REPLACEMENT VALUE OF GUINEA CORN FOR MAIZE IN PRACTICAL DIET FED TO QUAIL (*Coturnix coturnix japonica*) CHICKS

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ABSTRACT

A six week feeding trial was conducted to determine the replacement value of Guinea corn for maize in diet fed to 360, day-old quail chicks on deep litter. Four iso-nitrogenous (22 %Crude protein) diets incorporating graded levels (O, 15, 27 and 42 %) of guinea corn as replacement for maize were used in the trial. The ME levels of the diets ranged from 2700 – 2750 kcal/kg. Each treatment was replicated thrice. Feed intake, weight gain and feed/ weight gain ratio did not differ significantly (P>0.05) among the treatments. Feed cost decreased across the treatments and was lowest for the diet in which 42 % maize was replaced by guinea corn. Feed cost/kg weight gain was lower for diet B(15 % guinea corn) than for other diet tested. Results of this study indicated that a dietary crude protein level of 22 % and M E of 2700 to 2750 kcal/kg feed, of 42 % guinea corn based diet was suitable for growth of Japanese quail chicks.

Keywords: Guinea corn, Quail chicks, Productive Performance

INTRODUCTION

Much care is being exercised by many people on the quantity of animal fat consumed regularly because of the health implications. Japanese quail are small-bodied birds of the galliformiss family and are low in body fat and cholesterol (Garwood and Diehl, 1987, Schwartz and Allen, 1981). Therefore, much effort should be targeted to multiplying these birds for increased consumption of meat with low fat and high protein.

Livestock feed have become very expensive resulting in decrease in livestock production. There is increasing competition between man and livestock for available feedstuffs for food, feed and industrial raw materials. According to Bamgbose, *et al.* (2004), maize accounts for about 45 to 55 % of poultry feed. Therefore any effort to substitute maize in poultry feed will significantly reduce the cost of production. They successfully replaced 40 % maize with maize offal/cashew nut meal based diet and recorded no deleterious effect on carcass yield and nutrient digestibilities of broilers. The most relevant option to arrest the present feed crisis of the livestock industry is by-product utilization (Atteh, 1986). These deductions point clearly to alternative feed stuff for livestock feed productions in order to cut down feed prices and make them more affordable by livestock farmers. Olubamiwa, *et al*. (1999) had also successfully replaced 14 % maize with cocoa husk meal (CHM) with no depressive effect on the growth of quail chicks. Cullison, (1987), reported that sorghum can replace 50 % of corn with no adverse effect on animal performance but weight gain may reduce by 10 % or more with higher levels of replacement. This is contrary to the report of Spiridon, *et al.* (1979) who observed no depressive effect of sorghum on growth and feed efficiency even at 100 % replacement of maize with sorghum in meat chickens. However, carcasses of birds fed most sorghum diets were lighter than control. Guinea corn contains 11 % crude protein, 3300 kcal/kg metabolizable energy and a crude fibre level of 3 % (Aduku, 1992). Reports of Lee et al (1981) and Haruna, *et al.* (1997) had recommended crude protein levels of 24 % and 22 to 25 % respectively for quail chicks. This was contrary to the recommended level of 28 % crude protein (NRC, 1971). The work of Olubamiwa, *et al.* (1999) also recommended metabolizable energy levels of between 2,500 and 2,800-kcal/kg diet for growing quails.

This study investigated the effect of replacing maize with guinea corn in quail chick diet.

MATERIALS AND METHODS

Birds: Three hundred and sixty (360) day old Japanese quail (*Coturnix cotumix japonica*) chicks hatched at National Veterinary Research Institute, Vom Poultry farm were selected on the basis of fitness and uniformity and bodyweight. They were housed in pens in a standard poultry brooding house and spaced 75 sq cm per bird as recommended (NVRI, 1996). Each pen housed 30 unsexed quail chicks. In all there were 12 experimental pens each fitted with 100-watt electric bulbs. Two kerosene stoves (modernized) heated the entire room. Cardboard sheets designed to keep the chicks from straying away from the heat source were put in each pen. These measures were to achieve the desired brooding conditions. All chicks were weighed together in groups before they were placed in the pens. Subsequently, 20 percent of the chicks were weighed from each pen at weekly interval (for six weeks).

Table 1: Experimental diets (%)

Ingredients		A	B	C	D
1.	**Maize**	42	27	15	-
2.	**Guinea corn**	15	27	42	
3.	**FF Soya**	10	10	10	10
4.	**Wheat offal**	20	20	20	20
5.	**Fish meal**	1	1	1	1
6.	**Soya cake**	23.8	23.8	23.8	23.8
7.	**Bone meal**	2.0	2.0	2.0	2.0
8.	**Limestone**	0.5	0.5	0.5	0.5
9.	**Common salt**	0.25	0.25	0.25	0.25
10.	**Premix**	0.25	0.25	0.25	0.25
11.	**Methionine**	0.10	0.10	0.10	0.10
12.	**Lysine**	0.10	0.10	0.10	0.10
		100	100	100	100
Proximate Composition					
	CP	21.86	22.16	22.40	22.70
	ME	2750	2730	2714	2695 (Kcal/kg)
	Ca	1.07	1.51	1.51	1.09
	P	0.63	0.67	0.70	0.72
Feed cost/100 kg		3327.75	3252.75	3192.75	3117.75
Analysed Composition					
	CP	22.20	22.15	22.30	22.50
	Ca	1.11	1.21	1.4	1.15
	P	0.61	0.64	0.67	0.69

Table 2: Effect of different guinea corn levels on mean feed consumption, weight gain, and feed efficiency of quail chicks at 6 weeks of age

	A	B	C	D	SEM
Feed Consumption	382.6	383.16	365.66	373.84	± 14.19
Weight gain	128.52	140.43	20.52	129.97	± 4.62
Feed/gain ratio	3.38	3.14	3.38	4.84	± 1.43
Feed cost (₦/kg)	33.28	32.53	31.93	31.18	..
Initial weight (g/bird)	9.03	8.78	9.03	8.93	..
Final weight (g/bird)	137.56	149.11	130.89	138.89	..
Cost/kg gain (₦)	97.87	94.23	104.94	134.81	±24.47

Three groups each were randomly allocated the experimental feeds (B, C and D) while control group was fed with feed containing no guinea corn (0 level). Feed and water were given *ad. libitum*.

Guinea Corn: 100 kg was obtained from the open market in Vom, Plateau State and was verified to be in good condition, free from weevils.

Experimental Diets: Four experimental diets were formulated to contain graded levels of guinea corn (0, 15, 27 and 42) at the expense of maize. The diets represented by A, B, C, and D respectively were iso-nitrogenous containing 22 % crude protein. The energy levels of the diets ranged between 2700 to 2750 kcal/kg metabolizable energy. All experimental diets were analysed for proximate chemical compositions (Table 1) (AOAC, 1970).

Data Collection: The mean weekly body weight and feed consumption of birds were recorded throughout the experimental period. From the mean body weights and feed intake, feed conversion ratio was calculated. Feed cost /kg diet was calculated using the prevailing market price of feed ingredients around Jos. Data collected were subjected to two way Analysis of variance (ANOVA) (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Data on feed consumption, weight gain and feed/ weight gain ratio are shown in Tables 2. All the groups on the different treatments started to lay by the 6th week of life which confirms the report of Martins (1987). Even though there were numerical differences between diets in terms of the different parameters measured, they were not significantly different ($P > 0.05$). There were numerical differences in feed intake between treatment diets but the differences were not significant even though the energy levels were slightly decreasing across the diets from diet A. This may be attributed to the observed ability of quail to adjust feed intake over a wide range of dietary energy content (Olubamiwa, *et el.*, 1999). Even though there were seeming differences in weight gain of quail chicks (Table 2), the differences were not significant. The energy

contents of the diets decreased from 2,750 (diet A) to 2,695 (diet D) and apparently did not affect weight gain of quail chicks. Weber and Reid (1967) had reported that quail weight gain on 1760- 2400 kcal/kg ME diets was not significantly altered. Feed conversion efficiency of quail (table 2) did not differ significantly between treatments, though numerically it was highest for diet D and lowest for diet B. It is interesting that quail chicks did not register depressed weight gain, feed consumption or feed conversion even at 42 % guinea corn inclusion in the diet. The lack of depressive effect of the treatment diets on the productive parameters agrees with the report of Spiridon, *et al.* (1979). The tolerance to increasing guinea corn in the diets may be due to the ability of quails to adjust their eating habits. The feed conversion rate for quail was poor when compared to reports for chickens (Sobamiwa and Longe, 1998). This generally poor feed conversion had also been reported by Weber and Reid (1967) and Haruna, *et al.* (1997). This may be due to feed wastage characteristic of quail birds. In terms of feed cost/kg diet, diet D was the cheapest (Table 2). Feed cost/ kg weight gain was numerically lower for diet D than for other diets and compared favourably with those reported by Olubamiwa, *et al.* (1999). It is important to investigate the upper limit of guinea corn for quail chicks.

ACKNOWLEDGEMENT

The authors are grateful to the Director National Veterinary Research Institute, Vom for creating an enabling environment and for permission to publish this paper. We are also grateful to God for his grace.

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