

## **Effect of *Lablab purpureus* Seed Meal fed at Grower State on Sexual Maturity and Subsequent Laying Performance of Shika Brown Layers.**

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**Target Audience:** Farmers, Feed millers, Animal Scientist

### **Abstract**

*A study was conducted to find the effect of the inclusion of lablab seed meal (LSM) in the diets of Shika brown growers on their sexual maturity and subsequent laying performance. Two hundred and thirty four (234) 20 weeks old point of lay pullets previously fed diets containing groundnut cake (GNC), full fat soya (FFS) and lablab seed meal (LSM), as the major sources of plant proteins, were raised on a common diet. Each treatment group had three replicates of 26 birds. The feeding trial lasted for 20 weeks during which records were kept on body weight changes, egg production, egg weight and egg quality parameters. Results showed that pullets previously fed on LSM had similar performance in terms of age at first egg, 5%, 50% and peak production and weight of eggs. Except for body weight changes, for which pullets reared on FFS gained significantly ( $P < 0.05$ ) more weight, other performance characteristics and egg quality parameters did not differ significantly between treatment groups. It was however less expensive to rear growers on LSM. It could be concluded that lablab seed meal could be used as a source of plant protein in the diets of Shika brown growers without compromising their subsequent laying performance.*

**Keywords:** *Lablab*, Sexual Maturity, Laying Performance, Shika Brown Layers.

### **Description of Problem**

The grower stage of pullets is characterized by high feed intake and fast growth rate up to the twentieth week of age when the birds are expected to come lay. Few researchers have used lablab seed meal in the diets of pullets. Ogundipe et al. (1) reported higher weight in pullets fed lablab seed meal at 50% level. Various methods of processing that reduce antinutritional factor levels in lablab seeds to levels that

are well tolerated by pullets have been reported (2). Similarly, (3) reported that soaking lablab seeds in water for at least 10hrs followed by 30mins of boiling completely destroyed trypsin and amylase inhibitor activities, and eliminated cyanide production.

When egg production reaches 5%, the grower diet is withdrawn and a layer diet introduced so as to meet the nutrient requirement for egg laying. Dietary energy levels between 2550 and 2800kcal

Me/kg and Crude protein of 15-19% have been recommended by various researchers for chicken layer diets 19% (4) 16% (5) while (6) and (7) reported that 15% is the minimum level of inclusion of crude protein in the diet of layers.

The impact of the nutrients provided during the grower stage is relevant to initial laying performance of birds (8). This study proposes to feed a common diet to the pullets previously fed various diets containing groundnut cake (GNC), full fat soya (FFS) or lablab seed meal (LSM) at grower stage, in order to compare the impact of the grower diets on sexual maturity and subsequent laying performance.

#### **Materials and Method**

The trial commenced at the 21<sup>st</sup> week of age of *Shika Brown* pullets at the Poultry Production Unit of the Research Farm, Department of Animal Science, Usmanu Danfodiyo University, situated at the veterinary center in Sokoto metropolis. A common layer diet (Table 2) was formulated and fed to the pullets, that were previously raised on three different diets containing GNC, FFS or LSM as major plant protein source (Table 1) in order to compare their performance. The birds were maintained in the replications to which they were allotted to during the grower study. Each of the three treatment groups had 78 birds, in three replicates (26 birds per replicate). Parameters recorded during the trial included feed intake, weight gain, egg production, and

age at 5%, 50 % and peak production levels, egg weight, internal egg quality indices as well as mortality. The trial lasted for 20 weeks.

#### ***Egg quality assessment***

At between 25 and 40 weeks of age, 5 egg samples were collected once every week from each replicate for egg quality assessment. The eggs were weighed and broken for the determination of shell weight, shell thickness, yolk index and albumin height. Yolk height, albumin height and yolk diameter were measured using a vanier caliper and values obtained were used in calculating Haugh unit and yolk index using the formula  $HU = 100 \log (H7.5 - 1.7W^{0.37})$  Where: Hu is Haugh Unit, H is albumin height(mm) and W is weight of egg(g). Yolk index was calculated using the formula:

$$\text{Yolk Index (YI)} = \frac{\text{Yolk height (YH)}}{\text{Yolk diameter (YD)}}$$

according to (9) method.

Weight of egg shell was measured using a sensitive electronic balance, while the thickness of egg shell was measured by the use of micrometer screw gauge.

#### ***Data analysis***

Data collected were subjected to analysis of variance in a completely randomized design and means were compared by least significant difference (LSD) using the general linear model programme of the SPSS statistical package (10).

**Table 1. Gross and chemical composition of diets fed at the grower stage**

Ingredients (%)	Diet 1 (GNC)	Diet 2 (FFS)	Diet 3 (LSM)
Maize	43.00	39.00	39.30
GNC	12.00	0.00	0.00
FFS	0.00	14.00	0.00
LSM	0.00	0.00	13.50
Wheat offal	12.00	11.50	9.60
Rice bran	23.00	24.00	24.00
Blood meal	1.00	1.00	4.50
Limestone	4.00	5.00	4.10
Bone meal	4.00	4.50	4.00
Vit./ min. Premix*	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Methionine	0.25	0.25	0.25
Lysine	0.25	0.25	0.25
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Calcul. Chem.. comp</b>			
ME (kcal/kg)	2704	2703	2708.2
Crude Protein (%)	15.40	15.40	15.40
Crude Fibre (%)	5.40	5.50	5.30
Ether Extract (%)	5.80	7.50	5.30
Calcium (%)	2.90	3.50	3.00
Phosphorus (%)	0.80	0.90	1.10
Methionine (%)	0.50	0.50	0.50
Lysine (%)	0.90	1.00	1.30

\*Vitamin A, 1000 IU; Vitamin D, 3000 IU; Vitamin E, 8.0 IU; Vitamin K, 2.0mg; Vitamin B1, 2.0mg; Vitamin B6, 1.2mg; Vitamin B12, 0.12mg; niacin, 1.0mg; Pantothenic acid, 7.0mg; Mg, 1000mg; Cu, 8.0mg; Co, 0.45mg and Se, 0.1mg per kg of diet.

## Results and Discussion

### *Impact of the grower diet on sexual maturity*

The impact of grower diets on sexual maturity of *Shika Brown* pullets is shown in Table 3. There were no significant differences between treatments for any of the parameters, even though live weight

at point of lay was higher for birds grown on the FFS and LSM at grower stage, as compared to those grown on GNC. Peak production did not reach the conventional 70% or above, as expected (6). Peak production of 70 and 75.2% were recorded in two separate experiments conducted in the same location (11, 12).

**Table 2. Gross composition of the common diet fed from point of lay**

Ingredient	Level (%)
Maize	46.50
GNC	18
Rice bran	20.50
Blood meal	2.0
Limestone	7.5
Bone meal	4.5
Vit./Min. Premix*	0.25
Salt	0.25
Methionine	0.25
Lysine	0.25
<b>Total</b>	<b>100</b>
<b>Calculated chemical composition</b>	
ME (kcal/kg)	2715
Crude protein (%)	16.90
Crude fibre (%)	4.4
Ether extract (%)	5.5
Calcium (%)	4.3
Available phosphorus (%)	0.90
Methionine (%)	0.50
Lysine (%)	1.00

\*Vitamin A, 1000 IU; Vitamin D, 3000 IU; Vitamin E, 8.0 IU; Vitamin K, 2.0mg; Vitamin B1, 2.0mg; Vitamin B6, 1.2mg; Vitamin B12, 0.12mg; niacin, 1.0mg; Pantothenic acid, 7.0mg; Mg, 1000mg; Cu, 8.0mg; Co, 0.45mg and Se, 0.1mg per kg of diet.

**Table 3. Impact of grower diets on sexual maturity of pullets**

Parameter	Diet 1 (GNC)	Diet 2 (FFS)	DIET 3 (LSM)	SEM ( $\pm$ )
Body wt. at point of lay	1428.46	1569.92	1502.70	49.37
Weight of first egg (g)	37.33	41.33	40.00	3.67
Age at first egg (weeks)	20.19	21.00	20.85	0.63
Age at 5% prod. (weeks)	22.29	22.05	22.00	0.15
Age at 50% prod. (weeks)	31.00	28.67	29.33	1.93
Age at peak Prod. (days)	266.00	233.33	268.33	17.41
Average wt of eggs(g)	57.19	58.08	57.79	2.86
Peak Prod. Level (%)	58.99	62.08	66.17	2.49

The low level of productivity could be attributed, in part, to the vice habit of egg

eating that was persistent during the study. Only the peak production of birds

fed LSM was comparable to that obtained from Lohman strain of layers (67.2%) but other values obtained in this study were less than 72.2 to 82% obtained from other strains of layers (13).

**Performance characteristics**

The impact of the grower diets on the subsequent performance characteristics of pullets is shown in Table 4. Except for body weight changes, parameters did not differ significantly between the treatments. Birds fed FFS had higher body weight gain compared to those raised on GNC and LSM (P<0.05). Daily feed intake values recorded in this study (108-112 g/b) were higher than the values

(79-85g/b) reported by (14) when fish meal and poultry viscera offal meal were fed to laying pullets between 22 and 38 weeks of age. Similarly, lower feed intake values of 71-100g/b/day were reported by (15) when cocoa bean shell meal was fed to laying hens. However, daily feed intake of 116 – 121 g/b were reported by (16) in a trial in which malted sorghum sprouts were fed to 18 weeks old pullets for 25 weeks. The quantity of feed consumed by laying pullets is not only a function of body weight but also of the nature and composition of the diet particularly with respect to energy and fibre.

**Table 4. Performance characteristics of experimental birds**

Parameter	Diet 1 (GNC)	Diet 2 (FFS)	Diet 3 (LSM)	SEM (±)
Daily feed intake (g/bird)	109.87	111.99	107.99	1.63
Initial body weight (g/bird)	1345.80	1458.80	1419.37	50.23
Final body weight (g/bird)	1428.46	1569.92	1502.70	49.37
Body weight gain (g/bird)	82.67 <sup>b</sup>	110.85 <sup>a</sup>	83.33 <sup>b</sup>	5.71
FCR (kg/doz. egg)	3.55	3.20	3.38	1.90
Hen day egg prod. (%)	37.91	42.39	38.38	1.88
Cost of feed consumed (₦/b)	405.49	411.87	395.65	

a, b, c: Means in the same row carrying different superscripts are significantly different (p<0.05?)

Lack of significant difference (P>0.05) in performance characteristics of the pullets signifies that raising pullets on diets containing LSM could support egg production levels similar to those fed GNC and FFS during early laying stage. Age at peak production of pullets fed FFS was similar to 236 days and 238 days reported for Isa brown and Hyepco

strains of commercial layers fed diets containing soya bean meal (Majaro, 1999). In that same experiment, another strain, Lohman that was fed the same diet reached peak production at 329 days. The strains Nera Hyepco, Lohman Harco and Harco, reach peak production at shorter periods of 168, 170 and 212 days, respectively (13). This demonstrates

strain differences in age at peak production.

**Egg quality assessment**

Observations on egg quality characteristics are shown in Table 5. Egg weight, egg mass, shell weight, shell thickness, yolk index, albumen height and Haugh unit were not affected by treatment. Thus the different diets fed at grower stage did not affect egg quality.

Egg shell weights recorded in this study were higher than the values reported by (15) and (16). Shell thickness were however similar to values reported by (16). Adequate shell thickness prevents cracks and spoilage of eggs during handling and storage. Yolk index, an indication of the volume of yolk contained in the egg were lower than the values (4.3-4.6) reported by (17) and (12).

**Table 5. Impact of grower diet on egg quality**

Parameter	Diet 1 (GNC)	Diet 2 (FFS)	Diet 3 (LSM)	SEM (±)
Average egg wt. (g)	54.53	54.82	55.57	1.29
Egg mass (g/bird/day)	20.89	24.14	21.69	1.20
Shell wt. (g)	12.29	12.84	12.43	0.33
Shell thickness (mm)	0.27	0.28	0.30	0.04
Yolk index	3.33	3.41	3.49	0.15
Albumen height (mm)	4.23	4.61	4.74	0.36
Haugh unit (%)	85.42	85.67	86.19	0.95

This is good for egg consumers who do not like to consume much cholesterol, since most of the cholesterol in eggs are found in the yolk.

Lablab seed meal therefore, could be fed to growers in place of full fat soya or groundnut cake.

**Conclusion and Application**

It can be concluded that

- 1) The grower diets earlier fed to the pullets did not significantly affect sexual maturity and early laying parameters.
- 2) Production parameters for birds raised on the LSM diet were generally intermediate between those raised on FFS and GNC diets.
- 3) Raising pullets on diets containing LSM did not negatively affected the subsequent laying performance.

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