of three different strains of broiler chickens fed the same diet. The initial weight of birds in treatment 3 (Cobb 500) is significantly ($P<0.05$) higher than Arbor acre (T1) and Ross 308 (T2) strain of birds. The result of the final weight, weight gained, total feed intake, average daily weight gained, and average daily feed intake showed the same ($P>0.05$) level of significance across all the strains (Arbor acre, Ross 308, and Cobb 500). The result of the feed conversion ratio showed that there was no significant ($P>0.05$) difference across the treatment groups. The result of the initial weight broiler strains can be explained by different factors, such as genotype, sex, strains, and environmental conditions. So, it is assumed that the higher numerical weight of Cobb 500 broiler strains might arise from the genetic makeup during the embryonic stages, which can lead to having a superior growth potential than the Arbor acre strain. Also, the higher weight obtained by Cobb 500 broiler strains showed a higher potential of weight when compared to Arbor acre and Ross 308 birds.

This presents a great potential for lean tissue deposition in the carcass, giving it a higher weight in breeding programs for broiler chickens. However, broiler strains with a lower degree of breeding for meat production, such as Arbor acre, tend to show less development of noble parts of the carcass (Albino *et al.,* 2014). The final weight of the three strains of birds agrees with the report of Olawumi *et al*. (2012a), who found no significant effect on body weight at 4 weeks of age, but disagrees with those of Enaiat et al. (2010) and Razuki *et al.* (2011), who obtained significant strain differences in live weight of broiler chicken slaughtered for carcass at 8-12 weeks. The result of this work is in consonance with the results of Fadare *et al.* (2020), who obtained the highest weight gained for Cobb compared to other strains used in their study. Indarish and Pym (2009) reported a significant difference in feed intake and feed conversion ratio of three broiler strains: Cobb, Ingham, and Steggels, which negates the result of this present study

Table 2: Growth performance of three different strains of broiler chickens fed the same diet

Parameters	T1(Arbor acre)	T2(Ross 308)	T3(Cobb 500)	SEM
Initial weight (g/bird)	333.33[a]	316.67[a]	363.33[b]	7.41
Final weight (g/bird)	510.00	490.00	546.67	18.42
Weight gain (g/bird)	176.67	173.33	183.33	14.89
TFI (g/bird)	383.70	378.57	385.40	2.58
ADWG (g/bird)	54.96	53.93	57.04	4.63
ADFI (g/bird)	119.37	117.78	119.90	0.80
FCR	2.33	2.21	2.23	0.16

[a and b] Means across rows with different superscripts differ significantly at $P<0.05$; ADFI: Average Daily Feed Intake: ADWG: Average Daily Weight Gain: FCR: Feed conversion Ratio: TFI: Total Feed Intake: SEM: Standard Error of Mean.

CONCLUSION

It can be concluded that Cobb 500 strains of broiler could be raised for performance traits due to it higher weight gained. Although, Arbor acre and Ross 300 also have the potential to be used for same trait at the starter phase for farmers feeding the same diet.

REFERENCES

Albino, L.F.T., Tavernari, F.C., Vieira, R.A. and Nery, L. R. (2014). Criação de frango e galinha caipira, sistema alternativo de criação de aves. In Albino, L. F. T.; Tavernari, F. C.; Vieira, R. A.; Nery, L. R. (Ed.). Aves mais indicadas. Viçosa: Aprenda Fácil,. p. 21- 38

Al-Dawood, Amani & Al-Atiyat, Raed. (2022). A Comparative Study on Growth Parameters of Three Broiler Chicken Strains from Jordan. *Brazilian Journal of Poultry Science. 24(2). 10*.

Enaiat, M.M., Amina, A.S. and Eman, M.A. (2010). A Comparative Study of Productive and Physiological Performance Between Two Local Strains of Chicks. *Egyptians Poultry Science. 30(1): 297-316.*

Fadare, A.O., Dawodu, T.S. and Ilufoye, J.K. (2020). Variations in the carcass traits of three strains of broiler chickens. *Nigerian Journal of Animal Science. 22(2): 7-12.*

Ikusika, O.O., Falowo, A.B., Mpendulo, C.T., Zindove, T.J. and Okoh, A.I. (2020). Effect of strain, sex, and slaughter weight on growth performance, carcass yield, and quality of broiler meat. *Open Agriculture*, *5(1): 607–616*.

Indarish B. and Pym RAE (2009). The efficiency of protein utilization of different broiler strains. *Journal of Indon. Trop. Agric., 34(3): 23-27.*

Marcos A. Tavárez and Fausto Solis de los Santos (2016). Impact of genetics and breeding on broiler production performance: a look into the past, present, and future of the industry, *Animal Frontiers*, *6 (4): 37–41*.

Olawumi, S.O., Fajemilehin, S.O. and Fagbuaro, S.S. (2012). Genotype X Sex interaction effects on carcass traits of three strains of commercial broiler chickens. *Journal of World Poultry Research, 2(1): 21-24.*

Razuki, W.M., Mukhlis, S.R., Jasim, F.H. and Hamad, R.F. (2011). Productive Performance of Four Broiler Genotypes Reared Under High Ambient Temperature. *International Journal of Poultry Science, 10(2): 87-96*

Sam, I. M., Essien, C. A., Ukpanah, U. A. and Ekpo, J. S. (2019). Influence of sex on relationship between morphometric trait measurement and carcass traits in broiler chicken raised in humid tropic. *Journal of Animal and Veterinary Advances*, *18 (11): 309 – 314.*