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RESEARCH ARTICLE

Age Related Changes on Growth Traits of Pharaoh Quail (*Coturnix Coturnix Japonica*) Kept In Cages and Deep Litter System in Derived Savanna Area of Nigeria

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ABSTRACT

The study was carried out to determine the effect of age and housing system on growth traits of Pharaoh quail (*Coturnix coturnix japonica).* Two hundred (200) day old Pharaoh quail chicks (*coturnix* chicks) were brooded from day old to three (3) weeks of age and 100 of the birds were distributed into cage and deep litter systems respectively. Data were obtained on the growth traits of the Japanese quail at age 6, 7, 8, 9 and 10 weeks of rearing period on Body Weight (BW), Body Length (BL), Drum Stick Length (DSL), Chest Girth (CG), Shank Length (SL) and Keel Length (KL) for both cages and deep litter housing types. There were significant ($P<0.05$) differences between age and growth traits and this reveals that as the birds increase in ages the growth trait variables increases for BW (118.09g – 142.69g), BL (10.36cm- 11.06cm), SL (2.53cm - 2.97cm), DSL (4.95cm – 5.82cm), KL (6.61cm – 6.34cm) and CG (1.71cm – 4.02cm) at 6th to 10th week respectively. For housing types, the floor system reveals higher values (120.53, 5.61 and 4.06) for BW, DSL and CG than its counterpart on the cage housing system at all ages.

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INTRODUCTION

Poultry production in Nigeria has witnessed series of development especially in the field of housing. Housing in quail raising provides a physical environment that is conductive for optimal production and performance. It also permits the organization and concentration of the birds into a manageable unit. The housing pattern depends mostly on the system and management that is employed (Maurice and Gerry 2005)

Coturnix coturnix japonica is frequently housed in a room similar to garages. However, such rooms need to be well insulated, well ventilated and free from drought and must provide protection from rats, rodents and predatory birds. Housing should be designed to ensure comfort for the birds to make feed and water readily accessible and to permit easy and effective sanitation (Shim and Vohra 2000). Research indicates that grouping a male with 2 or 3 females generally gives high fertility. When quails are kept in colony pens, a ratio of one male or three females is sufficient and reduces fighting among males, pair mating in individual cages will also give good fertility. Fertility decreases markedly in old birds (Oladunjoye *et al*. 2005).

Body parts such as keel length and width, body length, shank length are not independent of one another but when observed separately tend to disclose facts which include the ability to select superior individuals. A number of external parts were known to be positively correlated with body weight (Amao *et al*. 2010; Maciejowski and Zieba 1982) while some have been reported to constitute growth criteria (Ibe 1994; 1995a and b).

Growth is a priority trait in the poultry industry. The Japanese quail (*Coturnix coturnix japonica*) have been used widely as a model species in research on poultry breeding and genetics of growth traits because they are small, have rapid growth enabling quails to be marketed for consumption at 5-6 weeks of age, less expensive than chicken and turkey, high rate of lay is much, lower feed and early sexual maturity. They have a short generation interval and show genetic variation for growth traits in most population (Marks 1990). The live weight of any animal is an important variable that determines its market value (Akanno and Ibe 2006). The precise time when an animal would be ready for slaughter is also dependant on its body weight and general growth trait (Oluwatosin 2007). There are a number of reported studies on the effect of selection on growth in Japanese quail. Marks

(1978) reported that growth curve parameters where changed by selection for body weight in Japanese quail. The growth pattern on growth curve animals for body weight or body parts in described by growth functions (Amao *et al*. 2011; Ojedapo *et al*. 2011). Therefore, the aim of the study was to determine the effect of age and housing on the growth traits of Pharaoh quail both in cages and deep litter system especially in derived savanna zone of Nigeria.

MATERIALS AND METHODS

Site of Experiment

The experiment was carried out at the Poultry unit of Teaching and Research Farm Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. Ogbomoso is a derived Savanna Zone of Nigeria that lie within the latitude 8^0 15^0 North and longitude 4^015^0 East. The area has a annual rainfall of 1247mm with altitude between 300-600 meter above the sea level while the mean annual temperature is about 27^0C (Amao *et al*. 2011).

Birds and Husbandry

A total of two hundred day old chicks of Pharaoh quails (*Coturnix coturnix japonica*) were purchased at day old from Obasanjo farm Nigeria Limited, Oluyole Industrial Estate, Ibadan. Quails used in this experiment were kept under normal brooding condition in brooding floor pens until they were three weeks of age under continuous light and with a gradual decrease in room temperature from 37^0C at hatching to 25^0C at six weeks of age.

Feed and Feeding

The birds were fed a ration containing 28% crude protein and 2800kcal/ME/kg at age 0-4 weeks, 24% crude protein and 2800 kcal/ME/kg at 9 weeks till the end of the experiment.

Description of the Housing systems

Battery Cage System

This type of housing involves the rearing or raising of bird in cage. The cage was partitioned into six cells. Each comprise of 20 birds and the 6th unit was used as a sick bay. The materials used to make the cage are plywood, 0.625 cm welded mesh wire and 2.5cm x 2.5cm timber to serve as frame work. The cage is 12.5cm height with length 10cm and Breadth of 7.5cm. Both feeders and drinkers are put in each cell. This type of battery cage was not costly compared with iron types.

Deep Litter System

This type of housing system involves the rearing or raising of birds cemented floor with bedding (Litter material) spiral all over the floor. A windowless house was used, boiled with plank wood and wire mesh 5.6cm covered with tarpaulin with well constructed door. The depth of the litter for chicks birds in 5cm and 10cm depth of the litter for birds at adult stage. The litters are changed fortnightly.

Data Collection

Parameters collected includes body weight (g), shank length (cm), body length (cm) drum stick (cm), chest girth (cm), and keel length (cm) of the birds both in cages and deep litter systems .

Data Analysis

All data collected were subjected to analysis of variance using the general linear model (GLM) of SAS (2003). The below model was adopted.

$Y_{ijk} = \mu + S_i + B_j + (SB)_{ij} + \ell_{ijk}$

Where;

Y_{ijk}= measurement of individual bird

μ = overall means

S_i= Fixed effect of age i^{th} (5, 6, 7, 8, 9, 10)

B_j = Fixed effect in housing system j^{th} (1, 2)

$(SB)_{ij}$= Interaction between age i^{th} and housing j^{th}

ℓ_{ijk} random error

RESULTS

The result of the least square mean of age on growth traits of Pharaoh quail is presented in Table 1. Body weight (BW) showed significant ($P<0.05$) difference as age increases. The highest significance was observed at age of 10 weeks while the least difference was observed at age of 5 weeks. Body length (BL) showed significant ($P<0.05$) difference as age increases. The highest difference was observed at age of 9 weeks. Shank length (SL) showed significant ($P<0.05$) difference as age increases. The highest significance was observed at 9 weeks of age. Drumstick length (DSL) showed significant ($P<0.05$) difference as age increases the highest significance was observed at 10 weeks of age. Keel length (KL) does not show any significant ($P>0.05$) as age increases. But individual parameters were different with the highest value observed at age of 5 week and least value at age of 7 weeks. Chest girth (CG) showed significant ($P<0.05$) difference as age increases. The highest chest girth was observed at age of 5 weeks while the least values were obtained at age of 7, 8, 9 and 10 weeks.

The result of the least square mean of housing system on growth traits of Pharaoh quail is presented in Table 2. There were significant ($P<0.05$) differences between housing systems and growth traits parameters. Generally, the body weight (BW) were significantly difference in both housing types at 5 and 6 week of age, floor housing were higher than the cage housing for body weight (BW) except at 7 week of age while cage housing system was higher than the floor system. Body length (BL) was only significant at 7 week of age. The Drumstick (DSL) was significantly differed in both housing type at 5, 6 and 7 week of age but floor housing were favoured with higher value for chest girth (CG) than the cage housing.

There were significant ($P<0.05$) differences at 8, 9 and 10 week of age the body weight were differed in both housing type at 8 and 10 week of age, cage housing were higher than the floor housing for body weight except at 9 week of age while age housing system was higher than the cages system. Body lengths were significantly differed at 8 and 10 week of age but cage housing where favoured with higher value at 8 and 10 week of age. Shank length

Table 1: Least square means of age on growth traits of Pharaoh quail

Age (wk)	N	BW	BL	SL	DSL	KL	CG
1	120	118.09±2.81[c]	10.36±0.09[b]	2.53±0.04[b]	4.95±0.06[b]	6.61±0.08[a]	4.02±0.07[a]
2	120	131.45±2.85[b]	10.59±0.11[b]	2.52±0.04[b]	4.67±0.07[b]	6.45±0.08 [b]	3.15±0.08[b]
3	120	136.92±1.86[b]	10.47±0.10[b]	2.61±0.04[b]	4.98±0.08	6.09±0.07 [b]	1.65±0.06[c]
4	120	140.71±2.14[a]	11.09±0.12[a]	3.33±0.04[a]	5.51±0.08[a]	6.39±0.05 [b]	1.75±0.02[c]
5	120	137.92±2.23[b]	11.53±0.09[a]	3.34±0.04[a]	5.77±0.05[a]	6.56±0.05[a]	1.75±0.02[c]
6	120	142.69±1.07[a]	11.06±0.11[a]	2.97±0.03[a]	5.82±0.05[a]	6.34±0.06[b]	1.71±0.02[c]

[ab] Mean along the same column having different superscripts at each age were significantly different (P<0.05); N = Number of Observation, BW = Body weight (g), BL = Body length (cm), SL = Shank Length (cm), DSL = Drumstick length (cm), KL = Keel length (cm), CG = Chest girth (cm)

Table 2: Least square means of Housing systems on growth traits of Pharaoh quail

Age (wk)	Housing Type	N	BW	BL	SL	DSL	KL	CG
5	Cage	60	115.65±1.39[b]	10.14±0.08	2.28±0.04	4.29±0.05[b]	6.71±0.09	4.06±0.07[a]
	Floor	60	120.53±1.42[a]	10.58±0.10	2.77±0.03	5.61±0.07[a]	6.51±0.06	3.97±0.06[b]
6	Cage	60	132.00±2.93[b]	10.29±0.08	2.25±0.04	4.25±0.05[b]	6.57±0.09	4.09±0.08[a]
	Floor	60	130.90±2.77[a]	10.89±0.73	2.78±0.04	5.08±0.09[a]	6.32±0.06	2.21±0.07[b]
7	Cage	60	141.10±2.04[a]	11.04±0.11[a]	2.56±0.05	4.84±0.09[b]	6.09±0.08	1.77±0.04[a]
	Floor	60	132.73±1.68[b]	9.90±0.09[b]	2.65±0.03	5.12±0.07[a]	6.09±0.05	1.53±0.03[b]
8	Cage	60	142.17±2.40[a]	11.19±0.11	3.44±0.03	5.43±0.09	6.42±0.05	1.78±0.02
	Floor	60	139.25±1.88[b]	10.98±0.13	3.22±0.04	5.59±0.06	6.36±0.04	1.71±0.02
9	Cage	60	136.47±1.46[b]	11.46±0.10	3.43±0.04	5.51±0.05[a]	6.12±0.05	1.74±0.02
	Floor	60	139.37±2.99[a]	11.59±0.08	3.24±0.04	6.02±0.04[b]	6.66±0.07	1.75±0.02
10	Cage	60	146.47±0.97[a]	11.22±0.12[a]	3.01±0.02	5.97±0.05	6.16±0.03	1.84±0.01
	Floor	60	138.92±1.16[b]	10.90±0.09[b]	2.93±0.03	5.67±0.04	6.52±0.08	1.58±0.02

[ab] Mean along the same column having different superscripts at each housing system were significantly different; (P<0.05); N = Number of Observation, BW = Body weight (g), BL = Body length (cm), SL = Shank Length (cm), DSL = Drumstick length (cm), KL = Keel length (cm), CG = Chest girth (cm)

has a higher value in cage housing system than floor housing system at 10 week of age and Drumstick were favoured with higher value at 9 week of age for floor housing system than cage housing system.

DISCUSSION

From the results obtained in this present study, body weight (BW) reveals an increase as age increases. This is in accordance of the work of Karimah (2000) who reported that growth trait of quail with respect to age in body weight is a function of feeding rate. Body length (BL) also reveals an increase as age increase. This also agreed with work of Karimah (2000) which started that body length (BL) increase gradually with an age for the first five weeks.

Shank length (SL), Drum stick length (DSL) and keel length (KL) values in this present study were in agreement with work Adeogun and Adeoye (2004). These authors reported that shank length increases as the bird increases in age but disagree with findings of Karimah (2000) that shank length fails to describe the genetic variation in quail as age increases. Data obtained in this study on Drumstick length (DSL) is also similar to the findings of Adeogun and Adeoye (2004) and keel length values also agreed with observation of Karimah (2000).

Results observed for chest girth in this study reveals an increase as the birds attaining ages. This agreed with the report of ARPN (2009) reveals an increase in chest girth as the birds attaining ages. The variation of values obtained in the housing types were earlier reported by Amao (2009) which was similar to this presence study. Body weight values favoured deep litter system while as lower values were observed in cage system which was in line with the findings of Magala *et al.* (2012). These authors reported the performance that favoured floor systems on the characteristic of Uganda local chickens. Deep litter system favoured chest girth over cage system in this study as it was also reported by Magala *et al.* (2012). Body length, shank length and drumstick value in cage reveal over deep litter system which agree with work of Marin *et al.* (2001) who reported domestic chickens were favoured in cage housing.

Conclusion

Base on this study, it can thus be conclude that both age and housing have an influence on growth traits parameters on quail. Also, deep litter system should be use for farmer for rearing quail since they perform better on floor compare to cage system.

REFERENCES

Adeogun IO and AA Adeoye, 2004. Heritabilities and phenotypic correlations of growth performance traits in Japanese quails. Livestock Research for Rural Development, 16: 67-73.

Akanno EC and SN Ibe, 2006. Prediction of body weight of the domestic rabbit at different stage of growth using linear body measurement. Nigerian Journal of Animal Production, 33: 3-8.

Amao SR, 2009. Comparative studies of growth performance and blood parameters of four strains of broilers chickens under deep litter and cage systems. M.Tech dissertation submitted to the department of Animal Production and Health Lautech, Ogbomoso (Unpublihsed).

Amao SR, LO Ojedapo and AO Sosina, 2010. Effect of strains on some growth traits of meat-type chickens reared in derived savanna environment of Nigeria.

Journal of Agriculture and Veterinary Sciences, 2: 58-64.

Amao SR, LO Ojedapo and AO Sosina, 2011. Evaluation of growth performance traits in three strains of broiler chickens reared in savanna environment of Nigeria. World Journal of Young Researchers, 1: 28-31.

ARPN, 2009. Asian and Research Publishing Network. Journal of Agricultural and Biological Science, 25: 48-55.

Ibe SN, 1994. Repeatability estimates of egg quality traits in a high expected response from selection, for those traits of white leghorn chicken. Nigerian Journal of Genetics, 95: 44-49.

Ibe SN, 1995a. Effect of data transformation on the distribution and repeatability of egg production traits. Journal of Animal Breeding and Genetics, 112: 53-58.

Ibe SN, 1995b. Repeatability of growth traits in Nigerian local chicken using early records. Nigerian Journal Animal Production, 22: 89.

Karimah A, Shahin, R Ahmed, Shemes, A Omary and S Kamal, 2000. Selection index alternatives for increased marketing body weight with minimum concomitant in body bone percentage recourse to tissue dissection on Japanese quail. Arch Tierz, Dummmerstort, 43: 535-543.

Maciejowski JO and J. Zieba, 1982. Genetics and Animal Breeding. Part A: Biological and Genetic Foundations of Animal Breeding. Elsevier scientific publishing co. Amsterdam Oxford-New York. PWN-Polish scientific.

Magala H, DR Kugoriza, H Kwizera and CC Kyarisiima, 2012. Influence of Management system on Growth and Carcass characteristics of Uganda local chickens. Journal of Animal Science Advances, 2: 558-567.

Marin RH, GD Fretesp and RB Jones, 2001. Effects of an acute stressor on fear and on the social reinstatement responses to domestic chicks to cage mates and strangers. Applied Animal Behaviour Science, 65: 221-224.

Marks HL, 1990. Genetics of growth meat in other galliformes. In: Poultry breeding and genetics. Ed. Crawford, RD, Elsevier, Amsterdam, the Netherlands pp: 677-690.

Marks HL, 1978. Growth curve changes associated with long-term selection for body weight in Japanese quail. Growth, 42, 129-140.

Maurice R and B Gerry, 2005. Raising Japanese quail. 4th edition, NSW Industries Publishing Limited. New South Wale pp: 1-10.

Ojedapo LO, TA Adedeji, SR Amao and SA Ameen, 2011. Effect of age and cage position on the growth traits of harco-black cockerel chicken in the derived savanna zone of Nigeria. World Journal of Life Science and Medical Research, 1: 60-65.

Oladunjoye IO, OO Ojebiyi and LO Ojedapo, 2005. Essentials of non-ruminant Animal Production a Monograph. Ola Printers, Behind California Hotel, Idi-oro Ogbomoso. pp: 53-61.

Oluwatosin, OO, 2007. Production equations and inter relationships among selected growth traits in cockerels. African Journal of Animal and Biomedical Science 2: 21-26.

SAS, 2003. Statistical Analysis system, user's guide: statistics 8. 6ed. SAS's Institute Inc. carry, North Carolina USA.

Shim FK and P Vohora, 2000. A Review of the housing of Japanese quail. World Poultry Science Journal 40: 261-274.