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CORRELATION BETWEEN BODY WEIGHT AND MORPHOMETRIC TRAITS IN ISA BROWN AND FULANI ECOTYPE CHICKENS IN SOUTHERN GUINEA SAVANNAH OF NIGERIA

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Abstract

Data on 400 chickens was used to estimate the correlation between body weight (BWT) and morphometric traits in young and adult Isa brown and Fulani ecotype chickens. Shank length had the highest correlation with BWT in young birds of both genotypes (0.87-0.92). All the morphometric traits measured in young birds were significantly ($P<0.05$) correlated with BWT except for wing length in Isa Brown. There was significant ($P<0.05$) correlation between BWT and each of the morphometric traits considered in adult female chickens while most of the estimates obtained for male birds were not significant ($P>0.05$). Comb length, neck length and breast length had better correlation with BWT than other morphometric traits in Isa brown (0.88-0.95), while beak length, neck length and toe length had better correlation with BWT in Fulani ecotype chicken (0.69-0.74). Negative correlation ($P<0.05$) was obtained between BWT and beak lenght (-0.78) in adult Isa brown and between BWT and shank lenght (-0.35) in adult male chickens. The present study showed that both Isa brown and Fulani ecotype chickens can be adequately characterised using morphometric indices. The study further revealed that morphometric indices like comb length, neck length and thigh length can be used to predict the BWT of young and adult Isa Brown and Fulani ecotype chickens. The differences between sex in the estimates of correlation and the negative estimate between BWT and beak-length in adult chickens require further investigation as these may underline some mechanisms for adaptation in adult chickens.

Keywords: Adaptation, body weight, correlation, Fulani ecotype, morphometric

INTRODUCTION

Body weight of an animal is a phenotypic expression of its genetic makeup under the prevailing environmental or rearing condition. Body weight plays important role in the determination of market price in farm animals (Momoh and Kershima, 2008). Variations in body weight within a flock can be attributed to genetic variation and environment factors that impinge on individuals (Ayorinde and Oke, 1995).

According to Ibe (1989), the next approach in livestock characterization apart from evaluation of its production performance is the evaluation of body size and conformation. Morphometric or quantitative

analyses of form, structure, shape and size of an animal have been found useful in contrasting size and shape of animals (Ajayi *et al*., 2008). According to Maciejowski and Zeiba (1982), morphometric traits such as shank lenght and shank diameter are good indicators of leg development while body girth is an indicator of breast development. The use of morphometric traits is therefore a practical technique to derive the bird's body weight (Gueye *et al.*, 1998; Semacula *et al*., 2011). Phenotypic correlation between body weight and morphometric traits could be a useful guide to resource poor rural poultry breeders in the choice of body size traits that can be incorporated into their selection programme.

Local chickens are genetically heterogeneous stock. There is the need for more documented evidence on the relationships between body weight and body measurements in Nigerian local chicken populations. The Fulani chicken is native to the dryer central and northern Nigeria. The purity of the chicken is preserved by the isolated family-group lifestyle of its Fulani keepers which tends to hinders it's inter breeding with other native chickens.

The aim of this study was to measure the correlation between body weight and morphometric traits in Isa brown and Fulani ecotype chickens in Southern Guinea Savannah of Nigeria.

MATERIALS AND METHODS

Location of the study

The study was carried out in Ilorin metropolis. The study location is between the rainforest of the Southwest and savannah grassland of Northern Nigeria with co-ordinates of 8° 30' 0" North, 4° 33' 0" East. Ilorin lies on an altitude of 305m, 1001' above sea level. It has annual rainfall, relative humidity and day temperature of 600-1200 mm, 65-80% and 33-37^0 C, respectively.

Experimental animals and management

A total of 200 Isa brown (comprising 50 adult male, 50 adult females and 100 mixed-sex growers) and 200 Fulani-ecotype chickens (comprising 50 adult male, 50 adult females and 100 mixed-sex growers) were used to estimate body weight, morphometric characteristics and correlation between body weight and morphometric traits in Isa brown and Fulani ecotype. The Isa Brown cockerel and adult chickens used for the study were obtained from the Department of Animal Production of the University of Ilorin. Fulani ecotype chickens were obtained from two retail outlets in the metropolis. The Isa Brown cockerels and adult birds were managed using conventional feeding and health care system, while the Fulani cockerel and adult chicken have been managed in Fulani kraals using local husbandry techniques. The mix-sex growers of both genotypes were estimated to be about 10 week of age.

Data collection

The live weight and 11 morphometric parameters were taken on all the Isa Brown and Fulani ecotype chickens. The monitored variables were comb length, beak length, head length, neck length, body length, wing length, shank length, thigh length and toe length. Others were breast length, breast breadth and live weight. Body weight (kg) and morphometric measurements (cm) were taken as described by Olawunmi *et al*.

(2008). All measurements were taken with the help of a field assistant.

Statistical analysis

SPSS (2001) package was used to obtain estimate of correlation between body weight and each of the morphometric traits (comb length, beak length, head length, neck length, body length, wing length, shank length, thigh length and toe length). The significance of the correlation coefficient was determined at P- value of less than 0.05.

RESULTS AND DISCUSSION

Estimates of correlation between body weight and morphometric traits in grower Isa Brown and Fulani ecotype chickens is presented in Table 1. Morphometric traits measured on young birds were significantly ($P<0.05$) correlated with body weight in both genotypes (0.49-0.92) except for wing lenght in Isa Brown. Shank length had the highest correlation with body weight in both genotypes (0.87-0.92). The results of correlation between body weight and morphometric traits in adult Isa Brown and Fulani ecotype chickens is presented in Table 2. There is a significant ($P<0.05$) correlation between body weight and each of the morphometric traits considered in the study. Comb length, neck length and breast length had better correlation with body weight than other morphometric traits in Isa brown (0.88-0.95), while beak length, neck length and toe length had better correlation with body weight than other morphometric traits in Fulani ecotype chicken (0.69-0.74). Table 3 shows the correlation between body weight and morphometric traits in adult male and female chickens. There is a significant ($P<0.05$) correlation between body weight and each of the morphometric traits considered in the female chicken. Most of the estimates obtained for the male chicken were not significant ($P>0.05$). Comb length, neck length and breast length had better positive correlation with body weight than other morphometric traits in male chicken (0.79-0.95), while comb length, breast breath and breast length had better correlation with body weight than other morphometric traits in female chicken (0.77-0.79).

The high correlation between body weight and morphometric measurements in this study agrees with the earlier report of Yahaya *et al.* (2012) who obtained high correlation coefficients of 0.86- 0.97 and 0.86- 0.97 between body weight and morphometric traits in Hubbard and Arbor Acre broiler strains. The estimates contained in their reports were generally higher than the values obtained in the present study. They were also generally higher than estimates obtained by Adeyinka *et al* (2006). The observed close relationship between body weight and breast breath in both young and adult Fulani ecotype chickens agrees with the earlier findings of Adebambo *et al.* (1996) who reported that breast breadth is a good indicator of meatiness in most poultry species. The relationship between body weight and body lenght in the present study also agrees with the findings of Ojo *et al.* (2013) who reported that body length is one of the best predictors of body weight in Japanese quail (*Cortunix cortunix japonica*).

CONCLUSION AND RECOMMENDATION

The present study showed that there exist strong association between body weight and most of the morphometric indices of young and adult Isa brown and Fulani ecotype chickens. Therefore, morphometric indices like comb length, neck length and thigh length can serve as useful guides in the selection of birds for body weight in the two genotypes. The difference between sex in the estimates of correlation in adult chicken and the negative correlation obtained between body weight and beak-lenght in adult chicken require further investigation as these may underline some mechanisms for adult chicken adaptation.

REFERENCES

Adebambo, O. A., Ikeobi, C. O. N., Ozoje, M. O., Adenowo, J. A. and Osinowo, O. A. (1996).Variation in qualitative traits and their effects on the performance of local ducks and Turkeys.*Nigerian Journal of Genetics, 11:20-3*.

Adeyinka, I. A., Oni, O. O., Nwagu, B. I. and Adeyinka, F. D. (2006). Genetic parameter estimates of body weight of naked neck broiler chicken. *International Journal of Poultry Science, 5(6): 509-512.*

Ajayi, F O, Ejiofor, O. and Ironkwe, M. O. (2008). Estimation of bodyweight from body measurements in two commercial meat type chicken. *Global Journal of Agricultural Science, 7(1): 57-59.*

Ayorinde, K. L and Oke, U. K. (1995).The influence of juvenile bodyweight and two feeding regimes during the growing phase on growth performance and early lay characteristics of pullets. *Nigerian Journal of Animal Production, 22(2):101 – 107.*

Gueye, E. F, Ndiaye, A. and Branckaert, R.D.S. (1998). Prediction of body weight on the basis of body measurements in mature indigenous chickens in Senegal. *Livestock Research for Rural Development, 10 (3).*

Ibe, S. N. (1989). Measurement of size and conformation in commercial broilers. *Journal of Animal Breeding and Genetics, 106: 461-469.*

Maciecjaski J. and Zieba T. (1982). Genetics and animal breeding. Polish scientific publisher Warszawa, pp 196.

Momoh, O.M. and Kershima, D.E. (2008). Linear body measurements as predictors of body weight in Nigerian local chickens. *Asset series A 8(2): 206 – 212*

Ojo, V., Fayeye, T. R., Ayorinde, K. L. and Olojede, H. (2013). Relationship between body weight and linear body measurements in Japanese quail (*Cortunix cortunix japonica*).*Proceedings, Genetics Society of Nigeria 37th Annual Conference, Lafia, Pp 121-126.*

Olawunmi, O.O., Salako, A.E. and Afuwape, A. A. (2008). Morphometric differentiation and assessment of function of the Fulani and Yoruba ecotype indigenous Chickens of Nigeria. *International Journal of Morphology, 26(4): 975 – 980.*

Semacula, J., Lusembo, P., Kugonza, D. R., Mutetikka, D., Ssennyonjo, J. and

Mwesigwa, M. (2011). Estimation of live bodyweight using zoometrical measurements for improved marketing of indigenous chicken in the lake Victoria basin of Uganda. *Livestock Research for Rural Development,Volume 23, 2011. http://www. lrrd.org/lrrd23/8/sema23170.htm*

Yahaya, H. K., Ibrahim, H. and Abdulsalam, S. (2012). Correlation between body weight and body conformation of two broiler strains under the same dietary treatment. *International Journal of Animal and Veterinary Advances, 4(3): 181-183*

Table 1: Estimates of correlation between body weight and morphometric traits in young Isa Brown and Fulani ecotype chickens

	Grower	
Trait	IB	FE
Comb Lenght	0.82*	0.79*
Beak Lenght	0.68*	0.79*
Head Lenght	0.75*	0.73*
Neck Lenght	0.74*	0.88*
Body Lenght	0.80*	0.49*
Wing Lenght	0.03	0.88*
Shank Lenght	0.87*	0.92*
Thigh Lenght	0.69*	0.91*
Toe Lenght	0.75*	0.73*
Breast Lenght	0.70*	0.70*
Breast Breath	0.79*	0.71*

* significant correlation ($P<0.05$)

Table 2: Estimates of correlation between body weight and morphometric traits in Adult Isa Brown and Fulani-ecotype chickens

	Adult	
Trait	IB	FE
Comb Lenght	0.95*	0.54*
Beak Lenght	-0.78*	0.72*
Head Lenght	0.73*	0.51*
Neck Lenght	0.88*	0.74*
Body Lenght	0.56*	0.61*
Wing Lenght	0.39*	0.26*
Shank Lenght	0.27*	0.59*
Thigh Lenght	0.94*	0.67*
Toe Lenght	0.59*	0.69*
Breast Lenght	0.88*	0.26*
Breast Breath	0.42*	0.67*

* significant correlation (P<0.05)

Table 3: Estimates of correlation between bodyweight and morphometric traits in Male and Female chicken chickens

	Sex	
Trait	M	F
Comb Lenght	0.95*	0.79*
Beak Lenght	-0.76	0.66*
Head Lenght	-0.13	0.51*
Neck Lenght	0.79*	0.53*
Body Lenght	0.52	0.23*
Wing Lenght	0.87	0.58*
Shank Lenght	-0.35*	0.42*
Thigh Lenght	0.94	0.37*
Toe Lenght	0.47	0.34*
Breast Lenght	0.86*	0.77*
Breast Breath	-0.07	0.79*

* significant correlation (P<0.05)