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PERFORMANCE OF GUINEA FOWL (NUMIDA MELEAGRIS) FED VARYING PROTEIN LEVELS

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ABSTRACT: *This study was conducted to investigate the effects of different protein levels on growth of guinea fowl keets (Numida meagris) of the same age under intensive system in a typical poultry house from 6th week to 12th week of age. They were fed commercial broiler starter for two weeks and maintained on same diet of 18% crude protein for 5 weeks of age and given water ad libitum. The birds were separated into three pens. One hundred and twenty old guinea fowls were assigned at grower period on 3 dietary protein levels of 14, 16 and 18% crude protein (CP) on same metabolizable energy level of 2800 kcal/ kg. The study was conducted in Kgatleng District in Botswana used to test the performance of the female birds. The birds were killed at the owner's farm by cutting the neck through the jugular vein. There was significant difference (P<0.05) in feed intake between the three treatments. The internal organs for the treatments were not significantly different.*

ORIGINAL ARTICLE

Keywords: *Dietary protein, guinea fowl, body weight gain, feeding performance*

INTRODUCTION

Guinea fowl is a wild bird found in most parts of Botswana. Many of them were captured and reared in captivity by farmers for the purpose of protein consumption of the people.

Guinea fowl (*Numidia meleagris*) can be kept both for meat and egg production (Smith, 2001). Guinea fowl adapt well to harsh environmental conditions, and they are less susceptible to poultry diseases, unlike chickens (Mathis and Mac-Donald, 1987). Guinea fowl production would not require excessive use of medicated feed (no antibiotics) as is common practice in intensive broiler production. Rearing of guinea fowl intensively has just begun in Botswana and is likely to accelerate the potential of the species. Guinea fowl meat has higher protein content than that of chicken. There are no cultural barriers against consumption of guinea fowl products (Saina et al., 2005). Guinea fowl can be raised under both intensive and extensive management systems. The problem facing poultry in developing countries is inadequate knowledge of the nutritional requirement of the domesticated birds (Adeyemo et al., 2006). It pays to give supplements to guinea fowl for growth from keets stage to maturity if they are kept under semi- intensive (Alawa and Nwagu, 1995). Information on guinea fowl production is rather lacking in Botswana which hampers rapid development of this industry (Nsoso et al., 2006). The study is aimed at examining dietary lysine levels at the growing stage.

MATERIALS AND METHODS

120 day old guinea fowls keets were kept together under a deep litter system with saw dust used as litter. These were fed commercial chick starter mash containing 21% crude protein (CP) and fed water *ad libitum*. At the beginning of 6th week, keets were randomly divided into three groups balancing for weight moved to grower pens. Three dietary protein levels were formulated to contain (CP) concentrations of 14, 16 and 18% CP respectively. The summary of the different dietary protein during the growing period and the composition of experimental diets fed from 6-12 weeks of age are shown in Table 1.

The diets were thoroughly mixed with a feed mixer. They were fed up to 12 weeks of age. Keets were raised under normal day light. The drinkers and the feeding troughs were thoroughly washed daily. The birds were weighed individually at the beginning of the experiment and every week, thereafter at end of the growing period of twelve weeks. Feed intake was determined weekly using a weighing balance. Body weight changes were determined using a measuring scale. Mortality was recorded as they occurred.

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Table 1 - Composition and proximate analysis of experimental diets			
Parameters	**14% CP**	**16% CP**	**18% CP**
Yellow maize	79.00	82.80	88.40
Sunflower	16.90	12.40	6.40
Salt	0.30	0.30	0.30
Calcium phosphate	1.00	1.00	1.00
Alfalfa meal	2.50	3.50	3.60
Vit-mineral mixture	0.30	0.30	0.30
Total	100.00	100.00	100.00
Proximate analysis			
Metabolizable energy (kcal/kg)			
Dry matter	2800	2800	2800
Moisture (%)	86.7	87.3	86.9
Crude Protein (%)	12.0	12.0	12.0
Ether extract (%)	18.06	18.07	18.08
Ash (%)	36.0	35.76	36.32
Nitrgen free extract (%)	11.60	11.76	11.48
Calcium (%)	14.73	14.64	14.59
Phosphorus (%)	21.78	21.95	21.87
Crude fat (%)	0.7	0.7	0.7

At 12 weeks of age six birds were randomly selected from each treatment, weighed and after being starved for 16 hours were killed by neck dislocation in the slaughter slab. Each bird was plugged; visceral organs, head, and wings were removed. The carcasses were eviscerated to determine the dressing percentage, heart, kidney and spleen weights. Length of intestine and oviduct were determined by using a meter ruler. The proximate analyses of the diets were carried out as per AOAC (1990).

The data were subjected to analysis of variance and significant differences among the means were determined using LSD test.

RESULTS AND DISCUSSION

The influence of the dietary protein level on feed intake, weight gain and feed efficiency is shown in table Table 2. Feed intake increased with increasing protein levels of 16% and 18 % crude protein respectively. These results are in agreement with Kingori et al. (2003) who reported increased feed intake as protein was increasd. In this study there was a general increase in body weight throughout the growing stage. Adeyemo et al. (2006) reported increased live body weight of guinea fowls fed different levels of crude protein. There was significant difference ($P<0.05$) in feed intake between the three treatments. This might be due to the differences in percentage crude protein content. This could also have been influenced by some ingredients in the diets to compel the birds to eat more to meet their body protein requirements. The weight gain increased significantly ($P<0.05$) between the treatments. Adeyemo et al. (2006) also reported significant difference of weight gain between birds fed 14 and 16% CP. Growth in animals is influence by genotype of birds, nutrition, hormones, tissue specific regulatory factors and other aspects of the bird's environment (Carlson, 1969). When birds consume below their protein requirement they do not improve protein utilization. The study showed that feed efficiency improved as protein was increased between 14, 16 and 18% crude protein (Table 2). Although slower growing than broiler chickens they are reported to out-perform replacement layer pullets in feed conversion efficiency (Olomu, 1983).

Table 2 - Influence of dietary crude protein level on feed intake, weight gain and feed conversion ratio from 6 to 12 weeks of age				
Parameters	**14%CP**	**16%CP**	**18%CP**	**P***
Average total feed intake (kg)	6.02^a	6.16^b	6.27^c	<0.05
Average total feed intake (kg)	6.02^a	6.16^b	6.27^c	<0.05
Body weight gain (g)	879^a	944^b	973^c	<0.01
Feed Conversion ratio	6.71^a	6.37^b	6.23^c	<0.05
% mortality	0	0	0	
Mean bearing different superscripts are significantly different (P<0.05)				

The dietary protein level did not influence increase in dressing percentage, weight of heart, spleen, liver, empty gizzard and kidney (Table 3). The length of the oviduct was not influence by increased dietary protein.

All parameters except body weight (live weight) were not significantly different. In this body weight increased significantly ($P<0.05$) with increased dietary protein. Ayorinde and Ayeni (1983) reported very low live body weights

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of 245.20 to 726 g at 12 weeks of age as compared with this study which reported 1.21 to 1.47 Kg at 12 weeks of age. However, heart weight, spleen weight and oviduct length tended to decline with increased protein level. Guinea fowl are reported to grow slowly and utilize feed less efficiently than chickens (Olomu, 1983). The problems of growth in guinea fowls can be associated with nutrition and selection. One cannot be sure that the birds were fed optimally. Though guinea fowls have similar gastrointestinal tract is may not be correct that it translate into similar nutrient requirements. There are other factors as genetics which contribute to the nutrient requirements. Various researchers have recommended high protein levels of 15-26% for good performance of guinea fowl with reduction as bird's mature (Nwagu and Alawa, 1995).

Table 3 - Effects of carcass parameters of guinea fowl fed varying levels of crude protein

Parameters	14%CP	16%CP	18%CP
Body weight (Kg)	1.21[a]	1.37[b]	1.47[c]
Dressing percentage (%)	87.5[a]	87.6[a]	87.5[a]
Heart weight/kg live weight (g)	3.89[a]	3.86[a]	3.85[a]
Spleen weight/kg live weight	1.98[a]	1.94[a]	1.94[a]
Empty gizzard weight (kg) live weight	26.53[a]	27.50[a]	26.48[a]
Liver weight g/kg live weight	22.13[a]	22.21[a]	22.20
Abdominal fat g/kg live weight	21.13[a]	21.16[a]	21.22[a]
Small intestine (cm)	130.23[a]	130.45[a]	130.43[a]
Oviduct length (cm)	8.75[a]	8.74[a]	8.73[a]
Kidney g/kg live weight	4.56[a]	4.63[a]	4.59[a]

Means bearing different superscripts are significantly different (P<0.05)

Sales and du Preez (1997) reported live weight of 1.56 at 12 weeks of age and it is higher than what it was found in this study. The three diets showed that guinea fowls need three different diets as reported by Blum et al. (1975). The live body weights of the birds were between 1.21 to 1.47kg at 12 weeks of age. Nsoso et al (2006) and Oguntona (1982) reported low growth rates of 1.29kg and 1.22kg respectively. Fajemilehin (2010) reported very low body weight of three breeds of guinea fowls at 0.510kg, 0.466kg and 0.478kg respectively as compared to this study which recorded 1.21, 1.37 and 1.47kg of body weight during 12 weeks of growth. There was no difference in length of oviduct of the birds fed the different protein levels at 12 weeks of age. There was no mortality in the dietary treatment groups.

CONCLUSIONS

The body weight gain increased with increasing dietary protein. Average feed intake increased with increased dietary protein. Feed conversion ratio decreased with protein increase. It is interesting that no mortality occurred during the study.

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