PHENOTYPIC CORRELATION OF BODY WEIGHTS OF DOMESTIC PIGEON SQUABS (*COLUMBA LIVIA*) AT DIFFERENT AGES IN MAIDUGURI, BORNO STATE, NIGERIA.

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Abstract
This research was carried out to determine phenotypic correlation on body weights of domestic pigeon squabs at the Livestock Teaching and Research farm, Ramat Polytechnic, Maiduguri Borno state. The information recorded was weights at days 0-30 at three days interval. Data collected were analyzed using the statistical package for Social Sciences (SPSS) and significant means were separated by the Duncan's multiple range tests. The results obtained revealed that the mean body weight of pigeon from day old to 30 days range between 17.33±0.19 and 346.69±1.98 g. The phenotypic correlations among body weights at different ages of domestic pigeon squabs were generally high and positive and ranged from 0.55 (for 3 days Bodyweight × 30 days bodyweight) to 0.97 (for 27 days bodyweight × 30 days bodyweight). Phenotypic correlations of body weight increased with increase in age of domestic pigeon squabs. The strong and positive correlation between body weights at different ages could be as a result of the same genes were controlling the bodyweight traits at different ages with increasing expressivity. This suggests that the improvement in bodyweights at any age could lead to an affiliated increase in the associated ages as a result of the strong and positive relationship between bodyweights of squabs at different ages.
Key words: Pigeon, Squabs, Phenotypic, Body weight, Correlations

Introduction

Pigeons are easier to rear with minimal cost of production and will be affordable for resource poor framers to produce, it will also contribute positively to the available animal protein for the teeming population (Abubakar *et al.,* 2021). They are of numerous advantages with unique qualities. In Nigeria pigeons are generally raised for consumption within the compound and only a very small number of them reach the trade market where they are either sold for meat or breeding stock (Sonaiya, 2000). Therefore, Poultry breeder should focus on selection and development of pigeon which is regarded as one of the lesser-known poultry for the production of animal protein and bridging of the existing gap in shortage of animal protein been experienced by masses in the country.

Correlation is the relationship between two matrix characters. It can either be positive or negative. Correlations can be phenotypic, genotypic or environmental. Phenotypic correlation among traits can encompass both the genetic and environmental portions of covariance. It is the observed relationship between two traits and includes genetic and environmental factors (Johari *et al.,* 1992). Phenotypic correlations among traits are important because they directly affect size of selection differentials and this is particularly true when the correlations are negatively or positively high. Phenotypic correlation among traits can encompass both the genetic and environmental portions of covariance (Falconer, 1988). It is the observed relationship between two traits and includes genetic and environmental factors. The strong positive association between body weight and the growth traits measured is an indication of pleiotropy and provides basis for possible genetic manipulation and improvement of the Nigerian local birds (Yakubu *et al*., 2009). Thus, there is a dearth of information on correlations (genetic, phenotypic and environmental) of domestic pigeons unlike other poultry species; therefore, the objective of this study was to estimate the phenotypic correlation of body weights of domestic pigeon squabs at different ages in Maiduguri, Borno State.

Materials and methods

The study was conducted at the Poultry and Livestock Teaching and Research Farm of the Department of Animal Production Technology Ramat Polytechnic, Maiduguri, Borno State, Nigeria. Maiduguri the capital city of Borno State is located at latitude 11^0 51'North and longitude 13^0 05' East and at an altitude of 354 m above sea level. Maiduguri has very short duration of rainy season (3-4 months) with about 645.9 mm/annum and a long dry season of about 8-9 months (MCN, 2018). The ambient temperature

could be as low as 20° C during the dry cold season in December – January and as high as 44° C during the dry hot season in April and May. Relative humidity is 45% in August which usually lowers to about 5% in December and January. Day length also varies from 11 to 12 hours (MCN, 2018).

A total of 50 pairs of parent's pigeons were used to produce 200 squabs for the experiment. The birds were housed in shelters provided for protection against predators and harsh weather conditions in an intensive system. The parent pigeons of breeding age were housed in wooden cage attached externally to the walls (open house type) usually in monogamous pairs or couples. They were fed with seeds and grains, varying from wheat, millet, sorghum to crushed maize and kitchen scraps, two times daily. Clean drinking water was provided *ad-libitum.*

Using a 5000 g digital sensitive weighing scale, measurements on body weights were individually collected at different intervals of 3 days from hatch to 30 days. Birds were individually observed for phenotypic expression of desired traits. Sex, plumage colour, shank type, and shank colour were recorded and kept. The data were analyzed using the general linear model of SPSS 11.0. Significant means were separated by the Duncan's multiple range tests. Phenotypic correlation was estimated from variance and covariance components using the formulae of Becker (1985) as follows:

$$r_P(s) = \frac{COV_W + COV_S + COV_D}{\sqrt{\delta^2 W(X) + \delta^2 S(X) + \delta^2 D(X)}\sqrt{\delta^2 W(Y) + \delta^2 S(Y) + \delta^2 D(Y)}}$$

Where: r_P = phenotypic correlation

δ^2_Y = the variance component for Y trait

δ^2_X = the variance component for X trait

COV = covariance between traits X and Y

Results and Discussion

The means and standard errors of body weights of pigeon squabs at various ages are shown in Table 1. The body weights ranged from 17.33 g at day old to 346.69 g at day 30. This result is in agreement with Zannah *et al.* (2021) who reported that mean body weight at old through 30 days of domestic pigeon squabs were 15.51 g and 363.00 g. and those of Aliyu *et al.* (2017) who similarly reported that the mean body weight of pigeon squabs at day old and 27 days were 15.19 g and 376.60 g as well as Bhowmik *et al.* (2014) who observed that live body weight of Jalali pigeon at 3, 15, 21, and 28 days of age were 31.68, 225.53, 275.59, and 324.79 respectively. Darwati *et al.* (2010) also reported that mean body weight of local pigeon at day old and 5th weeks were 16.20 g and 340.00 g respectively. It was apparent that the mean body weights of pigeon remarkably increased as the squabs progress in age up to 18 days and begin to slow down gradually thereafter (Zannah *et al.,* 2021). This is probably achieved by regurgitation of a white, slimy, caseous material formed by the desquamation of the epithelial cell structure in the parent for nutrition of the young. Its formation is controlled by prolactin. As a food of young pigeon, the crop milk consists of 75% water, 12.5% protein, 2.5% non-protein, 8.5% lipid and 1.5% minerals.

The phenotypic (r_p) correlations between bodyweights at different ages in the domestic pigeon squabs are presented in Table 2. The phenotypic correlations among body weights at different ages of domestic pigeon squabs were generally high and positive and ranged from 0.55 (for 3 days Bodyweight × 30 days bodyweight) to 0.97 (for 27 days bodyweight × 30 days bodyweight). Phenotypic correlations of body weight increased with increase in age of domestic pigeon squabs. The correlation between most of the ages were generally high and positive, indicating that selection for improvement in body weight at one age would lead to improvement in weight at other ages. The phenotypic correlation between day old body weight and 7 days body weight (0.69) and between 7 days body weight and 14 days body weight (0.73) reported in this study are similar to the findings of (Daikwo *et al.,* 2017). Similarly, Momoh *et al.* (2013) reported a strong and positive phenotypic correlation between bodyweights at different ages in domestic pigeon. This strong and positive relationship between body weights at different ages could be as a result of the same genes were controlling the bodyweight traits at different ages with increasing expressivity. Daikwo *et al.* (2017) similarly, expressed the same opinion in their work on the domestic pigeon.

Table 1: Mean ± SE of Body Weights (g) of Domestic Pigeon Squabs at Different Age.

Age (Days)	Mean	S.E (±)	C.V

0	17.33	0.193	18.60
3	68.92	0.599	22.75
7	119.47	1.090	23.75
10	187.85	1.516	22.04
14	243.37	1.823	21.52
18	278.90	2.108	22.43
21	286.90	2.015	19.23
24	307.99	2.016	18.17
27	324.69	1.993	16.64
30	346.69	1.975	14.94

SE= Standard error C.V = Coefficient of variance

Table 2: Phenotypic Correlation of Body Weights of Domestic Pigeon Squabs at Different Age.

Age (Days)	0	3	7	10	14	18	21	24	27	30
0										
3	0.65**									
7	0.69**	0.71**								
10	0.68**	0.72**	0.84**							
14	0.70**	0.63**	0.73**	0.87**						
18	0.69**	0.60**	0.66**	0.78**	0.87**					
21	0.64**	0.57**	0.61**	0.74**	0.85**	0.90**				
24	0.58**	0.61**	0.62**	0.74**	0.81**	0.87**	0.95**			
27	0.60**	0.58**	0.62**	0.72**	0.83**	0.88**	0.95**	0.91**		
30	0.61**	0.55**	0.62**	0.69**	0.80**	0.86**	0.91**	0.93**	0.97**	

**= significant at (P<0.01)

Conclusion

This study reveals that body weight of pigeon squabs generally increased as the squabs advanced in age up to 18 days thereafter the increment was very slow or minimal. In addition, there is high and positive phenotypic correlation of body weight among all the ages. This suggests that the improvement in bodyweights at any age could lead to an affiliated increase in the associated ages as a result of the strong and positive relationship between bodyweights of squabs at different ages. However, assessment of linear body measurements and body weight of domestic pigeon beyond 30 days of age is recommended.

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