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

GENOTYPE AND SEX EFFECTS ON 4-WEEKS BODY WEIGHT OF JAPANESE QUAILS

***Amana[1], O. C., [2] Fayeye, T. R. and Ahutu[1], I. A**
[1]Department of Animal Production, Kogi State University, Anyigba, Nigeria.
[2]Department of Animal Production, University of Ilorin, Ilorin, Kwara State, Nigeria.
*Corresponding author: amanac@kogistateuniversity.edu.ng amanacharles2014@gmail.com

ABSTRACT

The the aim of this study was to investigate the effect of genotype and sex on 4-weeks body weight of Japanese quails. A total of 1404 fertile eggs were obtained from two different genotypes (Black and White) of Japanese quails. The eggs were marked according to genotype and were incubated for 17 days. At hatch, the weight of the chicks from each genotype was recorded and subsequently on weekly basis until the 28th day. The data collected was analyzed with SPSS (version 16) and means were separated using Least Significant Difference. The results showed that genotype and sex were found to have significant differences ($p<0.05$) on 4-weeks body weight of Japanese quails. The black quail was significantly heavier ($p<0.05$) in body weight that the White quails at 7, 21 and 28 days of age. The female quails were also significantly heavier ($p<0.05$) in body weight than the male quails at 21 and 28 days. The interaction between genotype and sex were not significant on body weight throughout the experimental period. It was concluded that genotype and sex had effect on 4-weeks body weight of Japanese quails. The research therefore recommends the Black genotype over the White genotype and the female over the male Japanese quails when selecting for body weight.

Key words: Genotype, Sex, Effects, Body Weight, Japanese Quails

INTRODUCTION

Japanese quails are the smallest member of poultry with immense potentiality (Rondelli *et al.*, 2003). Body weight is the most frequently used determinant of growth in animals (Chambers, 1990). Previous studies had reported that there are genetic differences in growth rate between genotypes or breeds of chickens (Deep and Lamont, 2002; Rondelli *et al.*,2003) and differences exist between sexes on some performance traits including body weight (Balogun *et al.*, 1997; Ajayi and Ejiofor, 2009). However, *Thutwa et al.* (2012) and Hristakieva *et al*. (2014) reported insignificant genotype differences in body weight, body weight gain and feed conversion ratio. In addition, sex of quails also play a very important role on fattening performance and body weight of quails (Kul *et al*., 2006). Genotype, sex and genotype-sex interactions are increasingly important, because breeding programs rely on this information on the selection of good stock during genetic improvement programs. The the aim of this study was to investigate the effect of genotype and sex on 4-weeks body weight of Japanese quails. The objectives of the study were 1: to compare the body weight of two genotypes of Japanese quails 2: to determine the effects of genotype x sex interaction on 4-weeks body weight of Japanese quails.

MATERIALS AND METHOD

Study location

The study was conducted at the Livestock Teaching and Research Farm, University of Ilorin, Nigeria. University of Ilorin is located on Latitude 08 29 N and Longitude 004 35E. Annual temperature range is 22-34^{0}C and annual precipitation is 80-120mm (World Climate, 2013).

Source of experimental birds and feed

A total of 1404 fertile eggs from a random bred population were obtained from a reputable private farm in Ilorin, Kwara State. The eggs were cleaned, marked according to line of parent (black and white genotypes) and set in manual electric incubator tthat was maintained at 37.2^0C and relative humidity of 75% until hatching. During incubation, the eggs were turned manually three times daily throughout the incubation period. At hatch, the chicks were transferred into electrically heated brooder pen at the Animal pavilion unit of the Department of Animal Production. Antibiotics and vitamins were administered as and when due. The chicks were separated into two battery cages according to genotype. At exactly one week of age, the chicks were wing tagged individually for proper identification before weighing. Weighing was done subsequently on weekly basis. At three weeks of age, the chicks were sexed based on plumage colouration. The birds were raised under similar nutritional status, uniform management and environmental conditions. They were of same age and given chick mash throughtout the experimental period containing 21% CP and 3,000 Kcal/kg ME. The experiment lasted for four weeks.

Data collection

a) **Body weight (BW):** The body weight was measured in grams from 1^{st} – 4^{th} week of age using a digital electronic scale (Model EHA251). Weighing was done early in the morning.

Statistical analysis

An ANOVA was performed on the data collected using the Generalized Linear Models (GLM) procedures of SPSS software (version 16.0 statistical package) appropriate for 2-way (genotype and sex) designs. Differences between groups were tested using Duncans Multiple Range test (DMRT) (Duncan, 1955). Significance was considered at the level $P < 0.05$.

The following mathematical model was used for analysis of the data.

$Y_{ijk} = \mu + \alpha_I + \beta_j + \alpha\beta_{ij} + E_{ijk}$

Where; Y = observation of the i^{th} genotype and the j^{th} sex,

μ = mean, α_I = effect common to the i^{th} genotype,

β_j = effect common to the j^{th} sex,

$\alpha\beta_{ij}$ = overall interaction effect

and E_{ijk} = observational error for (ijk)th observation.

RESULTS AND DISCUSSION

Table 1 shows the effect of genotype and sex on four weeks body weight of Japanese quails. There was a significant ($p<0.05$) effect of genotype on body weight at 1^{st} week. The black genotype recorded higher mean value body weights than the white genotype. However, sex had no significant ($p>0.05$) effect on body weight of Japanese quails at week one. At 14^{th} day, body weight of Japanese quails were not significantly affected by genotype and sex. Mean body weight at 21 days was significantly ($p<0.05$) influenced by genotype. The black genotype was significantly ($p<0.05$) heaver than the white genotype. Also, sex significantly ($p<0.05$) influenced mean body weight of Japanese quails with the females showing better body weight than the males. At the end of the experiment, that is, 28^{th} day, genotype significantly ($p<0.05$) affected mean body weight of Japanese quails. The black genotype performed significantly ($p<0.05$) better than the white genotype. Sex also influenced body weight of Japanese quails significantly ($p<0.05$). The female Japanese quails performed significantly ($p<0.05$) better than the males in terms of body weight. On the final analysis, the effect of genotype and sex on four weeks body weight of Japanese quails shows that the black genotype in most cases during the experimental period recorded superior mean values than the white genotype. It can be inferred that the former has superior genetic make-up than the latter and the result confirmed existence of genotype differences in body weight as reported by several authors (Bagh *et al*., 2016; Hassan *et al.*, 2016; Devi *et al*., 2010). Likewise, the female Japanese quail consistently recorded higher body weights than their male counterparts. This suggest that sexual dimorphism exists in Japanese quails as previously reported by several authors (Devi *et al*., 2010; Amao, 2016).

Table 1: least square means showing the effect of genotype and sex on 4-weeks body weight of Japanese quails

Source of variation		7th day body weight (g± SE)	14th day body weight (g± SE)	21st day body weight (g± SE)	28th day body weight (g± SE)
Genotype	Black	18.5[a]±0.31	34.80±0.49	60.41[a]±0.66	84.92[a]±0.90
	White	16.35[b]±0.23	33.84±0.55	51.44[b]±0.74	71.62[b]±1.01
Sex	Male	17.05±0.24	34.40±0.56	54.85[b]±0.76	76.43[b]±1.04
	Female	17.35±0.20	34.24±0.47	57.00[a]±0.64	80.11[a]±0.87
Genotype*Sex	BL x M	18.09±0.31	34.53±0.74	58.94±1.00	83.26±1.35
	BL x F	18.21±0.27	35.05±0.64	61.88±0.87	86.58±1.18
	WH x M	16.20±0.36	34.27±0.86	50.76±1.16	69.61±1.57
	WH x F	16.49±0.29	33.41±0.69	52.13±0.94	73.64±1.28

ab: means in the same column having different superscripts differ significantly (P<0.05)

CONCLUSION AND RECOMMENDATION

The present study indicates the existence of significant genotype differences in 4-weeks body weight of Japanses quails. The black genotype of the Japanese quail appeared superior to the white genotype in terms of the measured trait. With respect to sex, the female Japanses quails had better body weight than their male counterparts. The study therefore recommends the Black genotype of the Japanese quail and the female of the Japanese quail for meat production.

REFERENCES

Ajayi, F.O. & Ejiofor O. (2009). Effect of genotype & sex interaction on growth and some development characteristics of Ross and Anak broiler strains in the high rainforest zone of Nigeria. *Asian Journal of Poultry Science*. 3(2), 51 – 56.

Bagh, J., Panigrahi, B., Panda, N., Pradhan, C. R., Mallik, B. K., Majhi, B., & Rout, S. S. (2016). Body weight , egg production , and egg quality traits of gray , brown , and white varieties of Japanese quail (Coturnix coturnix japonica) in coastal climatic condition of Odisha. 9, 832– 836. https://doi.org/10.14202/vetworld.2016.832-836

Balogun, T. F., Bawa, G. S., Adewumi, I., & Olumeyan, D. B. (1997). Effect of age and sex of egg strain chickens and of two stocking densities of broilers on voluntary water intake and performance in a sub-humid environment. *Tropical Animal Health Production*. 29(2), 117 – 123.

Chambers, J. P. (1990). Genetics of growth and meat production in chickens. In: Poultry Breeding and Genetics, Crawford, R. D. (Ed.). Elsevier, New York, Tokyo, pp: 1123.

Deep, N. & Lamont, S. J. (2002). Genetic architecture of growth and body composition in unique chicken population. *Journal of Heredity*. 93, 107-118.

Devi, K. S., Gupta, B. R., Prakash, M. G., Qudratullah, S., & Reddy, A. R. (2010). Genetic studies on

growth and production traits in two strains of japanese quails. *6*(5), 223– 230.

Duncan, D. B. (1955). Multiple range and multiple F test. Biometrics, 11: 1-42.

Hassan, K. H., Rafea, A., & Alsattar, A. (2016). Effect of Genotype and Genotype – Environment Interaction on Productive Performance of Japanese Quail Varieties. *4*(4), 49–52. https://doi.org/10.11648/j.ajbio.20160404.12

Hristakieva, P., Mincheva, N., Oblakova, M, Lalev, M., & Ivanova, I. (2014). Effect of genotype on production traits in broiler chickens. *Slovac Journal ofAnimal Science*. 14, 19-24.

Kul, S., Seker, I., & Yildirim, O. (2006). Effect of separate and mixed rearing according to sex on fattening performance and carcass characteristics in Japanese quails (Coturnix coturnix Japonica*). 49*, 607–614.

Ojedepo, L.O. & Amao, S. R. (2016). Sexual dimorphism on carcass characteristics of japanese quail (coturnix coturnix japonica) reared in derived savanna zone of Nigeria. *International Journal of Science, Environment and Technology*. 3(1), 250-257.

Rondelli, S., Martinez, O., & Garcia, P. T. (2003). Sex effect on productive parameters, carcass and body fat composition of two commercial broiler lines. Rev. Bras. Cienc. Avic. 5(3): 169-173.

SPSS (2016). Statistical package for social sciences, SPSS User guide for statistics, release 17.0, SPSS Inc., USA.

Thutwa, K., Nsoso, H. J., Kgwatalala, P. M., & Moreki, J. C. (2012). Comparative live weight, growth performance, feed intake carcass traits and meat quality in two strains of Tswana chickens raised under intensive system. *International Journal of Applied Poultry Research*, (11), 121-26.

World climate. (2013). http://www.climate-charts.com/Locations/n/N165101.php.Retrieved 10/09/2021.