NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

BODY WEIGHTS OF DOMESTIC PIGEON SQUABS (*COLUMBA LIVIA*) BY SEX AND PARITY IN MAIDUGURI, BORNO STATE, NIGERIA.

Zannah, B. B., Aliyu, J., Yusuf, M. J., Taki, I. M., Aminami, M. and Alade, N. K.

Department of Animal Science, University of Maiduguri, Borno State, Nigeria.
Corresponding Author: Phone no: 07068952636, Email:
bashir4babazannah@gmail.com

Abstract

This research was carried out to determine body weights of domestic pigeon squabs by sex and parity at the Poultry and Livestock Teaching and Research farm, Ramat Polytechnic, Maiduguri Borno state. The data collected were 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 least significant difference. The results obtained revealed that the mean body weight of pigeon from day old to 30 days ranged between 15.51±0.09 to 363.64±1.88 g. Males squabs had significant ($P<0.05$) higher body weights than females at all age groups studied. Significant effect of parity was also observed and squabs of the forth parity had highest body weights at all ages. However, improvement in body weight of pigeon squabs can be achieved with selection with fourth parity.

Key words: Pigeon, Squabs, Sex, Body weight, Parity

INTRODUCTION

Domestic pigeons (*Columba livia domestica*) are seen in many regions of the world, they live side by side with humans and they are bred as source of food, hobby and for experimental purposes where they have adapted to the life in urban, suburban and rural environment where they have close communication with humans (Amal *et al.*, 2014). In addition, domestic pigeons grow quickly and mature rapidly. Furthermore, a squab, the young pigeon can reach table size from 25-30 days and the size is mostly determined by sex. Sex is a set of structural and functional features that allow classifying organisms into male or female category. Sexual differences in birds can be observed on phenotypic, genetic and behavioural levels (Miasko *et al.*, 2017). In birds that are sexually dimorphic it is very easy to distinguish between males and females (Anna *et al.*, 2006). However, some literature reported that Pigeons have no sexual dimorphism (Ashraful, 2014a) males and females have very similar phenotypic traits such that even experienced ornithologists may have problems with unambiguous sex identification (Anna *et al.*, 2006).

Body weight is regarded as a function of frame work or size of the animal and its condition. An increase in body weight is highly correlated with feed consumption when selecting for rapid growth under *ad-libitum* feeding, indicating that more energy is available for growth over the maintenance requirement of birds (Yakubu *et al.*, 2009). The live body weight of any animal is an important variable that determines the market value of that animal. The exact time at which the animal is ready for slaughter can be assessed on the basis of its body weight and general development (Akanno and Ibe, 2006). There is a dearth of information on sex and parity of domestic pigeons unlike other poultry species; therefore, the objective of this study was to determine body weights of domestic pigeon squabs at different ages and how they are affected by sex and parity 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 15^o C during the dry cold season in December – January and as high as 44^o 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 106 pairs of parent's pigeon were used to produce 765 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. 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.*

With the use of a 5000 g digital sensitive weighing scale, measurements on body weights were individually collected at different intervals of three days from hatch to 30 days. Birds were individually observed for phenotypic expression of desired traits. Sex and parity of each hatching were recorded and kept. The data were analyzed using the general linear model of SPSS 11.0. Significant means were separated by the least significant difference.

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 15.51 g at day old to 363.64 g at day 30.This result is in agreement with the findings of Aliyu *et al.* (2017) who 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 to 28 days of age ranged from 31.68 to 324.79 g. It is evident that the mean body weights of pigeon squabs remarkably increased as the squabs advanced in age up to 18 days and begin to slow down gradually thereafter. The increment that occurred in the body weights at different age was reported to be logical and normal (Al-Gamal, 2014). Sales and Janssens (2003) indicated that pigeon reach mature body weight at 28 days of age and the increase in weight after that is very low.

The means and standard errors of body weights of pigeon squabs at various ages by sex are shown in Table 2. Males were significantly ($P<0.05$) heavier in body weights than females at all ages. This may indicate that there is sexual dimorphism in pigeons at the early ages. This agrees with the report of Aliyu *et al.* (2017) who reported that male squabs to be significantly heavier ($p<0.05$) than their female counterparts in body weights at hatch, 7 through 28 days of age. The mean body weights ranged between 15.53 g to 376.60 g, in males and 14.84 g to 370.53 g in females. The findings of Ibrahim and Akut (2007) also reported significantly heavier males than females at all ages and that of Bhowmik *et al.* (2014) in Jalali pigeons at 3-day to 5-month of age (37.19±0.37 to 339.40±3.33 g) for males and (26.16±0.60 to 310.19±2.59 g) for females. The mean values of body weights in this study were higher than that of Raji *et al.* (2017) who reported the mean body weights of domestic pigeon squabs at hatch to 28 days of age ranged from 13.51 to 325.14 g for male and 12.73 to 313.45 g for female respectively no significant sex effect on body weights were observed. Thus, the

variation in body weights of squabs could be as a result of differences in strain, managerial conditions and seasons under which the birds were reared.

The means and standard errors of body weights of pigeon squabs at various ages by parity are shown in Table 3. The result shows that squabs in fourth parity had significantly (P<0.05) heavier than other parities at all age groups. The squabs in third Parity had higher body weights than first and second parities at all age groups but statistically there was no significant (P>0.05) different in almost all the age groups except at hatch and 30 days of age there was significant (P<0.05) different. Generally, domestic pigeon squabs in this study showed parity effects for body weights as from fourth parity. This result is in line with that of Okoro *et al.* (2015) who reported significant (P<0.05) effect of parity on body weights. Odubote and Akinokun (1990) reported that parity significantly affect litter birth weight. The finding of this study is also agreement with those of Baas *et al.* (1992) who reported that the effects of parity on body weight increases initially and then decreases in subsequent parities and that of Afifi *et al.* (1987) who observed that average birth weight increased with advanced parity up to the fifth parity.

Table: 1 Mean and Standard Error of Body Weight (g) in Domestic Pigeon Squabs at Different Age

Age (Days)	Mean	Standard error
0	15.51	0.09
3	61.86	0.50
7	126.69	0.99
10	188.22	1.42
14	249.62	1.72
18	296.82	2.01
21	301.02	1.92
24	321.71	1.92
27	341.19	1.89
30	363.64	1.88

Table 2: Mean ± Standard Error of Body Weights (g) at Different Ages by Sex in Pigeon Squabs

Age (days)	Male	Female
0	17.10 ± 0.39^{a}	13.92 ± 0.35^{b}
3	67.80 ± 1.97^{a}	55.92 ± 1.89^{b}
7	134.96 ± 4.15^{a}	118.42 ± 3.98^{b}
10	199.11 ± 5.77^{a}	177.33 ± 5.54^{b}
14	264.28 ± 7.39^{a}	234.96 ± 7.08^{b}
18	332.78 ± 8.80^{a}	260.86 ± 8.44^{b}
21	314.30 ± 8.08^{a}	287.74 ± 8.75^{b}
24	332.94 ± 7.95^{a}	310.48 ± 7.85^{b}
27	360.16 ± 7.85^{a}	322.22 ± 7.59^{b}
30	386.07 ± 7.59^{a}	341.21 ± 7.22^{b}

ab= means within the row bearing different superscripts are statistically significant (p<0.05).

Table 3: Mean ± SE of Body Weights (g) at Different Ages by Parities in Domestic Pigeon Squabs

Age (days)	First parity	Second parity	Third parity	Forth parity
0	14.96 ± 0.71^{c}	15.53 ± 0.55^{b}	15.62 ± 0.39^{ab}	16.07 ± 0.18^{a}
3	60.28 ± 1.59^{b}	60.48 ± 1.46^{b}	62.06 ± 0.95^{ab}	64.40 ± 0.88^{a}

7	124.29±3.18^{b}	125.77±2.99^{b}	126.15±3.51^{b}	132.25±2.41^{a}
10	185.90±5.23^{b}	186.11±4.87^{b}	187.51±5.87^{b}	197.12±4.71^{a}
14	244.84±6.87^{b}	245.66±6.49^{b}	249.33±7.69^{b}	261.93±5.92^{a}
18	286.50±7.65^{c}	291.23±7.32^{bc}	298.17±7.11^{b}	314.79±7.01^{a}
21	295.08±7.98^{b}	298.37±7.54^{b}	300.32±8.09^{b}	314.71±7.82^{a}
24	315.38±7.33^{b}	318.65±7.69^{b}	322.25±8.67^{b}	336.03±6.87^{a}
27	335.95±7.02^{b}	335.98±7.04^{b}	342.35±8.29^{b}	356.75±6.14^{a}
30	354.33±6.26^{c}	362.10±6.36^{bc}	364.73±7.26^{b}	380.62±5.98^{a}

abc= means within the row bearing different superscripts are statistically significant ($p<0.05$).

Conclusion

This study reveals that male pigeon squabs were generally heavier than female pigeon squabs at all age groups. Squabs weight increase as number of the parity increases. However, domestic pigeon squabs can be selected at fourth parity for improvement of body weights and overall productive performance. Thus, assessment of body weight of this species of bird beyond fourth parity is recommended.

References

Afifi, E.A., Emara, M.E. and Kadry, A.E.H. (1987). Birth weight in pure breed and crossbreed rabbits. *Journal of Applied rabbit Research,* 9(1): 18-27.

Akanno, E.C. and Ibe, S.N. (2006). Prediction of body weight of the rabbit at different stages of growth using linear body measurements. *Nigerian Journal of Animal Production,* 33:3-8.

Al-Gamal, M. A. (2014). Blood Biochemical Profile of Young and Adult Racing Pigeons (*Columba livia domestica*) in Egypt. *Middle East Journal of Applied Sciences*. 4(3): 528- 538.

Aliyu, J., Amin, A. B., Ibrahim, A. A. and Zanna, B. B. (2017). Repeatability estimates of body weight of pigeon squabs in a semi-arid region of Nigeria. *Dutse Journal of Agriculture and Food Security (DUJAFS)*, 4(2): 192-195.

Amal, S. O., Sahar, A., Abd El-Rahim, Y. A., Abdel-Aziz, A., Sammour, H. B. and Aggour, M. G. (2014). A field study on pigeon production systems in the rural sector of El-Shakia Governnorate, Egypt. *Egyptian Poultry Science Journal*, 34:1039-1053.

Anna, D., Magdalena, C. and Zagalsa, N. (2006). Molecular techniques for sex identification in birds. Department of Ornithology, *Poland Academy of Sciences. Biologocal Lett*. 43(1):3.12

Ashraful, K. M. (2014a). Breeding biology of domesticated Eurasian collared dove (*Columbidae*) streptopelia decaoto frivalszky in Saidpur, Bangladesh. *International Journal of Environment.* 2091-2854.

Baas, T. J., Christian, L. L., and Rothchild, M. F., (1992). Heterosis and recombination effects in Hampshire and Landrace swine. I. Maternal traits. *Journal of Animal Science,* 70: 89- 98.

Bhowmik, N., Mia, M. M. and Rahman, M. A. (2014). Morphometric Measurements, Productive and Reproductive Performance of Jalali Pigeon. *International Journal of Development Research,* 4(4): 908-911.

Ibrahim, T. and Akut, P. K. (2007). Growth pattern of pigeon squabs in Bauchi metropolis, Nigeria. *Animal Production Research Advances*, 3(1):52-54.

MCN, (2018). Maiduguri Climate Normals: 1961 – 1990: National Oceanic and Atmospheric Administration.*ftp//ftp.atdd.noaa.gov/pub/GCOS/WMO-Normals/Table/REG-I/NI/65082.TXT*, Retrieved 25 July 2018.

Miąsko, J., Gruszczyńska, J., Florczuk, P. and Matuszewski, A. (2017). Determining sex in pigeons (*Columba livia*).*World Scientific News* 73(2) 109-114.

Oduobote, I.K. and Akinokun, J.O. (1990). Reproduction and body weight performance of the New Zealand white rabbits in the humid tropics of Nigerian. *Nigerian Journal of Animal Production*, 18: 61-65.

Okoro , V. M. O. Ogundu , U. E. Udedibie ., A. B. I., Okoro ., C. L., Ukwu , H. O. and Ibe , S. N. (2015). Effect of genotype, sex and parity on growth traits of diallel crossed Nigerian indigenous and exotic pigs. *Nigerian Journal of Animal Production, Nigerian Society for Animal Production* pp. 30-41.

Raji, A.O., Aliyu, J., Duwa, H. and Alphonsus, (2017). Ccomparison of three non-linear functions for describing growth curves of feral pigeons (*Columbia livia*) *Journal of Forest Science Environment*, 2 (1): 46 – 51. Available at www.jfseunimaid.com.ng &www.unimaid.edu.ng.

Sales, J., and Janssens G.P.J. (2003). Nutrition of the domestic pigeons *(Columba livia domestica).Worlds Poultry Science Journal*, 22:1-232.

Yakubu, A., Kuje, D. and Okpeku, M. (2009). Principal components as measure of size and shape in Nigerian indigenous chickens. *The Journal of Agricultural Science* 42 (3): 167 -176.