PHENOTYPIC CORRELATION BETWEEN BODY WEIGHT AND LINEAR BODY MEASUREMENTS OF JAPANESE QUAILS

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ABSTRACT
This study aimed to determine the phenotypic correlation between body weight and linear body measurements of Japanese quails. Thirty-six (36) matured Japanese quails comprising 30 hens, and 6 cocks were used as the base population of the study. The birds were assigned to 6 pens at a mating ratio of 5:1. The progenies (250) were raised to sexual maturity and body weight and linear body measurements were taken on weekly basis and were recorded. Data collected on the body weight and linear body measurements (body length, breast girth, shank length and wing length) were analyzed using One-way Analysis of Variances (ANOVA) of the Statistical Package of Social Science (SPSS) software. A high positive phenotypic correlation (r=0.858–0.951) was observed between body weight and linear body measurements with the highest correlation (r=0.951) between breast girth and wing length. From the findings of this study, it can be concluded that body weight of Japanese quails had high positive relationships with body length, breast girth, shank length and wing length of the Japanese quails used in the study.
Keywords: Phenotypic correlation, Body measurements, Japanese quails, Progenies, Sexual maturity

INTRODUCTION

The relationship between body weight and linear body measurements in Japanese quails (*Coturnix coturnix japonica*) is an important area of study in poultry science, particularly for enhancing breeding strategies and improving production efficiency. Japanese quails are increasingly recognized for their rapid growth rates and short generation intervals, making them a valuable source of protein in many regions, especially in developing countries like Nigeria. The ever-increasing human population in Nigeria has led to high demand for the available but insufficient animal and poultry products. Japanese quails and their products are one of the cheapest and easily affordable animal protein sources for the teeming population and thus could play very significant socio-cultural and economic roles in our societies. Japanese quail have been described based on phenotypic traits (Gambo *et al.,* 2014; Momoh *et al.,* 2014). Traits like body girth and body length have shown strong positive correlations with body weight at various growth stages, indicating their potential utility as indicators for early selection in breeding programs (Adeogun and Adeoye, 2004). Understanding the phenotypic correlations between body weight and various linear measurements such as body length, body girth, wing length, and shank length can provide insights into how these traits interact and influence overall growth performance. The objective of the study therefore is to assess the phenotypic correlation between body weight and linear body measurements of Japanese quails.

MATERIALS AND METHODS

Location of the study

The experiment was carried out at the Livestock Teaching and Research Farm of the Faculty of Agriculture, Shabu-Lafia Campus, Nasarawa State University, Keffi, Nasarawa State. Nasarawa State falls within the Southern Guinea Savanna Zone of Nigeria. Lafia lies between latitude 7° and 9°N and Longitude 7° and 10°E. 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 14.00 cm in others (Faculty Weather Station, 2023).

Experimental birds and their management

The Japanese quail used for this experiment was procured at maturity from National Veterinary Research Institute (NVRI) Vom and used as the base population. The birds in this base population were housed according to their sex for two weeks for quarantining and acclimatization. During this period, the birds were dusted against ecto-parasites and dewormed. Antistress (vitalyte), antibiotics and

coccidiostat were administered through water to check against possible disease outbreaks. After quarantine and acclimatization, the birds were randomly assigned into identified six breeding pens in the rearing house. A mating ratio of 1 cock to 5 hens was used. The cock in each breeding pen was allowed to freely mate their respective hens. Fertile eggs for hatching were collected after the birds had laid for two weeks. This is aimed at obtaining higher fertility and hatchability. The birds were fed formulated breeder diet containing 18% crude protein and 2700 Kcal/Kg metabolizable energy. Feed and water were provided *ad-libitum.*

Experimental Procedure

Thirty (30) matured hens and six (6) cocks were purposively allotted to six pens, respectively with each pen comprising five (5) hens and a cock thus representing six replicates. Hatching eggs were collected twice a day and were identified according to sire. The eggs were accumulated for 7 days during which they were held in egg crates under room temperature with good ventilation. At the end of 7 days of egg collection, the eggs were transported to BBS Poultry hatchery farm behind primary health clinic Rimi Uku, Doma road, Lafia. The eggs were set for pedigree hatching in an automated electric incubator.
Incubated eggs were placed horizontally in egg boxes. The egg boxes were placed in the egg tray and set in the incubator according to sire group. The eggs were turned, automatically at 4 hourly intervals each day. -Turning of eggs was stopped three days to the expected date of hatching to avoid dislocating the positioned beak ready for piping. Candling was carried out on the 6th day to determine fertile eggs. For accurate assessment of fertility and early embryonic mortality, candling was again, carried out on the 13th day of incubation. After hatching, all the hatched chicks were taken out of the incubator. The pens were thoroughly cleaned, scrubbed and disinfected using a disinfectant and allowed to dry for two weeks before the expected date of hatching. Brooding was carried out for a period of 15 days (2 weeks) using stoves and electric bulbs as sources of heat and illumination. Wood shavings were used as litter materials. They were spread at a sufficient depth (5cm). The chicks were brooded at a temperature of 35°C with adequate drinker and feeder spaces provided. The temperature was reduced gradually at the rate of 3.5°C on a weekly basis as brooding progressed. Light was provided for 24 hours during brooding to avoid pilling and death. Stone pebbles were disinfected and placed in their drinking water to avoid drowning.

The body weight and linear body measurements were taken on the progenies (250) obtained and were taken throughout the experiment and the correlation between body weight and the linear body measurements were determined.

Parameters measured

Body Weight**:** Live body weights were measured at hatch using a sensitive electronic scale and then at weekly intervals until 6 weeks of age. Thereafter, body weights were taken for week 6.
Body Linear Measurement**:** The body linear measurements such as body length, shank length, wing lengths and breast girth were measured at weekly intervals until maturity (6 weeks) using measuring tape.

Data Analysis

Data collected on body weight and body linear measurements were analyzed using One-way Analysis of Variance (ANOVA) of the SPSS Software (2011).

RESULTS AND DISCUSSION

The phenotypic correlation between body weight and linear body measurement of Japanese quails is presented in Table 1. The correlation between BW and other considered body measurement were all positive significant and high. Highest correlation was between BG and WL (r=0.951), followed by that between BL and WL (r=0.939). The least correlation value was between BW and BG (r=0.858). High positive correlation was observed between all the measured parameters – BW, BL, SL, WL and BG. This means any selection for one trait will result to the improvement of others and this is a good indicator for BW. The correlation between BG and WL has the highest correlation coefficient (r=0.951). With the body weight, BL had the highest coefficient with body weight among the linear measurements. For this study, the implication of this is that selection for growth traits with high phenotypic correlations will results to rapid improvement in body weight of the animal due to linkage gene effect operating on them. This finding is at variance with the report of Adil *et al*. (2022) who reported a negative relationship between BW and BL, BW and SL for both male and female in Pakistani Quail (*Coturnix japonica* PK).

They however observed high positive correlation between BW and TL and BW and SL. The positive correlation between body weight and linear body measurements were similar to the report of Mallam and Ombugu (2023) who reported that body weight with height at the withers had the highest correlation (r=0.826; p< 0.01) followed by body weight and chest girth (0.824; p<0.01) in Rabbits bucks.

Table 1: Phenotypic Correlation between Body Weight and Linear Body Measurements

Trait(s)	BW	BL	SL	WL	BG
BW	1				
BL	0.908**	1			
SL	0.876**	0.919**	1		
WL	0.878**	0.939**	0.905**	1	
BG	0.858**	0.940**	0.886**	0.951**	1

BW = Body weight; BL = Body length; BG = Breast girth; SL = Shank length; and WL = Wing length.

CONCLUSION

It can be concluded that body weight of Japanese quails had high positive relationships with body length, breast girth, shank length and wing length of the Japanese quails used in the study.

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