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EVALUATION OF BODY WEIGHTS AND MORPHOMETRIC TRAITS OF QUAILS FED DIFFERENT LEVELS OF CRUDE PROTEIN

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ABSTRACT

A total of ninety (90) one-week-old unsexed brown quails were used to evaluate the performance of quails fed graded levels of dietary protein. The diets formulated had three inclusion levels of dietary protein at 18, 20, and 22%. The experimental birds were randomly distributed into three (3) dietary treatments. These treatments had five replicates each with a total of six birds per replicate and the experiment was laid out in a Completely Randomized Design (CRD). Data on body weight and morphometric characteristics were taken weekly over a period of 5 weeks. The results of the study revealed, that birds fed 22% dietary crude protein showed the best performance in all traits measured however, there was no significant (P>0.05) difference between the treatment for in all traits measured as the birds progressed with age. The study, therefore, recommends that 22% CP inclusion level is the best dietary protein inclusion for optimum body weight gain and linear body growth.

INTRODUCTION

Japanese quails (*Coturnix japonica)* are well known for their fast growth, higher egg production potential, easy management, low caloric value and high dry matter. It is rich in protein, vitamins, essential amino acids, fatty acids, unsaturated fatty acids and phospholipids (Muthukuma and Dev Roy, 2005). There is an increase in demand for quail products for consumption due to its medicinal properties in curing ailments affecting humans (Sati *et al*., 2012). Increased diversification into the production of livestock species such as quail with short generation intervals could be a viable option in ameliorating the shortage of protein among the populace in developing countries (Muthukumar and Dev Roy, 2005). High cost of conventional protein feedstuff has contributed to the poor performance or productivity of many quail farms in Nigeria and this has led to a shortage in availability of animal protein to citizens (Adeniji and Jimoh, 2007).

The indirect method of estimating body weight using body measurements has been reported to be a practical, faster, easier, and cheaper approach, especially in the rural areas where the resources are insufficient and the acquisition of expensive sensitive weighing scales is unaffordable (Chineke*et al.*,2002*).* The shank length and diameter are important indicators of leg development, while body girth and length are good indicators of breast development. Estimates of the relationship between body weight and these linear measurements is not only important in developing predictive equations, it could also be employed in genetic improvement strategies to achieve an optimum combination of body weight and good conformation (Chineke *et al.*,2002).

Generally, quail requires a high protein diet for optimum growth and reproduction (Rio*et al.*, 2005*).* NRC (1994) has recommended the CP content in diets of growing quails between 24 and 27%. Whereas Shrivastav and Panda, (1999) observed optimum growth rate at 27% CP and 2800 kcal ME/kg for the quail up to 2 weeks of age, and 24% CP with the same energy level from 3 to 5 weeks of age in dry tropical climate. Other factors like physiological state, metabolic body size, environmental temperature and humidity also affect the energy and protein requirements of Japanese quails. This study was designed to evaluate the effect of feeding different crude protein levels on the morphometric traits and growth performance of quails

MATERIALS AND METHODS

Location and Duration of the Study

This experiment was conducted at the Poultry unit of University of Abuja Teaching and Research Farm which is located along Airport Road, Gwagwalada, FCT-Abuja. Gwagwalada falls within latitude 90° 4'N, longitude 7° 28'E,1500mm (59.1in) rainfall annually, temperature ranges between

18.45°c (65.21°F) and relative humidity of 67% at 0900GMT . The location has a particular rainy and dry season with a unimodal rainfall pattern which for the most part sets up between mid-May to early June, and tops in the long periods of the months of July/August. The total yearly rainfall in the location is between 1284mm-1383mm. However, dry season starts from mid of October to end of April. The area has a daily mean temperature of 30^0c in the raining season and 34^0c in the dry season (Meteorological Station of Nnamdi Azikiwe International Airport (MET), 2018). The experiment lasted for six weeks.

Experimental Animal and Management

A total of ninety (90) Japanese quail birds *(Cortunix japonica)* of one week of age was used for the study. The birds were sourced from National Veterinary Research Institute (NVRI), Jos, Plateau state. They were housed in battery cage system under the same living conditions. On arrival they were given water with vitalyte anti stress. The birds were weighed individually at the beginning of the experiment and tagged for identification using wing tags for purpose. This experiment was carried out using completely randomized design. The quails were housed in battery cages raised under the same living conditions. The birds were allocated in three treatments and five replicate, with six (6) birds per replicate. Standard management and medication was provided throughout the experimental period.

Experimental Diets

A total of three (3) experimental diets were formulated in which Protein is fed at graded levels of 18%, 20%, 22% (Table1)

Table 1: **Experimental diets (kg /25kg)**

Ingredients	Levels of Protein		
	18% CP	20 % CP	22% CP
Maize	4.80	4.80	4.80
Maize offal	1.21	1.56	1.81
Wheat	0.30	0.36	0.36
Soya Bean Meal	6.16	7.04	8.80
Groundnut Cake	4.12	5.17	5.92
Fish Meal	1.70	1.70	1.70
Bone Meal	0.0	0.0	0.0
Limestone	0.0	0.0	0.0
Vitamin premix	0.0	0.0	0.0
Lysine	0.15	0.15	0.15
Methionine	0.15	0.15	0.15
Salt	0.35	0.35	0.35

Analyzed value MCAL-2996Kcal/

*Premix used contained the following per Kg: Vit. A, 7200 mg; Vit. D , 1600mg; Vit. E, 14400mg; Menadion, 800 mg; Thiamine, 720 mg; Riboflavin, 2640 mg; 2 3 Niacin, 12000 mg; Pyridoxin, 1200 mg; Vit B12, 6 mg; D-Pantothenic acid ,4000 mg; Folic acid, 400 mg; Biotin ,40 mg; Choline chloride, 100000mg; Antioxidant, 40000 mg. Supplied per Kg: Manganese, 40000 mg; Zinc ,33880 mg; Iron, 20000 mg; Copper, 4000 mg; Iodine, 400 mg; Choline chloride, 3 100000 mg.

Parameter measured

The linear body measurements (LBM) which included beak length, head length, neck length, body length, wing span, wing length, drumstick, shank length, tail length, body girth and body weight were taken from the first to the 5th week. Trait description and measurement followed the guidelines of FAO (2012).

Statistical analysis

Data collected was subjected to one way analysis of variance (ANOVA) based on the Completely Randomized Design model, using Statistical Analysis System (SAS, 2012). Where differences occurred at 5 % ($p<0.05$), they were separated using Duncan's Multiple Range Test (SAS, 2012).

RESULTS AND DISCUSSION

Results

Morphometric characteristics of quails fed graded levels of dietary protein

Table 2 revealed that there was no significant difference among treatments in the morphometric traits and body weight across all ages except for shank length in week 2 where birds fed 22% crude protein inclusion were significantly (P<0.05) different from those fed at 20% and 18% crude protein levels.

Table 2: Morphometric characteristics of quails fed graded levels of dietary protein

Level of Inclusion (%)	Initial length (inches)	Week 1	Week 2	Week 3	Week 4	Week 5
Shank Length						
18	1.68 ±0.1643	1.82 ±0.1924	2.10 ±0.1000[ab]	2.48 ±0.1095	2.56 ±0.1140	2.58+0.1304
20	1.74+0.1673	1.82+0.1743	2.20+0.0707[a]	2.30+0.1414	2.58+0.1095	2.54+0.1817
22	1.66+0.1817	1.80+0.1225	2.06+0.0894[b]	2.38+0.1789	2.50+0.1414	2.70+0.187
Wing Length						
18	4.22±0.1924	4.80 ±0.5244	5.00 ±0.4950	5.22 ±0.5020	5.24 ±0.4930	5.60 ±0.5080
20	4.94 ±0.0894	5.04 ±0.0894	5.30 ±0.2550	5.48 ±0.2775	5.70 ±0.2121	6.10 ±0.2950
22	4.52 ±0.3493	4.98 ±0.0837	5.20 ±0.2121	5.60 ±0.2121	5.54 ±0.2074	6.12 ±0.1225
Body length						
18	6.92 ±0.1924	7.78 ±0.3564	8.04 ±0.4278	8.36 ±0.4219	9.80 ±0.8746	10.88 ±0.9476
20	7.12 ±0.1304	7.64 ±0.1140	8.14 ±0.2191	8.40 ±0.1732	9.40 ±1.0223	10.12 ±1.1367
22	7.06 ±0.1949	7.78 ±0.2388	8.00 ±0.2540	8.66 ±0.4827	10.28 ±8758	10.96 ±0.8167
Breast girth						
18	1.82 ±0.0837	1.82 ±0.0837	2.00 ±0.1871	2.12 ±0.1924	2.34 ±0.2074	2.48 ±0.2864
20	1.86 ±0.1817	1.86 ±0.1817	2.12 ±0.1304	2.10 ±0.1000	2.56 ±0.1140	2.48 ±0.0837
22	1.76 ±0.1140	1.76 ±0.1140	1.90 ±0.2550	2.08 ±0.1789	2.30 ±0.2549	2.62 ±0.1924
Growth Performance						
18	36.00 ±2.64	44.60±4.33	52.60±9.71	64.60±4.87	101.40±13.35	119.40±16.3340
20	39.40±4.16	43.60±4.45	54.20±3.42	54.60±7.71	96.20±13.61	122.60±11.4149
22	36.60±4.51	41.60±4.56	45.60±7.70	60.00±15.41	97.40±14.89	124.80±10.2581

1X±S.D. = mean ± standard deviation; 2Mean with different letters (abc) on the same column are significantly different at P<0.05

Discussion

The table above shows the effect of graded levels of dietary protein on body weight and some morphometric traits in Japanese quails. The results on the morphometric traits as well as growth performance revealed that there was no significant (P>0.05) difference between all the treatment groups as the birds aged in weeks (1st to 6th week). The growth performance of quails in this study was similar to the findings of Dudusola *et al.* (2018) 38.31g to132.33g, however, the linear measurements obtained in this study were however lower than values reported by other authors (Reddish *et al.*, 2003; Ojo *et al.*, 2014). The findings of this study was also in agreement with the report by Ojo *et al.* (2014) that body weight had a significant (P<0.05) linear relationship with all body measurements at all ages except with wing length and the shank length at different stages of growth with age. The study further revealed that body length, wing length, breast girth and shank length increased with age. This is possible because as bird's increases in bodyweight the body dimension, increases this is The growth performance of quails in this study was similar to the findings of Dudusola *et al.* (2018) 38.31g to132.33g, however, the linear measurements obtained in this study were however lower than values reported by other authors (Reddish *et al.*, 2003; Ojo *et al.*, 2014). The findings of this study was also in agreement with the report by Ojo *et al.* (2014) that body weight had a significant (P<0.05) linear relationship with all body measurements at all ages except with wing length and the shank length at different stages of growth with age. The study further

revealed that body length, wing length, body girth, shank length and drumstick length increased with age. This is relatively in most cases because as bird's progress in bodyweight there will be expected change in the body dimension and increase observed is in accordance with finding Nsoso *et al.* (2008) and Akram *et al.* (2012).

Conclusion

The results of this study shows that body weight and other morphometric measurements in Japanese quail were not significantly different for all the treatments except for shank length at week 2 . Therefore, in evaluating the performance of birds fed different level of protein can be possible using body weight and as well as other linear measurements. These birds can be easily organized and evaluated using easily measured parts like Body parts with a simple measuring tape. However, birds in this study showed no significant difference (P>0.05), but the bird fed 22% crude protein showed better performance in the measured traits in all treatments measured.

In conclusion, with the similarities in related development in bodyweight and other morphometric traits which is an indicator of the development of the quail birds indicates that body measurements can be used for estimation of body weight on the field where scales are not usually available. However, birds fed 22% Crude protein had higher values across all measurements indicating that for better performance, and growth, quail birds should be fed 22% crude protein and the study recommends further studies in higher levels of crude protein as the birds show great potentials to attain better body weight.

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