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Comparative Study of the Body Weight and Body Conformations of Two Broiler Strains Under the Same Dietary Condition

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Abstract: This study is aimed at comparing the two important economic traits (body weight and conformations) of Hubbard and Arboracre commercial broiler chickens treated under the same dietary and environmental conditions. A total of two hundred broiler strains comprising of 100 Hubbard and 100 Arboracre strain were used in the comparative evaluation of their body weight and body conformation from day old to 8 weeks of age. Body weight were taken on weekly basis while linear body measurement like shank length, breast width, back length, neck, thigh length and keel length were taken three times a week. Hubbard broiler strain had the body weight of 0.298±0.0287, 1.0083±0.0123, 2.063±0.0219 and 3.079±0.02J kg while Arboracre strain attain the body weight of 0.2603±0.0587, 0.8125±0.0185, 1.7100±0.0287 and 2.604±0.0219 kg, respectively all at 2.46 and 8 weeks of age. The linear body measurements of Hubbard strain were significantly higher than that of Arborace strain ($p<0.05$) at 8 weeks of age for all parameters studied. Hubbard broiler strain showed superiority in growth assessment of body weight and linear body measurements in the 0-56 days stuffy period.

Keywords: Body conformations, body weight, broiler strains, dietary condition

INTRODUCTION

Body weight in poultry is one of the most economic traits which are influenced not only by genetic make up, but also by environmental factors (Biligih, 1995). Apart from body weight, a number of conformation traits such as shank length, back length, keel length breast width, thigh length are known to be good indicators of body growth and market value of broiler. Selection programme is also being focused on these economic traits (Edward, 2000).

The Nigerian poultry industry has over the year witnessed the introduction of different broiler strains into the country. The realization of the full growth potentials of these imported strains is largely expected to depend on the nutritional and climatic variables subject to the genotypic traits which in turns have an effect on their productive capacity (Essien and Adeyemi, 1999). The implication is that the broiler producer should select stock which have the genetic potential for fast growth rate and the attainment of market weight early enough under the existing climatic conditions (Essien and Adeyemi, 1999).

Studies involving the comparison of the responses of two or more broiler strains to the same level of physiological or nutritional treatment will furnish producers with dependable information on the choice of boiler strains for table meat production. The present study is therefore aimed at comparing the two important economic traits (body weight and conformations) of Hubbard and Arboracre commercial broiler chickens treated under the same dietary and environmental conditions.

MATERIALS AND METHODS

The experiment was conducted at the poultry section of Department of Applied Science, Tudun Wada Kaduna South Local Government Area, Kaduna state, Nigeria, between February and March, 2010. Kaduna state is located between latitude 9º03′N and 11º32′N of the equator and longitude 6º05′E and 8º83E of the Green Witch Meridian. The climate is tropical comprising of dry harmattan, hot humid and raining seasons. The seasons vary with cool to hot season being longer them the raining seasons (Adeyinka *et al*., 2006).

A total of two hundred (200) broiler chicks comprising of 100 Hubbard and 100 Arberacre strains used in this study were purchased from commercial distributor in Kaduna. The birds were individually weighed and wing tagged for ease of identification in subsequent body measurements.

The two broiler strains were housed to separate pens and the pen were labeled as strain H and A respectively. The birds were fed *adlibitum* with the commercial broiler starter ration containing 23% crude protein for the first five weeks of life. Followed by the finisher mash containing 21% crude protein. Water was made available constantly. Routine vaccination was administered at the appropriate time.

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Table 1: Mean±standard error of body weight at 2, 4, 6 and 8 weeks of age for hubbard and arboracre strain

Age (weeks)	Broiler strain	N	B.W (KG)
2	A	99	0.2603±0.0587
	H	96	0.0298±0.0287
4	A	88	0.8125±0.0185
	H	88	1.0083±0.0123
6	A	75	1.7100±0.0287
	H	81	2.630±0.0021
8	A	75	2.604±0.0319
	H	80	3.079±0.0250

A: Arbor acre strain; H: Hubbard strain; N: Member of observation; B/W.: body weight; KG: Kilogram's

Data collection: Body weight and linear body measurements were obtained from each bird on a weekly basis using a manual scale calibrated in kilogrammes. The linear body measurements taken were neck length, back length, thigh length, keel length, breast width and shank length and are taken trice in a week using a tape rule calibrated in centimeter.

Statistical analysis: The data collected were subjected to statistical analysis using the Statistical Package for the Social Science (SPSS) version 15.0 incorporated (2008). The independent sample test by Gusset (1957) each at the 5% level of significance was used to compare the key variables of growth between the two strains. The statistical package was used to compute the means body weight and conformation of the two broiler strains.

RESULTS AND DISCUSSION

The mean and standard errors in respect of the body weight and linear body measurements in respect of Hubbard and Arboracre strains are presented in Table 1 and 2. The values obtained for each of the broiler strains increased progressively from day old to 56 days of age. Hubbard broiler strains exhibited consistent superior body weight difference over the Arboracre strain at each age group, a trend that was similarly reflected with the linear body measurements.

Mean body weights of 0.298±0.0289, 1.0083±0.0123, 2.0636±0.0219 and 3.079±0.02589 kg obtained t 2.46 and 8 weeks of age for Hubbard strain were higher than those of 0.26±0.58, 0.8129±0.018, 1.7100±0.0250 and 2.6094±0.032 kg, respectively for Arboracre strains at 2.4, 6 and 8 weeks of age (Table 1) the result shows that Hubbard broiler strains exhibit superior body weight differences over Arboracre strain at each age. These results confirm the fact that genotype sets a ceiling on the body weight capacity since in the present study, nutrition and other environmental factors were uniform. This agrees with the statement of Biligih (1995) that body weight is influenced not only by genetic make up but also by environmental factors.

The mean body weights obtained from this study (Table 1) were higher than those for lohman brown and Anak strain reported earlier by Essien and Adeyemi (1999) at 2.46 and 8 weeks of age. And also higher than those for Ross strain at 6 weeks of age reported by Folasade and Obinna (2009). This could be due to defenses in breeds used.

The result of this present study (Table 1) were also lighter than those for Hubbard and Arboracre strains obtained by Okoudu *et al*. (2005) and Jahan *et al*. (2006) at 2,4, 6 and 8 weeks of age. The relatively higher means body weight obtained in this study could be due to differences in feed composition, environmental condition or management system. (Okon *et al*. (1997).

Shank length of 7.340±0.047, 10.03913±0.080, 14.704±0.157 and 18.005±0.137 cm obtained for Arboracre strain were lower than those of 7.2455±0.2446, 11.1674±0.067, 16.414±0.038 and 19.165±0.0265 cm, respectively for Hubbard strain all at 4, 6 and 8 weeks but higher at 2 weeks (Table 2). This could be due to differences in genetic make up.

Neck length of 4.7498±0.0277, 7.796±0.04, 10.2018±0.03118 and 13.32±0.0325 cm, was obtained for Arboracre strain and were lower than those of 4.7712±0.0338, 7.963±0.0453, 10.607±0.042 and 12.99±0.427 cm, respectively for Hibbard strain all at 2, 4, 6 and 8 weeks (Table 2). This could be attributed to differences in the breeds.

Thigh length of 5.039±0.0396, 7.7489±0.054, 10.2004±0.028 and 13.8258±0.53 cm was obtained for Arboracre strain at 2, 4, 6 and 8 weeks and were lower than those of 4.8662±0.027, 7.9818±0.0373, 10.594±0.023 and 13.59±0.5358 cm, respectively for Hubbard strain at 4.6 and 8 week of age, but higher at 2 week of age (Table 2). This could be attributed to difference in genetic make up.

Table 2: Mean for linear body measurement at 2, 4, 6 and 8 weeks

Age (week)	Strain	N	S.L (CM)	N.L (CM)	T.L (CM)	K.L (CM)	BRW (CM)	B.L (CM)
2	A	99	7.2455±0.24460	4.74980±0.02770	5.03590±0.03969	3.10370±0.01182	7.35620±0.03674	8.991200±0.059900
	H	96	7.34010±0.04679	4.77920±0.03383	4.86220±0.02704	3.16810±0.00491	7.29830±0.03643	9.014100±0.059820
4	A	88	10.3913±0.08033	7.79850±0.04642	7.74890±0.05490	3.88600±0.10458	8.69200±0.03711	13.909432±0.059900
	H	90	11.16740±0.06650	7.96330±0.04531	7.98180±0.03731	3.98460±0.04041	9.03960±0.01957	9.014100±0.059820
6	A	75	14.70600±0.15708	10.20180+0.03118	10.20040+0.02813	5.58110+0.04177	11.21020+0.03461	16.860000 ±10.18020
	H	81	16.61440±0.03840	10.60700+0.04271	10.59420+0.02300	5.77900+0.01292	10..69260+0.01046	17.899200 ±0.081880
8	A	75	18.06580+0.13740	13.32130+0.03349	13.82580+0.53125	7.004400.06327	14.06890+0.08734	20.375600+0.199600
	H	81	19.16500+0.02647	12.99110+0.07641	13.5907+0.53576	7.2557+0.01467	13.15770+0.02793	21.016300+0.061260

A: Aboracre Strain; N.L: Neck Length; H: Hubbard Strain; S.L.: Shank length; B.W.: Body Weight; T.L.: Tight Length; B.W.: Breast Width; B.L.: Back Length; S.E: Standard Error

Keel length of 3.1037±0.0118, 3.89±0.1046, 5.5811±0.0418 and 7.0044±0.06327 cm obtained for Arboracre strain were lower than those of 3.168±0.00649, 3.9846±0.040, 5.7790±0.0129 and 7.2557±0.0149 cm, respectively for Hubard straiun at 2, 4, 6 and 8 week of age (Table 2). This could be due to differences in genetic make up.

Breast width of 7.3562±0.0364, 3.6920±0.037, 11.2102±0.0346 and 14.0689±0.087 cm for Arboracre strain were lower than those of 7.2983±0.03643, 9.0396±0.01957, 10.6926±0.0105 and 13.156±0.028 cm at 2, 4 and 8 week of age, respectively. This may also be due to differences in genetic make up.

Back length 9.0141±0.059, 14.371±0.0102, 17.8992±0.0819 and 21.0163±0.0612 cm was obtained for Hubbard strain and were higher than those of 8.9912±0.0599, 13.0943±0.097, 16.8600±0.1802 and 20.3756±0.1996 cm, respectively for Arboracre strain (Table 2). This could be due to strain differences.

The shank length, back length, keel length, breast width, neck length and thigh length obtained from this present study. At 2, 4, 6 and 8 week were all higher than those obtained by Kabir *et al*. (2008), Amina (2009) and Essien and Adeyemi (1999) at 2, 4, 6 and 8 weeks of age using Anak strain, marshall strain and Lohman brown strain. This could be as result of differences in breeds use, feed composition or management system which indicate hat there is variation in the growth pattern of the breeds. These result is consistent with earlier report of differences in growth pattern within species (Deaton, 1992).

CONCLUSION

From this study, Hubbard broiler strain has been seen to exhibit significant higher body weight and conformations over Aboracre strain $p>0.05$. On comparative basis, broiler producers may opt for Hubbard strain principally for purpose of attainment of market weight earlier.

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