SHORT-TERM EGG PRODUCTION AND PHYSICAL EGG CHARACTERISTICS IN A FLOCK OF HYBRID HUBBARD LAYERS

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ABSTRACT

Short-term egg production and characteristics were studied using a total of 200 Hubbard hybrid layers under the battery cage system for four months. Birds were fed on battery layer mash (4080 kcal/kg M.E., 15.31% crude protein. Age at first egg (AFE) was 146 days. The highest hen-day egg production was 60.84% obtained at the 4th week in lay. Average hen-day and hen-housed production percentages for the study period stood at 50.08 and 48.05 respectively. Average egg weight was $53.24g \pm 3.07$ (Standard) with mean egg-shell thickness of $0.48mm \pm 0.02$. Average daily feed intake was $153.05g \pm 1.82$ per bird giving an average feed consumption of 3.7kg per dozen eggs. Mean albumen, yolk and shell weights were 33.81g, 13.52g and 6.06g respectively.

INTRODUCTION

The Poultry Industry in Nigeria has witnessed renewed interest with a shift in emphasis from small scale production to large scale enterprises. There is therefore, the need for breed selection in terms of performance of a laying bird is determined to a large extent by its genetic make up (Oluyemi and Roberts 1979; Nesheim *et al*, 1979).

Egg number and size are major traits of economic interest in commercial egg production. According to Akinokun and Dettmers (1977), these traits are heritable and vary with strain of birds. Egg size in the poultry business determines to a large extent the price received in any market and the standard range should be between 53 and 63g (Oluyemi and Roberts, 1979). Mean percentage hen-day egg production reported in Nigeria for most exotic and hybrid layers range between 48.05 and 53.30g (Omoje, 1983).

The objective of this study was to obtain data on egg production and physical egg characteristic

on Hubbard hybrid layers under the humid environment of Calabar.

MATERIALS AND METHOD

A total of 200 Hubbard hybrid day-old pullets were purchased from Agrofeeds (Nig.) Ltd., Calabar for this study. The experiment was carried out in the Faculty of Agriculture, Poultry Unit, University of Calabar. Chicks were brooded under standard conditions on deep litter with woodshavings as litter material. At 10 weeks, chicks were transferred into and managed in half-walled pens with deep litter up to 18 weeks of age. At these two stages, chicks were fed commercial chicks mash (0-9 weeks) and grower mash (10 - 18 weeks). Feeding and Water were *ad libitum*. Chicks were inoculated against Newcastle, Pullorum and Fowl typhoid. Coccidiostats were also administered in water as part of the prophylactic treatment.

At the beginning of the 19th week, pullets were moved into battery cages with two birds per cage cell measuring 30 x 37 x 45 cm each. At this stage, birds were fed on commercial layer mash; (4080 kcal/kg M.E./, 15.3% protein; calculated). From the point of lay, 146 days, enough quantity of the feeds was weighed and given to the birds each day and the left-over weighed the following morning before fresh feed was given. Average weekly feed intake values were obtained by difference. The average body weight of the flock at first egg or point of lay was obtained on the day the first egg was picked. Egg collection which spread over 170 birds from point of lay was done twice daily. From each weekly collection, twelve eggs randomly picked were weighed, using egg characteristics; yolk, albumen and shell weights and shell-thickness (measured using a micrometer screw gauge). Data on parameters were collected from the 9th to 16th week in lay

while egg production records started from point of lay.

Records were also obtained on;

(i) Daily egg production

(ii) Hen-day (%) = $\frac{\text{Total egg laid/day} \times 100}{\text{No. of birds alive}}$

(iii) Hen-house = $\frac{\text{Total egg /day} \times 100}{\text{No. of birds originally housed}}$

(iv) Laying mortality.

RESULTS AND DISCUSSION

EGG PRODUCTION

Data on egg production at 2-weekly intervals up to 16 weeks in lay are summarised in Table 1. Results showed that egg number increased up to the 4th week when the birds attained their peak production of 724 eggs. Corresponding hen-day and hen- housed average was 60.84. Cole and Garrett (1980) reported that layer breeds usually reached their peak egg production between 6 and 8 weeks of lay. However, egg production trends in chicken depend on both the breed as well as the ambient temperature and humidity. Average hen-day percentage production for the group during the period of study stood at 50.08. This value falls within the range of 48.05 -

53.30% reported for most hybrid layers in the country (Omeje, 1983).

Egg number (Table 1) recorded for Hubbard in this study seems to be low for a commercial flock. This low performance could partially be due to the breed and the high energy in the commercial ration. Clever and Washburn (1979) noted that feeding of high energy diets to chicken decreases feed conversion ratio. The 4.08 Mcal/kg M.E. level of the ration used is higher than the 3.2 Mcal/kg M.E. level recommended for layers in the tropics (NRC, 1977). High energy feeds for layers could lead to accumulation of excess fat around the reproductive tract; a factor that impedes efficient egg formation.

FEED INTAKE:

Table 1 further shows the average daily feed intake values per bird at two - weekly intervals. Feed intake values showed an increasing trend from the 2nd week up to the 12th week. Differences between two-weekly averages were not significant ($P > 0.05$). Average daily feed intake per bird during the study period was 153.05g. This figure gave an average feed consumption of 3.75kg per dozen eggs. The feed intake value is obviously high with a low conversion ratio. Obioha (1982) suggested an average daily feed intake per layer during laying of 131g. The average daily feed intake recorded in this study

TABLE 1: EGG PRODUCTION AND FEED INTAKE ($\pm$ S.E.) OF HUBBARD HYBRID LAYERS

Age in Lay (weeks)	Egg Number	Production		Average Daily Feed Intake/Bird
		Hen-day %	Hen-Housed %	
2	552	46.39	46.39	135.35 $\pm$ 3.75
4	724	60.84	60.84	143.40 $\pm$ 7.20
6	693	58.24	58.24	148.36 $\pm$ 5.51
8	588	49.41	49.70	154.06 $\pm$ 4.30
10	593	49.83	51.34	162.16 $\pm$ 6.27
12	537	45.13	50.14	165.29 $\pm$ 6.27
14	552	46.39	51.54	153.40 $\pm$ 2.85
16	538	45.21	50.56	160.93 $\pm$ 6.78

TABLE 2: EGG PHYSICAL CHARACTERISTICS OF HUBBARD HYBRID LAYERS (9th - 16th week in Lay)

Egg Parameters	Period (weeks) in Lay							
	9	10	11	12	13	14	15	16
Egg Weight (g)	56.00 ± 1.45	50.15 ± 1.02	52.36 ± 0.87	51.19 ± 0.87	55.11 ± 0.87	51.75 ± 1.49	52.44 ± 1.63	56.27 ± 0.88
Yolk Weight (g)	13.14 ± 0.25	12.86 ± 0.31	13.68 ± 0.26	14.36 ± 0.71	13.86 ± 0.29	13.73 ± 0.25	12.87 ± 0.29	.67 ± 0.31
Yolk % Egg (%)	23.46	25.64	26.13	27.70	25.15	26.53	24.54	24.29
Albumen Weight (g)	37.48 ± 1.11	31.35 ± 0.85	32.77 ± 0.66	31.52 ± 0.81	34.75 ± 0.68	33.00 ± 1.03	33.56 ± 1.26	36.01 ± 0.68
Albumen % Egg (%)	66.93	62.51	62.59	60.80	63.06	63.77	63.99	63.00
Egg Shell Weight (g)	6.58 ± 0.20	5.78 ± 0.08	5.72 ± 0.11	6.07 ± 0.70	6.22 ± 0.15	5.90 ± 0.20	5.86 ± 0.16	6.39 ± 0.14
Egg Shell % Egg (%)	11.75	11.53	10.91	11.71	11.29	11.40	11.17	11.36
Egg Shell thickness (mm)	0.47 ± 0.015	0.48 ± 0.005	0.48 ± 0.011	0.47 ± 0.01	0.48 ± 0.0007	0.46 ± 0.20	0.52 ± 0.002	0.48 ± 0.009

inspite of the high energy value of the commercial ration, tends to be at variance with the generally acvariane with the generally accepted view that energy in feed will depress intake within the tropics. (Olomu, 1979). Increased intake recorded in the study could be as the average ambient temperature (25.30c) during the period of study was low. Futhermore, during the early laying period, the birds could still be growing hence the need for increased intake to meet requirements for growth and egg production.

PHYSICAL EGG CHARACTERISTICS

Represented on Table 2 are the physical egg characteristics of Hubbard hybrid layers from 9 - 16 weeks of lay. Average egg weight was 53.24g. The value is low compared with 61.79g reported by Nwosu *et al.*(1979) for Shaver Star Cross hybrid. Singer (1976) recorded an average egg weight of 55.58g for exotic chicken and regarded this as standard. Data from this study show a fluctuating trend in the egg weight.

Reported yolk weight for the hybrid was 13.52g. This gives a percentage of 25.39 of the egg. Ayorinde (1987) obtained an average yolk weight of 17.60g. The comparatively low yolk weight could be due to differences in feed ingredients and the environment. Data revealed no defined trend between yolk weight and egg weight rather, between weeks 13 and 16, the yolk weight decreased. Olsson (1936) observed that as the egg size increases, percentage yolk decreases.

Albumen weight and percentage of egg were 33.81g and 63.50% respectively. The albumen weight compares favourably missing with 34.70g reported by Ayorinde (1987) for Shaver Star Cross. A strong relationship ($r = 0.92$) was observed between albumen and egg weights. Benoff and Renden (1983) observed a similar relationship in chicken eggs and noted that majority of variation in egg weight can be accounted for by albumen weight.

Shell weight and thickness stood at 6.06g and 0.48mm respectively. Shell weight value appears high probably due to the increased level of calcium (3.6%) in the feed. Percent shell of egg tended to remain stable or decrease with increase in laying duration. A similar observation

was made by Jull (1924) and Olsson (1936). According to Olsson (1936) increases in egg size do not necessarily result in appreciable increase in percent shell. Patil *et. al.* (1980) reported shell thickness of 0.34mm and considered the value normal for table eggs. The high thickness value reported in this study could be as thickness was measured with the membrane intact. Eggs with thick shell survive better the rigours of handling.

Table 3 summaries the performance of the birds in parameters measured. Hubbard hybrid layers under the humid environment laid their first egg at 146 days of age at an average body weight of 1205.25g. Age value falls within the reported range of 140-168 days for layers in Nigeria (Jakonda, 1977). Cole and Garrett 1980) observed that birds that come into lay early have a longer year than those that come into lay late. McNaughton *et al.* (1977) considered body

TABLE 3: SUMMARY OF PERFORMANCE ($\pm$ S.E.) OF HUBBARD HYBRID CHICKEN

TRAIT	RESULT
Age at first egg, AFE, (days)	146 $\pm$ 2.03
Average body weight at 1st egg, g	1205.25 $\pm$ 3.63
Total egg number	9150
Average hen-day production, %	50.08
Avg. daily feed intake /bird, g	153.05 $\pm$ 1.82
Average egg weight, g	53.24 $\pm$ 3.07
Average shell thickness, mm	0.48 $\pm$ 0.02
Laying mortality, %	3.63

weight of 1225g as necessary for initiation of lay in laying genotypes. A laying mortality of 3.53% was recorded during the period. This value could reflect the high level of adaptability of the hybrid to the local environment.

In conclusion, results from this study depict satisfactory performance of Hubbard hybrid layers in AFE, egg characteristics and laying mortality. Results for egg number and feed conversion ratio were comparatively low. It may be possible to obtain better performance from the stock if fed on quality feed with a lower energy level.

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