EVALUATION OF CARCASS CHARACTERISTICS OF NIGERIAN INDIGENOUS AND IMPROVED BROILER CHICKEN

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ABSTRACT

In order to evaluate the effect of genotype on carcass characteristics, a total of 100 chicks comprising of 25 chicks per genotype (Noiler, Arbor acre plus, FUNAAB Alpha broiler, and FUNAAB Alpha pullet) were raised separately in a deep litter pen at day-old for a period of 7weeks using a completely random design. At 7th week of age, 5 birds per genotype were randomly selected, weighed individually after an overnight fasting, slaughtered and de-feathered by hand picking, and carcasses dissected into different cuts (cuts were expressed as proportions of live weight in percentages). Live weight, bled weight, plucked weight, eviscerated weight, carcass yield, weight of cut parts were evaluated. Result reveals a significant genotype differences (p<0.05) in the evaluated carcass traits with Arbor acre having the highest live weight, bleed weight, plucked weight, eviscerated weight, breast yield, drumstick yield, and thigh yield of 2161.50g, 2114.20g, 93.25%, 72.98%, 2.314%,10.39% and 10.62% respectively, followed by Naked neck with live weight (657.20g), bled weight (641.80g), eviscerated weight (61.96%), breast girth yield (1.362%) and thigh yield (8.876%) while FUNAAB Alpha (broiler has lowest plucked weight of 91.05%. These findings allow concluding that Arbor acre genotype has better carcass traits while other genotypes need to be improved through a well-defined breeding program probably using genomic selection.

Keywords: **Broilers, Carcass, Genetic improvement, Selection**

INTRODUCTION

Poultry production is key to the sustenance of humanity as it contributes largely to societal growth and development as the animal protein derived from poultry meat and eggs are of high-quality accounting for approximately 30% of global animal protein (Msoffe *et al*., 2006), and its consumption complement protein deficiencies among vulnerable groups (Ajayi, 2010). In the past, chicken was sold whole but due to high cost of production leading to exorbitant price of whole chicken coupled with reduced purchasing power, customers now demand for chicken parts to reduce financial burden on family finances. Hence, a dramatic global increase in the proportion of grown birds for portioning and processing especially in countries where broilers are raised for human consumption (Msoffe *et al*., 2004). The Nigerian indigenous chicken represents a large pool of untapped genetic resource. In spite of increase in the Nigeria poultry industry, especially with the introduction of exotic chicken breeds, indigenous chicken breeds still remain the largest source of poultry meat and eggs and play a vital role in socio-economic life of rural dwellers even though they are considered less productive compared to the exotic strains (Alabi e*t al*., 2012). The industry requires chicken breed/strains of fast growth rate to reach market acceptable weight with more lean meat and less fat, as it is evident that there are differences in body weight among chicken strains (Musa *et al.,* 2006). However, there is a continuous need to explore the importance of variation in carcass traits in local chicken genetic resources to compare body size as well as animal's morphometrics (Latshaw and Bishop, 2001) which could be used for selection and improvement programmes. Hence, the aim of this study was to evaluate the effect of genotype on carcass characteristics using different Nigerian indigenous and improved broiler chickens.

MATERIALS AND METHODS

Experimental site

The experiment was carried out at the Poultry Unit, Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora, Oyo State.

Procurement of experimental animals

The Nigeria improved indigenous (FUNAAB Alpha broiler - Fin-αB and FUNAAB Alpha Pullet Fin-αP) were procured from Poultry Breeding Unit, Federal University of Agriculture Abeokuta while Arbor acre and Noiler (adapted indigenous chicken) were procured from a reputable farm in Oyo State.

Experimental animal and their management

A total of 100 chicks (25 per genotype) were housed separately in a deep litter pen at day-old. Commercial feed (Starter feed containing 20% CP and 2,996Kcal/kg ME from 0-4weeks, and finisher diet with 16.80% CP and 2,823Kcal/kg ME from 4-7weeks), and potable water were provided *ad libitum*. Necessary vaccinations against Newcastle and Gumboro diseases as well as prophylactic antibiotics and anti-coccidial drugs were administered to the birds.

Carcass Processing

At the end of 7th week of age, 5 birds per genotype were weighed individually after an overnight fasting, slaughtered, scalded in hot water and de-feathered by hand picking. For each bird, feathers were weighed after being dried for 24 hours using sun rays during the day. The head and shanks were removed and weighed. Evisceration was accomplished by posterior ventral cut, thus a complete removal and weighing of the visceral organs. The carcass parameters evaluated were live weight, plucked weight, eviscerated weight, carcass yield, weight of cut part, and weight of the individual carcass cut were expressed as proportions of live body weight in percentage (breast yield. thigh yield, drumstick yield, and wing yield).

Data Analysis

Data collected were analysed using one-way analysis of variance of SAS (2003). Differences among genotype means were compared using Duncan's Multiple Range (test. The model equation used was:

$$Y_{ij} = \mu + G_i + e_{ij}$$

Where: Y_{ij} = *general observation;* μ = *overall mean for the parameter of interest;* G_i = *the parameter of interest (Carcass weight);* e_{ij} = *residual error*

RESULTS AND DISCUSSION

Dressing percentage is a better index of total edible meat after the visceral organs, blood and feathers have been removed (Ugwu and Onyimonyi, 2008). Based on the present study, Arbor Acres had more edible meat than other genotype examined. Ikeme (1990) and Akinwumi (2006) have earlier reported that bled weight, plucked weight and dressed weight followed the same trend with the pre-slaughtered weight in chicken as observed in this study. However, it was observed that Arbor acre has the highest live weight (2161.50g), bled weight (2114.20g), plucked weight (93.25%), eviscerated weight (72.98 %), breast (2.314%), drumstick (10.39%), and thigh (10.618%). Marcu *et al.* (2013) and Olawumi and Fagbuaro (2011) reported that genotype has significant effects on overall carcass characteristics such as dressed weight, breast, drum stick, thigh, back and shank weights and edible giblet weights.

The result of Arbor acre, Noiler, FUNAAB alpha Pullet (Dual-purpose) and FUNAAB alpha Broiler chickens' carcass data is given in Table 1. Naked neck has the lowest live weight (657.20g), bled weight (641.80g), eviscerated weight (61.96%), breast girth (1.362%) and thigh (8.876%) while FUNAAB Alpha broiler has lowest plucked weight of 91.05%. Arbor acre has the lowest neck and shank of 3.978% and 3.800% respectively. The findings of this study also indicated higher live body weight and carcass weights in Arbor Acres and these are in full agreement with those of Udeh and Ogbu (2011) Egena *et al.* (2014) and Udeh (2015). However, differences in values of carcasses traits between the strains could be attributed to genotypes and nutrient absorption effects between genotypes and effect due to genetic makeup of the chicken examined. The weight of primal cuts of the chicken such as breast, thigh, drumstick, wings and back is very important as whole carcass is no longer popular but preference given to cut. This study corroborated the report of Young *et al.* (2001) that strains and species of animals could affect the yield of carcass after slaughter, and yield of body component or primal cuts

changes with the increase in body weight. However, differences in values of carcasses traits between the strains could be attributed to genotype and nutrient absorption effects between genotypes and effect due to genetic makeup of the chicken examined.

Table 1: Carcass traits as affected by genotype

Parameters	Arbor Acres	FIN-αB	FIN-αP	NOILER
LW	2161.50^{a}±45.40	1221.80^{b}±29.54	657.20^{c}±37.15	956.80^{b}±166.89
BW	2114.20±47.20	1203.20±29.80	641.80±35.72	947.60±164.54
PW	93.25 ^{a}±0.229	91.05 ^{b}±0.455	91.15 ^{b}±0.469	91.16 ^{b}±0.754
Eviscerated weight	72.98 ^{a}±0.836	67.46 ^{b}±0.750	61.96 ^{c}±0.614	65.92 ^{b}±1.40
Head	2.419 ^{c}±0.114	3.149 ^{b}±0.106	4.106 ^{c}±0.147	3.498 ^{b}±0.286
Neck	3.978 ^{b}±0.584	5.078 ^{a}±0.207	4.400 ^{b}±0.274	4.619 ^{ab}±0.222
Shank	3.800 ^{b}±0.256	4.451^{ab}±0.886	5.079 ^{a}±0.106	4.260 ^{b}±0.367
Drum stick	10.39 ^{a}±0.163	9.658^{ab}±0.456	9.155 ^{b}±0.179	8.752 ^{b}±0.273
Chest	5.948±0.742	5.276±0.162	4.915±0.194	5.999±0.302
BRW	2.314^{a}±0.695	1.602^{b}±0.557	1.362^{c}±0.351	1.560 ^{bc}±1.044
Thigh	10.618^{a}±0.445	9.849^{a}±0.213	8.676^{b}±0.180	9.45^{a}±0.542
Wing	7.426 ^{b} ±0.148	9.311^{a}±0.403	8.760^{a}±0.206	9.434^{a}±0.416
Tail	0.629^{bc}±0.036	0.733^{ab}±0.057	0.537^{b}±0.082	0.856^{a}±0.085
Back	7.060±0.363	7.039±0.132	6.815±0.210	6.939±0.506

^{a,b,c} means in the same row within variable group with different superscripts are significantly different ($p<0.05$). FIN-αB : FUNAAB Alpha Broiler; FIN-αP : FUNAAB Alpha Pullet (Dual-purpose), LW= Live weight, BW= Bled weight, PW= Plucked weight, BRW=Breast weight

CONCLUSION

The variation in genetic makeup and breed difference of the chicken used accounted for the differences in carcass characteristics as Arbor Acres chicken performs better in all the parameters measured. Genetic selection and improvement of Nigeria indigenous chickens may be needed to increase their productivity and weight. Therefore, cross-breeding of Arbor Acres and other Nigerian indigenous and improved chicken (FUNAAB Alpha Broiler and FUNAAB Alpha Pullet) is highly recommended on a large scale.

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