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Evaluation of the Parameters Needed To Describe the Growth Traits of Two Commercial Broiler Strains

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Abstract

The study focused on the effect of strain on growth traits of two commercial broiler chickens. Data were collected from 150 broiler chickens consisting of 75 each of Cobb and Marshall birds respectively. They were kept in separate pen and parameters measured at 1- 8 weeks of age and were analyzed for the effect of strain in a Completely Randomized Design (CRD). Significant strain ($P<0.05$) differences were obtained among the growth traits. Generally, the results showed an increase in the live body measurements as the birds matured, indicating a direct relationship between body weight and growth traits measured. Cobb birds were mostly superior in the growth traits measured than their Marshall counterparts. Cobb birds had higher values for body weight and keel length at weeks 1, 2 and 4 than their Marshall counterparts. Meanwhile, Marshall birds were superior in shank length at weeks 2 and 3 of the starter phase. However, at 7th and 8th weeks, Cobb birds had superior values for body weight, body length, breast girth, and drum stick length than their Marshall counterparts. The values obtained for body weight and some growth traits coupled with the ability of Cobb and Marshall birds offered the baseline that will assist in evaluating the various growth patterns of broilers in this part of the country.

Keywords: Cobb bird, Marshall bird, broilers, growth traits

1.Introduction

Research on meat production globally indicates poultry as the fastest growing livestock especially in developing country. Nigeria is not exempted since the outlook for Nigeria chicken industry appears optimistic because the demand for chicken product is expected to increase along with the population and income growth of the country. In Nigeria today, the persistence short supply of good quality protein for the populace is the main problem which was as a result of the accelerated increase in the population and created a pressure on all form of food supply. Broiler meat production is raised primarily for human consumption within shortest period of time profitability (Amao *et al*., 2011).

The Nigeria poultry industry has over the years witnessed the introduction of different broiler strains (Essien and Adeyemi, 1999). The realization of the full growth potentials of these strains is largely expected to depend on the nutritional and climatic variables subject to the genotypic traits which in turn set a ceiling on their productive capacity. The implication is that the broiler producers should select stocks which have the genetic potential for fast growth rate and attainment of market weight early enough under the Nigeria climatic conditions. Within the last one decade, there has been an intensified study on the genetic, physiological, nutritional and growth performance of such imported hybrids as Cobb, White Ross, Lohmann Brown, Hypercom, Hubbard, Anak, Shaers, and Perduc among others (Essien and Adeyemi, 1999).

There are several factors which affect the growth performance of broiler chickens, and these include strain or breed, sex, nutrition, housing and stocking rate. Current commercial broiler strains are as a result of successful selection programs for rapid growth and body conformation. There are various reports on the genetic parameter estimates for broiler growth traits has been reported by Amao *et al.,* (2009) and Oluyemi and Roberts, (2000) suggested the need to generate this estimates as to use these data for any improvement in the future. Reports from Amao *et al.,* (2009); Ojedapo *et al.,* (2008) and Mallo *et al*., (1997) stressed their findings on the different strains of commercial broilers in term of growth traits. Their studies was undertaking to access the level of genetic variability among two broiler strains of chicken at starter phase with respect to their body weight, shank length, breast width, keel length, thigh length and thigh circumference in relation to age of the birds. Essien and Adeyemi, (1999) also reported that body weight also varied with genotype or breed. They also observed that Anak broiler chickens exhibited consistent superior body weight over Lohman brown at 1-7 weeks of age. They

also reported that strain differences in body parameters of broiler chickens at different age. Anak broilers were observed to have better performance in body weight, chicken height, body length, shank length, thigh length, wing length, body circumference and head circumference as compared to the Lohman strains. Therefore, the aim of this present study was to evaluate the variables needed to describe the growth traits of two commercial broiler strains i.e. (Cobb and Marshall meat-type chickens) in the derived savanna zone of Nigeria.

2. Materials and Methods

2.1 Site Of Study

The experiment was carried out at the poultry unit of the teaching and research farm of Ladoke Akintola University of Technology, Ogbomoso. It is located on longitude 4°15 East of Greenwich Meridian and Latitude 8°7 North of the equator. It is about 145km North East of Ibadan, the capital of Oyo state. The altitude is between 300 and 600 meters above sea level and the mean annual temperature of 27°C with mean rainfall of 1247mm (Ojedapo and Amao, 2014).

2.2 Experimental Animal and Management

Two strains of commercial broiler were used and purchased from reputable farms of 150 day-old chicks comprising of 75 each of Marshall and Cobb respectively. The experimental chicks were housed into two separate pens for each strain and covered with wood shavings. Before moving the experimental bird into their pen, pens were washed and disinfected using the morigad solution prior to the arrival of the chicks and left alone for 7days before stocked with chicks. The daily routine management observed was; supplying birds with clean, cool and drinkable water, feeding them *ad libitum.* Cleaning the drinker and feeder daily, adequate floor and feeding spaces and vaccines were given at times due.

2.3 Experimental Diets

The birds were fed *ad libitum* on a standard broiler starter ration containing 24% crude protein and 2900kcal/kg ME for four weeks of age followed by a finisher diet containing 21% crude protein and 2800kcal/kg ME from five weeks till the end of the experiment at 8 weeks. Water, feed was also available *ad libitum* to the birds.

2.4 Data Collection

At the end of each week, 40 birds were selected randomly from each strain regardless of their sex. The birds were weighed using sensitive weighing balance to determine the body weight in gram, shank length, breast width, keel length, drum stick length, neck length, body length, chest girth and wing length were all measured with tailors tape rule and expressed in (cm) every week and lasted for eight weeks.

2.5 Statistical Analysis

Data obtained was subjected to Analysis of Variance (ANOVA) using the General Linear Method (GLM) of SAS (2003) with the student T-test of the same procedure used to separate the means. The model below was adopted:

$$Y_{ij} = \mu + T_i + E_{ij}$$

Where;

Y_{ij} = Observation on each broiler strain

μ = Population mean

T_i = Treatment carried out (strain effect)

E_{ij} = Error in the distribution

3. Results

Table 1 shows the mean values of growth traits of Cobb and Marshall broiler chickens at the starter phase. It can be seen from the table that Cobb broiler chickens are superior in the growth traits measured than their Marshall counterparts. Significant strain ($P<0.05$) differences was observed for body weight, body length, breast girth, keel length, shank length, and drum stick length measured at week 1. At week 2, body weight, breast girth, keel length values were higher for Cobb broilers than the Marshall birds while at this age, Marshall had higher value for shank length. The breast girth, keel length, and drum stick length values at week 3 were superior for Cobb broiler than Marshall birds while at this age, Marshall birds had higher shank length than Cobb birds. At 4th

week, Marshall broilers had higher body length than Cobb broilers while the body weight and breast girth values were higher for Cobb broilers than the Marshall birds.

Table 2 shows the mean values of growth traits of Cobb and Marshall broiler chickens at the finisher phase. There are significant ($P<0.05$) difference among the strains, age and the growth traits. Cobb birds revealed higher values for body weight, keel length and shank length at 5weeks of age than their Marshall counterparts. At 6weeks of age, Cobb birds had higher values for body weight and keel length. However, at 7 and 8 weeks of age Cobb birds had superior values for body weight, body length, breast girth, and drum stick length than their Marshall counterparts.

4. Discussion

The pattern of variation between strains on growth traits of two commercial broiler chickens in this present study reveals genetic differences which have been supported by findings of Amao *et al.,* (2009) and Farran *et al*., (2000). These authors reported that the strains differences for body weight of meat-type chicken were due to genetic make-up of these broiler chickens. However, Cobb broiler strain superiority over Marshall birds in this present study were probably due to higher feed intake and several other factors might be involved herewith. This result was in agreement with the reports of Gonzales *et al.*, (1998); Sarker *et al.*, (2001); Abdullah *et al.*, (2010), who found similar variations in rearing different strains under experimental conditions. The difference in the weight gain of the broiler strains may be explained by different factors, such as, genotype, feed, sex, strains, and environmental conditions and so on. Gonzales *et al.*, (1998) found effects among several strains of birds in live weights. So it is assumed that more weight gain of Cobb broiler strain might arise from the genetic make-up during the embryonic stages, which can lead to having a superior growth potential than Marshall broiler strain and it may be possible owing to strain effect and some other factors might be involved herewith. The observation for an increase in the measured variables as the body weight increases for the two strains of commercial broiler used were in agreement with the findings of Ajayi and Ayorinde, (2002) who reported direct relationship for body weight and other body parameters as it has been observed for Cobb broilers in this study.

The general differences noticed for the body weight, body length, breast girth, keel length, shank length and drumstick length that favoured Cobb birds were in line with the report of Amao *et al*., (2010) who reported a similar values for Ross broiler strain, but this result disagreed with the observation of Olawumi *et al*., (2012) who noticed no significant effect of strain on body weight and other body measurements for Arbor acre, Hubbard and Marshall broiler strains. The superiority of Marshall birds in terms of shank length and breast girth than Cobb broilers at week 3 in this present study were in agreement with the report of Olawumi *et al*., (2012) who reported that Marshall broilers showed similar superiority over Arbor acre and Hubbard broiler strains.

5. Conclusion

Strain has effect on growth traits of broilers reared in deep litter house in derived savannah zone of Nigeria. This study on growth traits of two strains commercial broiler chickens indicated that Cobb birds were superior over their Marshall counterparts. Therefore, it would be preferable to rear Cobb broiler chickens to eight weeks of age and form reliable for further studies and further studies and effective selection for meat-yield between Cobb and Marshall broilers for further improvement.

6. RECOMMENDATION

The values observed for body weight and some growth traits in this study coupled with the genetic potential of Cobb broilers offered the baseline that will assist researchers and farmers in evaluating the various growth patterns of broilers as affected by strain in the derived savannah zone of Nigeria.

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Table 1: Means and standard errors of growth traits of Cobb and Marshall broiler chickens at starter phase.

		WEEKS			
Variables	**Strains**	**1**	**2**	**3**	**4**
BW	Cobb	160.03±3.01[a]	344.33±7.73[a]	771.00±122.77	1008.23±14.40[a]
	Marshall	127.55±2.22[b]	294.88±9.25[b]	560.50±16.12	910.65±17.97[b]
BL	Cobb	8.18±0.08[a]	12.00±0.10	14.29±0.15	18.32±0.17[b]
	Marshall	7.83±0.06[b]	11.77±0.16	14.52±0.19	18.76±0.12[a]
BG	Cobb	3.68±0.09[a]	5.51±0.07[a]	6.85±0.05[b]	8.32±0.08[a]
	Marshall	2.90±0.02[b]	5.09±0.10[b]	8.35±0.11[a]	7.94±0.09[b]
KL	Cobb	5.55±0.08[a]	7.79±0.08[a]	9.98±0.06[a]	11.29±0.08
	Marshall	4.88±0.06[b]	7.49±0.11[b]	9.32±0.11[b]	11.10±0.09
SL	Cobb	3.15±0.04[a]	3.62±0.06[b]	4.28±0.04[b]	5.21±0.04
	Marshall	2.90±0.02[b]	4.12±0.05[a]	5.12±0.06[a]	5.30±0.05
DL	Cobb	5.14±0.07[a]	6.98±0.05	9.03±0.07[a]	10.28±0.07
	Marshall	4.72±0.05[b]	6.89±0.10	8.24±0.11[b]	10.40±0.06

[ab]Means along the same column at each age with different superscripts are significantly ($P<0.05$) different.

BW= Bodyweight (kg), BL= Body length (cm), BG= Breast girth (cm), KL= Keel length cm), SL= Shank length (cm), DL= Drumstick length (cm).

Table 2: Means and standard errors of growth traits of Cobb and Marshall broiler chickens at finisher phase.

		WEEKS			
Variables	**Strains**	**5**	**6**	**7**	**8**
BW	Cobb	1499.48±23.01[a]	1881.03±28.93[a]	2347.63±46.28[a]	2810.63±50.98[a]
	Marshall	1184.40±38.81[b]	1577.78±45.58[b]	1985.05±63.20[b]	2588.00±53.77[b]
BL	Cobb	21.85±0.22[a]	26.24±2.39	24.42±0.30[a]	28.18±0.22[a]
	Marshall	20.36±0.32[b]	23.29±0.33	23.01±30[b]	26.89±0.23[b]
BG	Cobb	10.23±0.10	11.07±0.13	12.04±0.10[a]	13.49±0.11[a]
	Marshall	9.98±0.16	11.14±0.10	11.90±0.14[b]	13.16±0.12[b]
KL	Cobb	13.49±0.10[a]	14.58±0.11[a]	15.93±0.12	17.54±0.11[a]
	Marshall	12.66±0.13[b]	14.20±0.10[b]	15.62±0.15	16.88±0.15[b]
SL	Cobb	6.34±0.04[a]	6.89±0.08	7.96±0.05	9.03±0.10
	Marshall	6.05±0.06[b]	7.10±0.09	7.79±0.07	8.79±0.10
DL	Cobb	12.16±0.09	14.16±0.15	15.80±0.13[a]	17.71±0.09[a]
	Marshall	12.34±0.12	13.87±0.26	15.23±0.19[b]	16.86±0.15[b]

[ab]Means along the same column at each age with different superscripts are significantly (P<0.05) different

BW= Bodyweight (kg), BL= Body length (cm), BG= Breast girth (cm), KL= Keel length cm), SL= Shank length (cm), DL= Drumstick length (cm).