

PHENOTYPIC CHARACTERIZATION OF NIGERIAN INDIGENOUS PIGEON IN AKWANGA LOCAL GOVERNMENT AREA OF NASARAWA STATE

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ABSTRACT

The study was conducted using one hundred and fifty (150) matured domestic pigeons and 200 eggs to measure body linear parameters and external and internal egg quality characteristics. Data were taken at maturity on body weight, shank length, breast girth, body length, wing length, tail length and beak length. The eggs were analysed for both external and internal quality characteristics. The data obtained were analysed using descriptive statistics of the SPSS Statistical software version 21. The result obtained from this study showed that the domestic pigeon in Akwanga Local Government Area of Nasarawa State are of medium size. The percent coefficient of variation (CV) among the linear body measurements was highest (17.54) in shank length while that of egg quality characteristics was highest in yolk height (17.71). However, body length demonstrated the least (7.84) percent CV for body parameters while egg shape index demonstrated the least percent CV value (0.21) for egg quality traits. From the findings of this study, it was concluded that shank length is the most suitable body measurement for selection of domestic pigeon due to its high coefficient of variation.

Keywords: body linear measurements, body weight, external egg qualities, coefficient of variation, internal egg qualities.

INTRODUCTION

Diversification into production of livestock species with short generation interval such as Pigeon could be a viable option in ameliorating shortage of protein among the populace in developing countries (Muthukumar and Dev Roy, 2005). Domestic pigeon (*Columbalivia domestica*) are durable birds that can be raised with little effort and are able to survive in hostile climates. But raising pigeons for food is not as wide spread as it could be; indeed, in modern times its potential has hardly been tapped. Farmed pigeons are particularly promising as urban micro-livestock because they require little space and thrive in cities (Gambo *et al.*, 2021). Young pigeons (squabs) grow at a fast rate. Their meat, finely textured, has an attractive flavour and is often used in place of game fowl. The meat which is tender and easily digested commands premium market prices. In many areas, demand is hardly met (Aediran, 2009). In an extensive management where the birds are released each day to feed themselves almost no land is needed. Under intensive conditions, where the birds spend their lives in confinement, a mere half hectare can be enough space to raise 2,000 pairs (Gambo *et al.*, 2021). Free- ranging pigeons forage over a wider area than most domestic fowl because they fly out to find their feed and they brood the young with little intervention. The objective of the study was to determine variations in body linear measurements and egg characteristics within indigenous pigeon populations reared in Akwanga and its environs

MATERIALS AND METHODS

The experiment was carried out at Akwanga Local Government Area of Nasarawa State. The study area falls within the Southern Guinea Savannah zone of Nigeria. Akwanga lies between latitude 7° and 9° North and Longitude 7° and 10° East. It has a climate typical of the tropical zone because of its location. It has a temperature ranging from 20°C in October to 36°C in March while rainfall varies from 13.73 cm in some places to 14cm in others (Faculty of Agriculture Lafia Weather Station, 2018).

Experimental procedure

The total of one hundred and fifty (150) indigenous pigeons were used for the experiment. This comprised of 75 males and 75 females. The birds were sourced from neighbourhood who keep the birds and body linear measurements were taken. For the egg quality characteristics, 200 eggs were purchased and used for egg quality assessments.

Data collection

Body Weight: Live body weights were measured at maturity.

Body Linear Measurement: The linear body measurements such as body length, shank length, wing lengths and breast girth were measured at maturity using measuring tape.

Egg Quality Traits: The external egg quality traits such as egg length, egg width, egg shape index, egg shell weight and egg shell thickness were measured. Egg length and egg width were measured using a vernier calipers. For shell thickness measurement, eggs were broken and the shells were washed with clean water and cuticle gently removed and air dried for 24 hours. Samples were taken and measured with the aid of micrometer screw gauge. The internal egg qualities recorded were albumen length, albumen height, albumen width, yolk height, yolk width, yolk index and haugh unit. These were carried out using the destructive techniques. By this method, the eggs were gently broken and the contents carefully poured into a flat plate. Vernier caliper was used to measure albumen length, albumen width, yolk width and yolk height.

Experimental Design and Analytical Procedure

The design of the experiment was Completely Randomized Design. Data on linear body measurements and egg characteristics were analyzed using descriptive statistics procedure of SPSS Statistical software version 21.

RESULT

Summary statistics of body weight and linear body measurements of local pigeons is presented in Table 1. The mean values of body weight, body length, wing length, breast girth, shank length, tail length and beak length were; 244.58 ± 2.889 , 25.31 ± 0.162 , 25.66 ± 0.219 , 8.34 ± 0.079 , 2.99 ± 0.171 , 11.08 ± 0.112 and 2.26 ± 0.024 , respectively. Judging from the percent coefficient of variation (CV %) values, shank length has the highest variability (17.54%) followed by body weight (14.46%). Body length (7.84%) demonstrated the lowest variability. Table 2 present the descriptive statistics of external and internal egg quality characteristics of domestic indigenous pigeons. The mean values of egg weight, egg length, egg width, egg shape index, egg shell weight, egg shell thickness, albumen length, albumen height, albumen width, yolk height and yolk width were; 15.70 ± 0.190 , 3.64 ± 0.042 , 2.77 ± 0.023 , 76.16 ± 0.351 , 2.14 ± 0.028 , 21.35 ± 0.167 , 522 ± 0.075 , 0.56 ± 0.011 , 4.44 ± 0.027 , 0.48 ± 0.019 , 276 ± 0.023 respectively. From the CV values, yolk height (17.71%) has the highest variability followed by Albumen height (8.93%). Egg shape index (0.21%) demonstrated the lowest variability.

Table 1: Descriptive statistics of body weight and linear body measurements of Nigerian indigenous Pigeon reared in Akwanga and its environs

Parameter	Min	Max	Range	Mean	SEM	Var.	SD	CV%
BW	178	298	120	244.58	2.889	1251.60	35.378	14.46
BL	20	28	8	25.31	0.162	3.937	1.984	7.84
WL	20	29	10	25.66	0.219	7.189	2.681	10.45
BG	7	11	4	8.34	0.079	0.935	0.967	11.59
SL	2	4	2	2.99	0.171	4.405	2.099	17.54
TL	9	14	5	11.08	0.112	1.886	1.373	12.39
BKL	2	3	1	2.26	0.024	0.087	0.295	13.05

BW = body weight, BL = body length, WL = wing length, BG = breast girth, SL = shank length, TL = tail length and BKL = beak length

Table 2: Descriptive statistics of internal and external egg quality parameters of domestic pigeon in Akwanga and its environs

Parameters	Min	Max	Range	Mean	SEM	SD	Var.	CV%
EWT	15	17	2	15.70	0.190	0.85	0.722	5.41
EL	3	4	1	3.64	0.042	0.19	0.035	5.16
EW	3	3	0	2.77	0.023	0.10	0.011	3.72
ESI	74	78	4	76.16	0.351	1.57	2.459	0.21
ESW	2	2	0	2.14	0.028	0.13	0.016	5.93
EST	20	22	2	21.35	0.167	0.75	0.555	3.49
AL	5	6	1	5.22	0.075	0.34	0.113	6.46
AH	1	1	0	0.56	0.011	0.05	0.003	8.93

AW	4	5	1	4.44	0.027	0.12	0.014	2.68
YH	1	1	0	0.48	0.019	0.09	0.007	17.71
YW	3	3	0	2.76	0.023	0.11	0.011	3.80

EWT= Egg weight, EL = egg length, EW = egg width, ESI = egg shape index, ESW = egg shell weight, EST = egg shell thickness, AL = albumin length, AH = albumin height, AW = albumin width, YH = yolk height, YW = Yolk width, SEM = standard error of the mean, SD = standard deviation, Var. = Variance and CV = coefficient of variation.

DISCUSSION

Body characteristics of domestic pigeons

The mean value of body weight of adult pigeon ($244.58 \pm 2.889\text{g}$) obtained in this study is similar to the report of Gibbs *et al.* (2000). However, the value obtained in this study is lower than $246.22 \pm 4.35\text{g}$ for male and $301.91 \pm 435\text{g}$ for females respectively reported by Adediran (2008) as the body weight for domestic pigeons in Benue State. Also the value is lower than the mean adult weight of $420 \pm 0.03\text{g}$ reported by Adenowo *et al.* (1999) and $351 - 421\text{g}$ reported by Anebi (2010).

The mean body length of $25.31 \pm 0.162\text{cm}$ obtained in this study fall within the range of 15cm to 27cm reported by Blechman (2007) and 21.20 to 26.05 reported by Anebi (2010). The result for body length is however higher than the value of $23.45 \pm 0.54\text{cm}$ reported by Adediran (2008) for domestic pigeons in Benue state and far higher than $14.70 \pm 1.09\text{cm}$ reported by Adenowo *et al.* (1999) for pigeons from the South-West region of Nigeria.

The shank length ($2.99 \pm 0.171\text{ cm}$) obtained in this study agree with the range of $2.90 - 4.15\text{cm}$ reported by Anebi (2010) but lower than $3.83 \pm 0.04\text{cm}$ reported by Adenowo *et al.* (1999) and $3.60 \pm 0.29\text{cm}$ reported by Adediran (2008). The mean value of breast girth of $8.34 \pm 0.079\text{cm}$ obtained in this study is lower than $17.99 \pm 0.4\text{cm}$ reported by Adenowo *et al.* (1999) and $17.10 - 18.10\text{cm}$ reported by Anebi (2010). This observed differences could be due to environment, season, management practice, breed and selection among others. The pigeon used in this study were under free range with no standard feeding. The mean value of wing length in this study ($25.66 \pm 0.219\text{cm}$) is higher than $23.68 \pm 1.98\text{cm}$ reported by Adenowo *et al.* (1999) and equally higher than $8.86 \pm 0.49\text{cm}$ reported by Adediran (2008). The beak length obtained in this study (2.26 ± 0.024) is higher than $1.057 \pm 0.08\text{cm}$ reported by Adenowo *et al.* (1999). Tail length of $11.08 \pm 0.112\text{cm}$ obtained in this study could not be discussed as there were no literature value on tail length of Nigerian domestic pigeon.

The percent coefficient of variation among the linear body measurements was highest in shank length. The higher CV value obtained in this study for shank length agreed with findings of Gambo *et al.* (2014) as well as Adeogun and Adeoye (2004) in Japanese quail. Gambo *et al.* (2014) reported that shank length had the highest CV over other body linear parameters throughout the six weeks' growth period of Japanese quail. This suggests that, shank length is the best criteria for body weight selection in pigeon. The high variability observed in shank length could be used for breed/strain characterization. Reported values for linear body measurements of pigeon are very scanty in literature as compared to other poultry types such as the chicken. This might be due to some practical problems associated with measurement of the traits such as the small size of the bird and the need for careful handling of birds to measure these traits.

Egg quality characteristics of pigeons

The descriptive statistics of egg parameters of mature domestic pigeons indicated higher variability in yolk height (17.71). Egg shape index demonstrated the least and very low variability with coefficient of variations (CV) of 0.21. This finding is in contrast to the report of Gambo *et al.* (2014) who reported highest CV (15.59) in albumen height and lowest CV 0.09 in yolk index in Japanese quails. The observed difference could be due to breed differences. Reported values for egg quality traits in pigeon are very scanty in literature as compared to other poultry types such as the chicken.

CONCLUSION

The result obtained from this study showed that the domestic pigeon in Akwanga are of medium size. The high variability observed in shank length could be used for breed/strain characterization. This suggests that, shank length is the best criteria for body weight selection in pigeon. For egg quality

characteristics, highest variability was observed in yolk height (17.71). However, egg shape index demonstrated the least and very low variability with coefficient of variation (CV) of 0.21. From the findings of this research work, it is recommended that shank length should be used for selection.

REFERENCES

- Adediran, J. O. (2009). Body biometry and breeding characteristics of the domestic pigeon in Benue State of Nigeria. M.sc thesis Dept. of Anim. Breeding and Physiology, University of Agriculture Makurdi. Pp39
- Adenowo, J. A., Adebambo, O. A. and Ikeobi C. O. N. (1999). Characterization of the local pigeon in South Western of Nigeria. *Tropical Journal of Animal Science*. 2(2) 73-80.
- Adeogun, I.O. and Adeoye, A. A. (2004). Heritability and Phenotypic Correlations of Growth Performance Traits in Japanese Quails. *Livestock Research for Rural Development*. 2(2): 311-313
- Anebi, P. E. (2010). Genetic Analysis of a Flock of Domestic Pigeons (*Columba via domestica*). MSc. Thesis, Department of Animal Breeding and Physiology, Univ. of Agric. Makurdi. 68 pp.
- Blechman, A. (2007). Pigeons-the fascinating Saga of the worlds most revered and reviled bird. St. Lucia Queensland: University of Queensland Press. Pp. 223-231
- Gambo, D., Ajibike, A. B., Imam A. A., Hussaini, Y. I., Ubu, I., Alhassaan I. D. and Kosshak, A. S (2021). Heritability estimate, haemoglobin and albumin genotyping of Nigerian indigenous pigeon in Lafia and its environs. Proceedings of the 44th genetic society of Nigeria held in Ahmadu Bello University Zaria between 10-14th October 2021. Pp. 30 – 39.
- Gambo, D., Momoh, O. M., Dim, N. I. and Kosshak, A. S. (2014). Body parameters and prediction of body weight from linear body measurement in coturnix quail. *Livestock Research for Rural Development* 26(6) 2014.
- Gibbs, D. Eaustace, B. and John, C. (2000). Pigeons and Doves: A guide to the pigeons and doves of the world: United Kindom: Pica Press, pp 624.
- Muthukumar, S. P. and Dev Roy, A. K. (2005). Alternate Poultry Production in India. An overview. Copyright 2005–06 Sadana Publishers and Distributors. All right reserve http://www.dairyearbook.com/poultry_news_1.aspx.