PHENOTYPIC CORRELATION OF BODY WEIGHT OF SELECTED INDIGENOUS TURKEY (*Meleagris gallopavo*) AT DIFFERENT AGES IN ZARIA, KADUNA STATE, NIGERIA

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ABSTRACT
The study was conducted to determine the phenotypic correlation of body weight of selected indigenous turkey (Meleagris gallopavo) at different ages in Zaria, Kaduna State, Nigeria. The foundation stock consisted of 9 adult turkeys that comprised of three Sire and six Dams, each sire served as replicate and was mated to two dams. Eggs were collected and hatched. A total of 45 F1 poults were produced, at 8 weeks, three toms and six hens with high body weight were selected while others were maintained as control group. The procedure used in producing F1 was adopted for F2 body weight of both the selected and the control were taken at an interval of 4 weeks up to 36 weeks. Data generated were subjected to the General Linear Model (GML) procedure of SAS, differences between generations were compared using Duncan Multiple Range Test (DMRT). The results revealed significantly ($p<0.05$) higher BW in G2 (46.78±0.18g to 6208.72±60.80g) over G1 (44.21±0.27g to 6065.30±50.70g), with higher coefficient of variation (CV) observed in G1 (4.2 to 37.68) over G2 (2.91 to 30.29). Thus, selection for increased 8 weeks BW increases BW of indigenous turkey even at later age. Positively significant ($p<0.05$) relationship was observed in body weight among different ages which ranges from high to moderate in generations (0.993-0.270) one and (0.989-0.268) two. Positive relationship observed was as a result of the same gene controlling the body weight at different ages with increasing expressivity as observed in the increase in weight of the generation two over generation one. This suggest that an increase in body weight at any age could lead to an increase in associated ages as a result of the positive relationship between body weight at different age.
Keywords: Indigenous turkey, Body weight, Phenotypic correlation.

INTRODUCTION
The growth of turkey industry in Nigeria is very fast. This is because of the intensification of production and development of large breeds with standard weight ranging from 15-17 kg for male and 8-10 kg for female (Kabir et al., 2015). Turkey production is considered significant next to chicken, duck, guinea fowl, pigeon and quail in contributing to the national economy, nutritional status and food security of the increasing population of the country (Shettima et al., 2023)
Growth is an important characteristic of animals. It gives the idea of how the body of animals changes with age. Body size is therefore a function of time and body weight has been commonly used to measure body size (Shettima et al., 2023).

Correlation is the estimation of relationship between two traits. While, Genetic correlation is the relationship of additive effects of genes governing two characters that is caused by plieotropy and linkage, phenotypic correlation is the relationship observed that arise from genetic and environmental effects affecting the two traits (Sebastian et al., 2018). Shettima et al. (2023) opined that phenotypic correlation assumed to reflect genotypic correlation in evolutionary biology and also the use of phenotypic correlation as proxies for genetic correlation is appropriate, evidence has been found across animal and plants species. Both correlations can provide bases for genetic manipulation and improvement of Nigerian indigenous turkey. Thus, there is dearth of information on phenotypic, genetic and environmental correlations of body weight of Nigerian indigenous turkey unlike other poultry species, hence this paper aimed to determine the phenotypic correlation among body weight at different ages of selected indigenous turkey (Meleagris gallopavo) at different ages.

MATERIALS AND METHODS

The research was conducted at the Teaching and Research Farm of Department of Animal Science, Faculty of Agriculture, Ahmadu Bello University Zaria, Nigeria. Detailed of description of the site was as given by (IAR, 2020).

Mating design and management of experimental birds:

The foundation stock consists of 9 adult turkeys of two different strains that comprised of 3 toms and 6 hens. Eggs were collected and hatched a total of 45 (G1) poults were produced. At 8 weeks, 3 toms and 6 hens with high body weight were selected while others were maintained as control group. The selected groups were used as the parents of the second generation. The same procedure was followed to produce the (G2) and body weight of both the selected and the control were taken at an interval of 4weeks up to 36 weeks.

The birds were fed starter diet that contains 2800 kcal ME/kg with 28% CP, grower diet of 2900 kcal ME/kg with 18% CP and breeder diet of 2900 kcal ME/kg with 15% CP. They were fed ad libitum, clean drinking water provided. Necessary medications and vaccinations were administered as when due to ensure good health and improved egg production.

Data collection

Body Weight (g) and six linear body measurement (body length, breast girth, shank length, thigh length, wing length and neck length) of each individual turkey was taken from day old to maturity at 4 weeks interval as described by (Gueye et al., 1998).

Data Analysis

Data generated were subjected to the General Linear Model (GML) procedure of SAS (SAS, 2002), differences between generations were compared using Duncan Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Table 1 shows the effects of Generation on body weight (g) at different ages (weeks) of turkey. There was significant increase ($p<0.05$) in body weight at different ages in Generation Two over One (G2 and G1) at day old, 4, 8, 24, 28, 32 and 36 weeks. Mean body weight at day old, 4, 8, 24, 28, 32 and 36 weeks that ranges from 44.21±0.27g to 6065.30±50.70g in G1 is lower than the range of 46.78±0.18g to 6208.72±60.80g in G2, whereas, no differences were observed in body weight at 12, 16 and 20 weeks of age from G1 to G2.

Table 1: Least square mean ± (SE) of BW at different ages of turkey in generations 1 and 2

Age (week)	Generation 1	Generation 2	CV	LOS
Day old	44.21±0.27[b]	46.78±0.18[a]	5.35	*
4	279.60±4.05[b]	294.05±2.32[a]	10.34	*
8	804.00±12.67[b]	838.62±6.89[a]	10.94	*
12	1513.04±34.05	1531.10±19.98	16.19	NS
16	2357.87±36.42	2409.87±20.75	10.93	NS
20	3213.58±68.56	3267.70±43.58	15.91	NS
24	4009.31±69.48[b]	4458.05±68.76[a]	87.85	*
28	4404.26±133.63[b]	4700.05±104.61[a]	24.83	*
32	5142.25±195.63[b]	5429.84±152.25[a]	31.09	*
36	6065.30±50.70	6208.72±60.80	34.85	*

[ab] means with different superscript on the same row are significantly different at $P<0.05$; NS= Not significant; CV= coefficient of variation; LOS= level of significant; Age= week; BW = Body weight.

This shows that there was an increase in body weight due to selection. This is in accordance with the finding Nestor et al. (2008) who recorded a significant increase in body weight as the generation of selection increases when they select for higher body weight at 8 weeks in turkey birds. In the same vein, Nestor (1977) observed a highly significant gain (175g) per generation of selection as they select for increased body weight. The coefficient of variation ranged between 4.2 to 37.68 and 2.91 to 30.29 in G1 and G2, respectively, with higher variability observed in G1 over G2. This shows that selection increases homogeneity of body weight and make the birds look similar in G2. This is similar to the study of Adedibu et al. (2016) that reduction in coefficient of variation shows that animals are becoming

homogenous in performance. Phenotypic correlation (above diagonal) for generation one and (below diagonal) for generation two among body weight (BW) at various ages (0-36 weeks) are presented in Table 2. The phenotypic correlations in body weight at different ages were all positive. Significantly (P<0.05) high to moderate relationship was observed in body weight among different ages which ranges from (0.993-0.270) in generation one and (0.989-0.268) in generation two.

Table 2: Phenotypic correlations among body weight (BW) at various ages (0-36 weeks) for generation two (below diagonal) and generation one (above diagonal)

	BW0	BW4	BW8	BW12	BW16	BW20	BW24	BW28	BW32	BW36
BW0	-	0.630**	0.392**	0.256*	0.505**	0.418**	0.394**	0.409**	0.389**	0.390**
BW4	0.641**	-	0.551**	0.351**	0.430**	0.378**	0.117 ns	0.275*	0.251*	0.286*
BW8	0.445**	0.629**	-	0.540**	0.550**	0.270*	0.030 ns	0.102 ns	0.089 ns	0.249*
BW12	0.167 ns	0.312**	0.404**	-	0.616**	0.134ns	0.156 ns	0.012 ns	0.014 ns	0.174 ns
BW16	0.277*	0.295*	0.344**	0.631**	-	0.546**	0.269**	0.490**	0.460**	0.572**
BW20	0.444**	0.415**	0.391**	0.343**	0.515**	-	0.263*	0.811**	0.790**	0.769**
BW24	0.414**	0.408**	0.312**	0.183*	0.359**	0.815**	-	0.324**	0.305**	0.268
BW28	0.374**	0.423**	0.277*	0.167 ns	0.299**	0.740**	0.962**	-	0.978**	0.957**
BW32	0.365**	0.423**	0.268*	0.165 ns	0.279**	0.706**	0.932**	0.986**	-	0.993**
BW36	0.341**	0.405**	0.271*	0.162 ns	0.261*	0.665**	0.902**	0.964**	0.989**	-

*= P<0.05; **= P<0.01; NS= not significant

This is consistent with the result of Adeniyi (2014) who observed a moderate to high phenotypic correlation between body weights at different ages in quails. Higher relationship (0.989-0.902) noticed between 24. 28, 32 and 36 weeks corresponds to the study of Sabra et al. (2017) who records a high positive correlation (0.97-0.79) among body weight at 36, 40 and 44 weeks in bronze turkey raised in Egypt. In the same vein, Zannah et al. (2023) observed higher relationship between body weights at different age in pigeon. Low or not statistically significant relationship P>0.05 observed are less in G2 compared to G1, this shows that the magnitude of relationship increases from G1 to G2. This is similar to the work of Shettima et al. (2023) who observed an increase in magnitude of relationship as generation of selection increases in indigenous turkey. Positive correlation observed between all the body weights at different ages in this study is as a result of the same gene controlling the body weight at different ages with increasing expressivity as stated by Shettima et al. (2023) that phenotypic correlation can be used as proxy to genotypic correlation.

CONCLUSION

Higher BW observed in G2 (46.78±0.18g to 6208.72±60.80g) over G1 (44.21±0.27g to 6065.30±50.70g), with higher coefficient of variation (CV) observed in G1 (4.2 to 37.68) over G2 (2.91 to 30.29) shows that selection for increased 8 weeks BW increases BW of indigenous turkey. Thus, breeders and farmers can select turkey for increased 8-weeks body weight to increase their growth rate. Positive phenotypic correlation observed in body weight at different ages indicates an improvement in body weight in an associated age as observed in differences in weight between the two generations.

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