

REARING SYSTEMS AND SEX EFFECT ON CARCASS TRAITS OF FULANI ECOTYPE CHICKENS IN SOUTH WESTERN NIGERIA

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ABSTRACT

The study was conducted at the Federal University of Technology Akure, Teaching and Research Farm to study the effect of sex and rearing system on carcass traits of 36 Fulani Ecotype chickens raised for 26 weeks in a 2x2 factorial experiment. The values for live weight, slaughtered weight, carcass weight, breast weight, shank weight, thigh weight and drumstick weight of each chicken were taken and recorded using an electronic scale. The effects of sex and rearing system on body weights and the cut parts were estimated from the least-squares procedures of SAS 2008 version 13. Where significant differences were observed, the differences among means were tested using Duncan's multiple Range procedures of the same statistical package. The result showed that live weight and various carcass traits of male Fulani Ecotype chickens were significantly ($P < 0.05$) higher than that of the female Fulani Ecotype chickens in both systems of rearing. Some cut-parts like the drumstick weight, shank weight, carcass weight and breast weight of the deep-litter female Fulani Ecotype chickens were slightly greater than those of the caged female Fulani Ecotype chickens while the thigh weight of the caged female Fulani Ecotype chickens was slightly higher than those under deep litter system. This trend was observed in the carcass traits of the male Fulani Ecotype chickens in both rearing systems. The study concludes that rearing system affects the carcass quality and yield of the Fulani Ecotype chickens and therefore recommends that intense research on these birds and their growth performance characteristics under the two rearing systems for large scale meat production be carried out.

Keywords: Sex, rearing system, Fulani Ecotype, carcass trait.

INTRODUCTION

Poultry meat production, particularly chicken meat has increased tremendously over the last decades (Fuzhu and Zhuye, 2008). Demand for poultry meat is higher because of its perceived superiority in health aspects when compared to red meat. The meat has comparably low contents of fat and cholesterol. The relatively low price, the typically convenient portion and lack of religious restriction made poultry producers and consumers to focus on the poultry carcass yield, composition and quality (Jaturashita *et al.*, 2004a). Local chicken constitutes 80% of the poultry birds in Nigeria. Annually the native chicken has remained largely genetically uncharacterized and unimproved (Oluyemi and Roberts, 2000). Le Behan-Dual (2004) also stated that many consumers prefer the local chicken to the exotic ones due to its leanness and relatively low price. Evaluation of farm animals

is usually done using various indices among which we have growth and developmental trait. A number of factors such as nutrition, growth rate, sex and age and management have been reported to affect growth response (Omeje and Nwosu, 1983), while carcass quality traits also depend on a number of factors such as genotype, sex and age (Pikulet *et al.*, 1987). Among all these factors, sex have greatest impact on the possibility of genetically improving growth response and carcass quality traits because, genetic variability is due to physiological processes, especially in body weight and body composition of male and female animal.

MATERIALS AND METHODS

The study was carried out at the Teaching and Research Farm, Livestock section (Poultry unit) of the Federal University of Technology Akure (FUTA). Thirty-six Fulani ecotype chickens of

26 weeks old were used for the study. The birds consist of ten (10) males and twenty-six (26) females in total. Eighteen (18) were reared under cage system while Eighteen (18) were reared under deep litter system. The birds were distributed into different cell of five (5) to three (3) per group and were supplied with fresh feed of a commercial source with clean water on daily basis. Electronic scale was used to take the various measurements (in grammes) during carcass evaluation.

Data Collection

All the birds were used at twenty-six weeks old for carcass evaluation. The birds were starved over-night, weighed, slaughtered and manually de-feathered. The slaughtered weight, carcass weight and main-cut parts such as the breast weight, thigh weight, drumstick weight and shank weight were determined using an electronic scale. Data collected were subjected to a 2x2 factorial analysis. The analysis was done using the General Linear Model (GLM) procedure of the Statistical Analysis System (SAS, 2008) software. The effects of sex and rearing systems on body weights and cut parts weights were estimated from the least-squares procedures of unequal sub-class numbers according to the method of Statistical Analysis System (SAS 2008 version 13). Where significant differences were observed, the differences among means were tested using Duncan's multiple Range procedures as outlined in SAS (2008).

The statistical model used was:

$$Y_{ijk} = \mu + S_i + A_j + (SA)_{ij} + E_{ijk}$$

Where;

- Y_{ijk} = The individual measurement on each bird
- μ = The overall mean
- S_i = Effect of the i th sex (1,2)
- A_j = Effect of the j th rearing system (1,2)
- $(SA)_{ij}$ = Interaction effect of sex i th and rearing system j th
- E_{ijk} = The random errors

RESULTS AND DISCUSSION

The result of the study shown in Table 1 represents the least squares means for the effect of sex and rearing system on different carcass traits of Fulani ecotype chickens. For both rearing systems, only the breast weight was significant and it was significantly ($p < 0.05$) higher for the birds under deep litter rearing system (197.74g) than those in cage (181.10g).

However, the highest breast proportions were registered in the males under both rearing systems and this result disagrees with Bogosavljevic *et al.* (2006) where the authors recorded highest breast proportion for female chickens in the free-range system and lowest proportion of breast muscle for male chickens reared extensively. The live weight, breast weight, shank weight, thigh weight and drumstick weight were significantly different ($p < 0.05$) in both sexes but males were highly significant ($p < 0.05$). The differences exhibited in terms of sex was similar to the findings of Ozkan *et al.* (1997). These authors reported these carcass traits in male chickens to be significantly higher than female chickens. No significant difference was observed for all the carcass traits in terms of the interaction between sex and rearing systems. Slaughtered weight and carcass weight were not significantly different ($P > 0.05$) for both sexes and rearing system with the least squares means of 96.62% for the cage birds and 98.46% for the deep-litter. The carcass weight value is higher in the deep-litter with the least square means of 65.4% than the cage system with the least square means of 60.28%. The least square means for breast weight, shank weight, thigh weight and drumstick weight were higher in the deep-litter system than the cage system.

CONCLUSION AND RECOMMENDATION

From this study, it can be concluded that rearing system did not have a statistically significant effect on the proportions of major basic carcass parts except for breast muscle in the Fulani Ecotype chickens ($p < 0.05$). Heavier carcass traits were recorded in the males, and in both rearing systems. Live weights and various carcass weights of male Fulani Ecotype chickens were significantly higher than that of the female Fulani Ecotype chickens in both systems of rearing. Some cut-parts like the drumstick weight, shank weight, carcass weight and breast weight of the deep-litter female Fulani Ecotype chickens were slightly greater than those of the cage female Fulani Ecotype chickens while the thigh weight of the cage female Fulani Ecotype chickens were slightly higher than the deep litter ones. Similar trends were observed in the parameters of the Fulani Ecotype chicken males in both rearing systems. It can be recommended that researchers should intensify their research

efforts to the carcass characteristics of the local breeds of chickens especially the Fulani Ecotype, which will help in determining their carcass yield, meat content and qualities. Also, researches should be directed to the type of rearing system that will improve the carcass quality and yield which will eventually encourage their production on a large scale for meat production.

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Table 1: Least squares means for the effect of sex and rearing system on different carcass traits of Fulani Ecotype Chickens

RS / SEX	Live Weight (g)	Slaughter Weight (%)	Carcass Weight (%)	Breast Weight (g)	Shank Weight (g)	Thigh Weight (g)	Drumstick (g)
Rearing System							
C	1229.41±52.36	96.62± 1.58	60.28± 1.88	181.10±7.93 ^a	39.85±4.10	117.85 ±7.68	106.11±9.74
D	1276.32±43.82	98.46± 0.18	65.04± 2.96	197.74±7.75 ^a	46.68±4.27	120.45±9.00	116.34±8.93
Sex							
F	1162.96±22.26 ^b	97.18± 1.00	61.23± 1.83	178.81±5.01 ^b	37.23±2.65 ^b	107.02±4.38 ^b	94.71±4.45 ^b
M	1527.78±49.37 ^a	98.80± 0.17	67.47± 4.65	224.77 ±10.54 ^a	62.13±5.37 ^a	155.86±14.05 ^a	161.92±11.57 ^a
Rearing System x Sex							
C F	1142.31±41.15	95.94± 2.05	59.87± 1.66	169.66± 6.06	32.82± 1.07	104.88± 3.09	88.95± 3.64
CM	1512.50±71.81	98.84± 0.34	61.59± 6.57	222.07 ± 15.73	62.67±11.79	160.03± 20.93	161.87±24.98
DF	1182.14±20.03	98.34± 0.23	62.48± 3.19	187.31± 7.32	41.32± 4.85	108.99± 8.07	100.05±7.77
DM	1540.00±74.83	98.78± 0.20	72.18± 6.27	226.94±15.77	61.70±4.51	152.54± 21.04	161.96±10.36
Factor Main Effects and Interaction							
RS	NS	NS	NS	**	NS	NS	NS
SEX	**	NS	NS	**	**	**	**
SEX x RS	NS	NS	NS	NS	NS	NS	NS

^{a,b} Means along the same column with different superscripts are significantly ($P < 0.05$) different. NS=Not Significant ($p > 0.05$).

** = ($P < 0.05$) significant. RS = Rearing system, C=cage, D= Deep litter, F= female and M= male.