EVALUATION OF GROWTH RATES OF F_1 NIGERIAN LOCALLY-ADAPTED TURKEYS

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Abstract

A total of 78 day-old random-bred Nigerian local turkey poults were used to generate another *232 day-old poults in two planned experiments to determine the rate of growth of Locally-adapted turkey of Nigeria. Three phenotypic classes (black, white and spotted) were obtained as base population and used to generate F_1 progeny in Experiments 1 and 2, respectively.. Linear body measurements (LBMs), namely body length (BDL), shank length (SHL), keel length (KLL), breast width (BW), wing length (WGL) and drumstick length (DSL) were measured. Growth rates of linear body parameters range from 0.24 to 1.05 in black, 0.25 to 1.08 in white and 0.30 to 1.11 in spotted varieties. The growth rates based on body weight of the various phenotypes have shown that for any unit advancement in age (A) there would be 132.23g, 126.74g and 123.12g increases per week in body weight (W) for black, white and spotted phenotypes, respectively. Growth rates of linear body parameters range from 0.24 to 1.05 in black, 0.25 to 1.08 in white and 0.30 to 1.11 in spotted varieties. However, the linear body parameters in spotted phenotype were significantly ($p<0.05$) higher than those of black and white phenotypes, except the body weight. It was therefore, concluded that for rapid improvement of these traits, the black variety could be used to enhance growth of Nigerian local turkeys in the study area while the spotted variety could be useful as a fast-growing variety.*

Key words: local turkey, growth rate, body weight, body measurements.

Introduction

Nigeria is endowed with diverse animal genetic resources of the local breeds. These local breeds possess genes relevant for their survival and adaptation to their environment and local breeding goals. The problem of protein shortage especially that of animal origin is a perennial one which is common throughout the country (Ojewola, 1993). Currently, total poultry population in Nigeria is estimated to be about 172 million out of which chicken is estimated at 160 million, guinea fowl (8.3 million), ducks (1.7 million) and local turkeys (1.05 million) (FAOSTAT, 2011). Some people prefer the flavor of the meat that is usually associated with scavenging birds (Oluyemi and Roberts, 2000). Turkey (*Meleagris gallopavo*) is becoming popular in Nigeria due to its capacity to expand the poultry subsector and help to supply meat and eggs. In spite of all these attributes, local turkeys have poor growth performance, low egg production and low fertility (Zahrudden *et al.*, 2011). The local breeds of animals in Nigeria deserve improvement in their genetic profile (Nosike *et al.*, 2013). Growth is normally accompanied by an orderly sequence of maturational changes and involves accretion of protein and increase in length and size, not just an increase in body weight (Gous, 1997). Body weight and body dimensions have been used as parameters for selection by local sellers and for research (Olowofeso, 2009). Therefore, the objective of this study was to determine growth and linear body parameter(s) that could be used to predict body weight of Nigerian local turkeys.

Materials and methods

The study was conducted at the Poultry Unit of the Teaching and Research Farm of the Michael Okpara University of Agriculture, Umudike, Abia State.

Experiment 1: Management of the Based Population and Production of F_1 Birds

A total of 78 day-old local turkeys of three phenotypic classes based on plumage colour (black, white and spotted) were obtained from the P. C. Onuoha and Co. Ltd., Owerri, Imo State as base population. The poults comprised of 26 black, 23 white and 29 white phenotypes. They were reared to generate F_1 progeny with clear plumage colour differentiation for the study. At time of breeding, 2 Toms and 12 hens of black, 2 Toms and 12 hens of white and 3 Toms and 18 hens of spotted were used for mating. Random mating was used for the mating scheme within each identified group by selecting sexually active males for the females in the ratio of 1:6 for egg production. Eggs produced by the base population turkeys were collected on a daily basis, identified appropriately with markers and set in the incubator on weekly basis. The number of progeny (F_1) poults produced

were 86, 72 and 74 for black, white and spotted respectively. The poults were properly identified on hatching. Distribution and number of poults hatched per phenotypic class is shown in Table 1. They were brooded in three small metal cages for each hatch for a period of 2 weeks after which they were transferred to small compartments according to their phenotypic group for a period of 4 weeks and finally to deep litter pens at 6 weeks of age. Dry wood shavings were used as litter material. Fresh clean water was given *ad libitum* to the poults during this period. Routine management operations such as washing of the water and feed troughs were carried out on daily basis. The birds were given routine vaccination.

Prophylactic antibiotics and anticoccidial drugs were administered to the birds periodically via drinking water. The birds were also dewormed and and acaricide sprayed to check worms and ectoparasites.

The respective hatches were brooded separately on floor pens. The brooding period lasted for 6 weeks. From brooding through rearing, maximum comfort for the poults was ensured. Feed was provided in adequate quantity to the poults twice a day, namely 8.30am and 2.30pm and drinking water was given *ad libitum.* Poults (0-6 weeks) were fed *ad libitum* with starter mash containing 28% crude protein and 2800kcal ME/kg. Growing turkeys (7-24 weeks) were fed growers mash (20% crude protein and 3000 kcal ME/kg). Rearing was between 7 and 24 weeks. Sexing was done at 16 weeks of age by observing the growth of wattle on the males only.

Experiment 2: brooding and rearing

A total of 210 day-old F_1 poults hatched in different batches were used in the study. The three phenotypic groups of local turkey contributed 70 straight-bred poults each for the study.

Brooding procedure was as in Experiment 1 above.

The birds were given routine vaccination and administration of drugs as in Experiment 1 above.

Feed was provided in adequate quantity as in Experiment 1 above.

Linear body measurements (LBMs) taken in this phase were: body length (BDL), shank length (SHL), keel length (KLL), breast width (BW), wing length (WGL) and drumstick length (DSL). Body weight (BWT) (g): Body weight was measured weekly using a top loading 20kg-CAMRY scale with a sensitivity of 10g. Above parameters, except BWT, were measured weekly using a tailor's 'cm' tape. The measurements were taken on the birds before feeding in the morning.

Data obtained were statistically analyzed with SPSS (2011). Regression of body weight and each of the linear body parameters on age to determine rate of growth, within each phenotypic class.

The regression model used was: $P_i = a + b\,(Age)_i + e_i$

Where, P_i = the i^{th} body weight (g) or Linear body parameter (cm); a = regression constant/intercept; b = the required growth rate; $(Age)_i$ = Age/independent variable (week); e_i = Random error assumed to be independently, identically and normally distributed with zero mean and constant variance [iind $(0,\sigma^2)$].

Results and discussion

The growth rates of various body traits of the phenotypes are given in 2

Table 1: Distribution of local turkey poults hatched per phenotypic class

Mating	Phenotypic class	Hatch 2	3	4	5	Class total
Black x Black	Black	3	11	10	36	26	**86**
White x White	White	2	6	6	28	30	**72**
Spotted x Spotted	Spotted	2	7	8	26	31	**74**
Total hatch		**7**	**24**	**24**	**90**	**87**	**232**

Table 2: Growth rates of various body traits of the phenotypes

Traits	Phenotypic class Black	White	Spotted
Body weight (g)	132.23±11.34 [a]	126.74±9.67 [b]	123.12±8.93 [c]
Body length (cm)	0.58±0.02 [b]	0.59±0.05 [b]	0.61±0.09 [a]
Wing length(cm)	0.24±0.01 [b]	0.25±0.06 [b]	0.30±0.03 [a]
Keel length (cm)	0.44±0.17 [b]	0.45±0.19 [b]	0.48±0.11 [a]
Shanklength(cm)	0.44±0.12 [c]	0.46±0.10 [b]	0.48±0.10 [a]
Breast width(cm)	1.05±0.20 [c]	1.08±0.25 [b]	1.11±0.32 [a]
Drumstick length (cm)	0.39±0.07 [b]	0.39±0.06 [b]	0.40±0.08 [a]

[a-c] Means in the same row with different superscripts are significantly different ($p<0.05$).

**S.E = Standard error of Means*

The growth rates based on body weight of the various phenotypes have shown that for any unit advancement in age (A) there would be 132.23g, 126.74g and 123.12g increases per week in body weight (W) for black, white and spotted phenotypes, respectively. Growth rates of linear body parameters range from 0.24 to 1.05 in black, 0.25 to 1.08 in white and 0.30 to 1.11 in spotted varieties. However, the growth parameters in spotted phenotype were significantly ($p<0.05$) higher than those of black and white phenotypes, except the body weight. In poultry, growth rate is expressed as the regression of body weight on age i.e. changes in body weight over time (Ibe, 1993). This significant growth in the average body weight suggests that black phenotype may have the potential for fast growth. This is an indication of higher average daily weight gain in black turkeys. This result has shown that black and spotted are fast-growing, locally-adapted turkeys, which may be used in breeding for development of base stock for improved turkey production in the study area.

Conclusion

This study has revealed the growth rate of Nigerian local turkeys based on body weight and linear body measurements. The result showed that prediction equations of body weight or linear body measurement using age yielded a very strong relationship, implying that age has a direct link with body weight and linear body measurements, and therefore can be used to predict the latter in Nigerian local turkey. In view of the results obtained in this study, it is recommended that: Shank length should be used to predict body weight of Nigerian local turkeys.

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