COMPARATIVE STUDY OF BODY WEIGHT AND SOME BIOMETRIC PARAMETERS OF PROGENIES OF INDIGENOUS CHICKENS AND THEIR NAPRI X CROSSES

H. Y. ABBAYA, G. N. AKPA, I. I. ALABI AND M. ORUNMUYI
Department of Animal Science, Ahmadu Bello University, Zaria
Correspondence:07036608339;abbaya177@gmail.com

ABSTRACT
A comparative study on body weight and biometric traits was conducted on the progenies of three Nigerian indigenous chickens. They include Normal feathered (N), Naked neck (Na) and Frizzle feathered (F) and their crosses with NAPRIX to form crosses of Normal X NAPRIX (NNPX), Naked neck X NAPRIX (NaNPX) and Frizzle X NAPRIX (FNPX) to evaluate their potentials for genetic improvement of body weight. Body weight and biometric traits at 28, 56 and 84 days and their correlation were evaluated. Body weight (BW), body length (BL), shank length (SL) and thigh length (TL) differed significantly ($P<0.05$) with NNPX having the highest values for the measured traits while body girth (BG) did not significantly differ ($P>0.05$). The correlation between traits was highly positive and significant ($P< 0.01$; $r= 0.62$-0.99) except for moderate relationship in NaNPX between BW and BG ($P< 0.05$; $r= 0.31$). This indicated that normal feather chicken can respond more fastly when subjected to genetic improvement among the indigenous chickens.
Keywords: Bodyweight, Biometric, Indigenous, Chicken, Crosses, NAPRIX.

INTRODUCTION
Indigenous chickens are essential part of the Nigerian society. They are characterized by hardness, disease tolerance and they are genetically envied for genetic exploration and hybrid vigour exploitation (Peters, 2000). One of the ways to enhance the commercial values of the indigenous chicken is to improve their breeding performances through utilization of advantageous genes in breeding strategies (Machebe and Ezekwe, 2005). Body weight is regarded as a function of frame work or size of the animal and its condition (Philip, 1970). Linear body measurements can be used to predict body weight in broiler (Akanno *et al.*, 2007; Kabir *et al.*, 2006) and Cross breeding is the major tool for the development of present day commercial breeds of chicken. NAPRIX chicken has been selected for fast growth for several years and can be used to improve indigenous chickens. Limited attention has been given to the upgrading of indigenous non-descriptive chicken types using high performing broiler breeds. The objective of the study is to evaluate body weight and biometric traits resulting from progenies produced from three genotypes of Nigerian indigenous chickens and their crosses with NAPRI X broiler chicken.

MATERIALS AND METHODS
The study was conducted at the Poultry Unit of the Department of Animal Science and Research farm, Faculty of Agriculture, Ahmadu Bello University, Zaria. The experimental site is as described by Akpa *et al.* (2002). Three genotypes of Nigerian indigenous chickens namely; Normal feather (N), Naked neck (Na), and Frizzle feather (F) and Exotic broiler breed known as NAPRIX were mated. A total of 115 chickens comprising of 30 Normal feather (N), Naked neck (Na) and frizzle hens each, 5 Normal feather (N), Naked neck (Na) and frizzle cocks each and 10 cocks of the exotic broiler (NAPRIX) were raised on deep litter. Feed and water were given *ad-libitum*. Mating in the pure breeds was done naturally and artificial insemination was used in crossing the indigenous hens and NAPRIX cocks given 3 pure and 3 crossbred progenies.

Body weight (g) were taken using a sensitive weighing balance (Citizen Electronic Balance, Goldair) calibrated to 0.1g and body linear measurements (cm) for each progeny were taken by flexible measuring tape, respectively: Breast girth(BG)= measured just the wings through the chest (cm); Body length (BL): diagonal distance from the points of shoulder to points of hip or first thoracic vertebrae to base of tail or to hip bone(cm); Shank length (SL):The distance from

the lower joint of drumstick to the head of tarsus joint(cm).

Data generated were subjected to one analysis of variance (ANOVA) using SAS, 9.2(2003). Duncan multiple range test was used to separate means. Correlation between traits was carried out using Pearson Moment correlation of the same software.

RESULTS AND DISCUSSION

Table 1 shows the least square means of body weight and biometric traits at 28, 56 and 84 days. BW, BL, SL AND TL differed significantly ($P<0.05$) between the genotypes (N, Na, F, NNPX, NaNPX and FNPX) while BG did not significantly differ ($P>0.05$).

NNPX consistently had higher values for measured body weight and body measurements while the least was recorded in F genotype with the exception of Shank length at 28, 56 and 84 days respectively. The significant difference obtained in body weight and measurement at 28, 56 and 84 days were comparable to the reports of (Mwalusanya, 1998; Ubani *et al.*, 2011; Ojedapo, 2013). The general superiority of the crosses over the pure bred counterparts agreed with (Nwosu *et al.*, 1980) that indigenous chickens possess

small body and grow slowly than the exotic breeds. The consistent higher body weight recorded for NNPX suggest that crossing of N genotype with an exotic breed will give fastest genetic improvement.

Table 2 shows the correlation matrix of body weight and body linear measurements in the six genotypes studied indigenous genotypes X NAPRI X broilers. The correlation was highly positive and significant ($P< 0.01$; $r= 0.62$-0.99) between traits for all the genotypes except for moderate relationship in NaNPX between BW and BG ($P< 0.05$; $r= 0.31$). The high estimates of correlation in the present study are comparable to those reported by (Kabir *et al.*, 2006; Aziz and Al-Hur, 2013). The strong relationship existing between body weight and body measurements may be useful as selection criterion, since positive correlations of traits suggest that the traits are under the same gene action (pleiotropy).

CONCLUSION

The breeders could exploit the potentials of normal feathered chickens and linear measurements that have high positive correlation with body weight for selection for improved body weight.

REFERENCES

Akano, E. C., Ole, P.K., Okoli, I. C. and Ogundu, U.E. (2007). Performance characteristics and prediction of body weight of broiler strains using linear body measurements. *Precedings 22nd Annual Conference of Nigerian society of animal production (NSAP).* A. O. E. Malau-Aduli (ed) Calaba, Pp.162-164.

Akpa, G. N., Asirbo, O. E, N., Oni, O. O., Alawa, J. P., Dim, N. I., Asinwo, O. A. and Abubakar, B. Y. (2002). Milk production by Agropastoral Red Sokoto Goats in Nigeria. *Tropical Animal Health and production, 34(6):525-533*

Aziz, M. M. A. and AL-Hur, f. s. (2013). Differentiation between three Saudi goat type using size-free. *Food Agriculture,*25(9): 727-735.

Kabir, M., Oni, O. O., Akpa, G. N. and Adeyinka, I. A. (2006). Heritability Estimates and the interrelationships of body weight and shank length in Rhode Island and White chickens. *Pakistan Journal of Biological Sciences,* 9(15): 2892-2896.

Machebe, N. S, Ezekwe, A. G. (2005). Effect of season on ejaculation quality of genotypes of Nigerian local chicken; Hamessing the Livestock Resources for National Economic Empowerment, Nsukka, Nigeria. Pp. 24-26

Mwalusanya, N. A. (1998). Productivity and nutritional status of local chickens under village management condition. M.Sc. Dissertation, Royal Veterinary and Agr icultural University, Copenhagen, Denmark. Pp. 56.

Nwonsu, C. C., Obioha, F. C., Fred, G., Belonwu, T. C., Onuora, G. I. and Omaje (1980). Agrowth of growth pattern of local and exotic chickens. *Nigerian Journal of Animal Production,7:38*

Ojedapo, L.O. (2013). Evaluation of body weight and other linear parameters of Marshal Broiler for repeatability estimates.

International Journal of Applied Agriculture and Apiculture, 9:1-2

Peters, S. O. (2000).Genetic variation in the reproductive performance of indigenous chicken and growth of pure and half bred progeny. M. Agric Thesis, Department of Animal Breeding and Genetics. University of Abeokuta, Nigeria. Pp. 25-27

SAS. (2003). Statistical Analysis Sysyem. User's Guide. SAS Institute Inc., Cary, NC 27513 USA.

Ubani, E, O, A., Adeyinka, I. A., Nwagu, B. I., Abeke, F.O., Sekoni, A. A., Otu, M. O. and Iyoola-Tunji, A, O. (2011). Estimates of repeatability for some growth traits in naked neck broiler chickens. *Proceedings of the 36th Conference of Nigerian Society of Animal Production (NSAP)*. A.A. Adeniji, E, A., Oltunji, O. A Olafedahan and E.S. Gana. University of Abuja, Nigeria Pp. 48-50

Table 1: Least square means of body weight and biometric traits at 28, 56 and 84 days of indigenous chicken and their crosses with naprix

	Body weight(kg)	Body length(kg)	Breast girth(cm)	Shank length(cm)	Thigh length(cm)
28 Days					
Normal	196.00^{b}	27.52^{b}	11.12	2.59^{b}	5.40^{b}
Naked	172.10^{b}	26.02^{b}	11.28	2.21^{c}	5.29^{b}
Frizzle	157.80^{c}	25.92^{c}	10.27	2.43^{b}	4.94^{c}
NNPX	353.06^{a}	33.43^{a}	13.93	4.03^{a}	7.00^{a}
NaNPX	306.22^{a}	31.44^{a}	13.10	3.64^{a}	6.15^{a}
FNPX	277.07^{a}	30.90^{a}	12.74	3.26^{a}	6.12^{a}
SEM	67.87	3.81	3.21	1.20	0.91
56 Days					
Normal	464.69^{b}	42.80^{b}	18.88	5.27^{b}	8.35^{b}
Naked	467.27^{b}	42.02^{b}	19.19	5.42^{b}	8.28^{b}
Frizzle	467.27^{c}	40.15^{c}	19.27	4.55^{c}	8.01^{b}
NNPX	346.65^{a}	53.37^{a}	22.75	6.56^{a}	10.43^{a}
NaNPX	798.61^{a}	50.96^{a}	22.18	6.32^{a}	10.05^{a}
FNPX	722.73^{a}	51.40^{a}	21.87	6.17^{a}	9.81^{a}
SEM	56.41	1.78	2.27	0.32	0.41
84 Days					
Normal	599.15^{b}	52.31^{b}	25.08	7.32^{b}	11.83^{b}
Naked	580.63^{b}	52.72^{b}	25.13	7.41^{b}	11.78^{b}
Frizzle	574.12^{b}	50.89^{b}	24.59	7.22^{c}	12.02^{b}
NNPX	1469.62^{a}	59.31^{a}	30.07	8.21^{a}	13.20^{a}
NaNPX	1365.92^{a}	74.91^{a}	29.45	8.05^{a}	13.03^{a}
FNPX	1363.73^{a}	58.23^{a}	29.58	8.08^{a}	13.08^{a}
SEM	80.95	19.52	0.59	0.17	0.16

Means in the same column with different superscripts are significantly different ($P<0.05$).BW=bodyweight
NNPX= Normal x NAPRIX, Na NPX= Naked neck x NAPRIX, FNPX= Frizzle x NAPRIX.

Table 2: Pearson correlation of body weight and body measurement traits among the three indigenous genotypes X NAPRI X broilers

	Thigh length (cm)	Breast girth (cm)	Body length (cm)	Body weight (g)
INDIGENOUS				
NORMAL				
Shank length(cm)	0.97**	0.95**	0.99**	0.92**
Thigh length (cm)	-	0.97**	0.96**	0.90**
Breast girth (cm)		-	0.96**	0.86**
Body length (cm)			-	0.92**
Body weight (g)				-
NAKED NECK				
Shank length(cm)	0.96**	0.97**	0.98**	0.91**
Thigh length (cm)	-	0.96**	0.95**	0.90**
Breast girth (cm)		-	0.96**	0.90**
Body length (cm)			-	0.95**
Body weight (g)				-
FRIZZLE				
Shank length(cm)	0.91**	0.62**	0.92**	0.90**
Thigh length (cm)	-	0.63**	0.93**	0.94**
Breast girth (cm)		-	0.67**	0.69**
Body length (cm)			-	0.96**
Body weight (g)				-
CROSSES				
NNPX				
Shank length(cm)	0.98**	0.95**	0.95**	0.90**
Thigh length (cm)	-	0.97**	0.96**	0.93**
Breast girth (cm)		-	0.95**	0.94**
Body length (cm)			-	0.87**
Body weight (g)				-
NaNPX				
Shank length(cm)	0.95**	0.95**	0.98**	0.85**
Thigh length (cm)	-	0.97**	0.94**	0.88**
Breast girth (cm)		-	0.93**	0.88**
Body length (cm)			-	0.31*
Body weight (g)				-
FNPX				
Shank length(cm)	0.97**	0.97**	0.95**	0.88**
Thigh length (cm)		0.98**	0.95**	0.91**
Breast girth (cm)		-	0.96**	0.91**
Body length (cm)			-	0.85**
Body weight (g)				-

Bw-Body weight ** (P<0.01)-highly significant.*-(P<0.05) significant, NNPX= Normal x NAPRIX, NaNPX= Nakedneck x NAPRIX, FNPX= Frizzle x NAPRIX.