



SEXUAL DIFFERENTIATION AND PHENOTYPIC CORRELATIONS AMONG BIOMETRIC TRAITS OF NIGERIAN LOCAL TURKEY (*MELEAGRIS GALLOPAVO*)

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Abstract

One- hundred and twenty four (124) Nigerian local turkeys at age of six month were used for this study. Data were collected on growth traits to determine the effect of sex and phenotypic correlations among growth traits. Sex had significant effect ($p < 0.05$) on all the variables in favour of male. The body weight, shank length, thigh length, body length, wing length, wing span and breast girth for males were 3.80 kg, 9.01 cm, 21.68 cm, 63.00 cm, 32.44 cm, 72.86 cm and 40.17 cm respectively, while the corresponding values for female were 2.93 kg, 7.27 cm, 17.96 cm, 55.37 cm, 28.18 cm, 63.92 cm and 36.14 cm. The correlation coefficients between body weight and the linear measurements in the two sexes were positive and mostly significant in male. It ranged between 0.291 and 0.561 in male and 0.233 and 0.721 in female. Sexual dimorphism was obvious in all the traits considered in favour of male in similar trend the positive correlations between body weight and the linear body measurements in the two sexes indicate pleiotropy which means improvement in any of the traits will lead to improvement in the body weight.

Keywords: Nigerian local turkey, sex, wing length, body length and breast girth

Introduction

The first approach in livestock characterization apart from evaluation of its production performance is the evaluation of body size and conformation (Ibe, 1989). A quantitative measure of conformation will no doubt enable reliable genetic parameters for the traits to be estimated but also make it possible to include conformation in breeding programme. Body weight has been commonly used to measure body size. Assessment of body weight and linear body measurements have been found useful in quantifying body size and shape (Ibe and Ezekwe, 1994).

Phenotypic characterization of Animal Genetic Resources (AnGR) is the process of identifying distinct breed populations and describing their external and production characteristics in a given environment and under given management, taking into account the social and economic factors that affect them. The information provided by characterization studies is essential for planning the management of AnGR at local, national, regional and global levels. The *Global Plan of Action for Animal Genetic Resources* (FAO, 2007) recognizes that “A good understanding of breed characteristics is necessary to guide decision-making in livestock development and breeding programmes”.



The developmental processes of males and females are governed by partially different hormonal and physiological controls (Nestoret *et al.*, 2000). Such sex differences in physiological parameters may translate into sex-specific responses to selection among males and females of the same age and, ultimately, can lead to a rapid change in sexual size dimorphism even under constraints of shared gene pool (Rhen, 2000). Therefore, the aim of this study was to determine the effect of sex on growth traits and the phenotypic correlations among the growth traits.

Materials and methods

The experiment was carried out in a farm at Ibadan in Oyo State. Ibadan is located on latitude 07° 23N and longitude 03°54E and has a semi-hot equatorial climate characterized by seven or more uninterrupted humid months and one to three dry months. One- hundred and twenty four turkeys were raised from day-old to six month of age in a deep litter system, where they were fed with commercial feed and water supplied *adlibitum*. At the sixth month of age, the turkeys were weighed individually and linear body measurements taken as follows:

Linear body measurements were as suggested by Gueye *et al.* (1998) and Solomon (1996). The weights of the birds were obtained using a 20 kg weighing scale, while a measuring tape was used for body measurements in centimeter. Wing Length (WL) was taken from the shoulder joint to the extremity of terminal phalanx while Shank Length (SL) was measured from the hock joint to the spur. Thigh Length (TL) was taken as the distance between the hock joint and the pelvic joint. Body Length (BL) is the length between the tip of the *rostrum maxillare* (beak) and that of the *cauda* (tail, without feathers). Breast girth (BG) was taken under the wing at the edge of the sternum while wing span (WS) is length between tips of right and left wings after both are stretched out in full. To ensure accuracy, each measurement was taken twice and the mean was used in subsequent analysis. All the measurements were taken by the same person

The data collected were subjected to analysis of variance to determine the summary statistics and sex effect on the growth traits using SAS (1999). Pearson correlation was used to determine the correlation coefficients among the traits on sex basis.

Results

Table 1 shows the summary statistics of the body weight and linear body measurements on the basis of sex. Sex had significant effect ($p<0.05$) on all the variables considered .Higher values were recorded in favour of male.

Table 1: summary statistics of body weight and linear measurements of Nigerian local turkey

SEX	VARIABLE	MEANS	STD.DEV.	N	NIN.	MAX.	CV
FEMALE	BWT	2.93±0.06	0.46	81	1.5	3.5	15.74
	SL	7.27±0.11	0.78	81	6.0	9.0	10.76
	TL	17.96±0.19	1.33	81	16.0	22.0	7.38
	BL	55.37±0.44	3.17	81	47.0	63.0	5.73
	WL	28.18±0.28	1.99	81	24.0	34.0	7.09
	WS	63.92±0.51	3.65	81	56.0	73.0	5.71



	BG	36.14±0.48	3.40	81	28.0	42.0	9.41
	BWT	3.80±0.06	0.38	43	3.0	4.5	9.95
	SL	9.01±0.08	0.49	43	8.0	10.0	5.38
	TL	21.68±0.19	1.18	43	19.0	24.0	5.43
MALE	BL	63.00±0.52	3.12	43	57.0	70.0	4.95
	WL	32.44±0.40	2.42	43	25.0	36.0	7.46
	WS	72.86±0.90	5.41	43	57.0	80.0	7.42
	BG	40.17±0.51	3.05	43	34.0	45.0	7.59

Bwt-body weight,Sl-shank length,Tl-thigh length; BL-body length;Wl-wing length;Ws-wing span;Bg-breast girth

The correlation coefficients between the body weight and linear measurements for male and female are shown in Table 2. The upper diagonal shows the correlations for male while the lower diagonal is for the female. The correlations between body weight and the linear measurements were positive in the two sexes but not significant with wing length. However, it was not significant with shank length (0.263), thigh length (0.228) in the female. The correlations among the linear measurements in the male ranged between -0.057 and 0.559 while in the female were between 0.050 and 0.779.

Table 2: Phenotypic correlation between body weight and linear measurements

	BWT	SL	TL	BL	WL	WS	BG
BWT	1.000	0.366*	0.561**	0.466**	0.291	0.397*	0.516**
SL	0.263	1.000	0.470**	0.387*	0.506**	0.431**	0.008
TL	0.228	0.637***	1.000	0.673***	0.562**	0.559**	0.266
BL	0.495**	0.545***	0.588***	1.000	0.504**	0.588**	0.153
WL	0.233	0.467**	0.531***	0.633***	1.000	0.749***	-0.057
WS	0.325*	0.445	0.562***	0.639***	0.779***	1.000	0.09
BG	0.721***	0.188	0.050	0.447**	0.205	0.338*	1.000

Bwt-body weight,Sl-shank length,Tl-thigh length; BL-body length;Wl-wing length;Ws-wing span;Bg-breast girth

Discussion

The significant effect of sex on the body weight and other variables considered in this study was in favour of male which had higher values on all the variables. The higher values observed in the males indicate sexual dimorphism. This is in agreement with the observation of Ogah (2011) who reported body weight of 3.38±0.07 kg for male and 2.65±0.02 kg for female in Nigerian indigenous turkey at five month of age. The 3.80±0.06 kg for male and 2.93±0.06 kg for female



observed in this study are lower than 6.01 kg and 3.97 kg reported by Kodinetz (1940) and Muzic (1990) from Zagorje turkey at five month of age. The higher values observed in the variables compared with the values reported by Ogah (2011) for the same breed could be attributed to age differences. The relatively low body weight in the present study compared to the respective traits found in temperate region may be due to the unfavourable environmental conditions such as temperature, feed supply and unselective nature of tropical animal genetic resources. The positive correlations between body weight and other body measurements observed in both male and female turkey indicate that improvement in any of the variables correspond to improvement in body weight which could be explain by pleiotropy. Similar observations were reported by Ogah (2011) and Bachev (1990).

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