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EVALUATION OF EGG PRODUCTION PERFORMANCE OF NOILER AND ISA BROWN CHICKEN STRAINS IN SOKOTO STATE NIGERIA

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ABSTRACT
The study evaluated egg production performance of Noiler and Isa Brown layer chicken strains at the teaching and research farm of Umaru Ali Shinkafi Polytechnic, Sokoto. A total of 75 birds each of Noiler and Isa Brown chickens were sourced at point of lay and used for the study. Data on feed intake and egg production performance were recorded. The parameters measured include body weight on arrival, age at first egg, body weight at first egg, weight of first egg, egg number on hen-day basis, hen-housed egg production and feed intake. Data collected were subjected to analysis of variance. It was observed that the Noiler chicken had a significantly higher body weight on arrival, at first lay and at 32 weeks than that of Isa-Brown layer. In terms of genetic variability recorded in egg production, egg weight for Isa-Brown was higher at 1st lay, 24th week, 28th week and 32nd week and had a higher mean Hen-day and Hen-housed production than that of Noiler chicken. The Isa-Brown layer is therefore recommended to farmers for better egg productivity.

Keywords: Evaluation, Egg, Performance, Isa-Brown, Noiler

INTRODUCTION

The population of Nigeria will rapidly grow and transmute extensively in the next three decades (Wale *et al.*, 2020). The author noted that specifically, the population is projected to double to almost 400 million between 2015 and 2050. Although the agricultural sector before the advent of oil was known as the base of the Nigerian economy, it still remains an important source of livelihoods for a large part of the Nigerian population (John-Jaja *et al.*, 2016). Meanwhile, despite being dominated by smallholder farming, agricultural sector contributes about 21.2 percent to GDP, 36.5 percent to employment and 60 percent to non-fuel export value (Wale *et al.*, 2020).

The country remains a major importer of livestock products. Out of her 190 million people, 102 million are estimated to still live under the poverty line. Poultry egg consumption is expected to increase by 195% between 2015 and 2050 (Ajiboye *et al.*, 2019). Although various reports have sufficiently established the profitability of poultry (egg) production, a number of studies have equally shown that the industry is continually characterized by low production levels and that unbearable cost of feed constitute one of the highest variable costs in the poultry production process (Folorunsho *et al.*, 2016). Input such as feed have significant relationship with poultry egg output. Although the subject of economic analysis of poultry production and productivity in Nigeria has received considerable attention in literature, it is necessary to study the difference in the egg production potentials of Noiler and Isa Brown layer strains in the country considering the fact that the Noiler strain was introduced into the Nigerian Poultry industry few years back. This study is therefore designed to provide information to egg producers in the study area on the choice of layers among the two strains for better productivity.

The aim of the study is to evaluate the growth and egg production performance of Noiler and Isa Brown chicken strains in the study area. Specifically, the objectives are:

i. To ascertain the body weight of the two strains at different ages
ii. To determine the difference in egg weight of the two strains throughout the period of production
iii. To find out the feed intake and convertion efficiency of the two strains

MATERIALS AND METHODS

The study area

The study was conducted in Sokoto State of Nigeria. The State, which consists of 23 Local Government Areas (LGAs), has its capital and seat of government located in Sokoto. The State is located in the North-west geographical zone of Nigeria lying between latitudes 4^0-$6^0 40'$ N and longitudes $11^0 30'$-$13^0 50'$ E. It covers a land area of 28,232.37 square kilometers (SOSGD, 2013). The site of the study is the teaching and research farm of Umaru Ali Shinkafi Polytechnic, Sokoto. The farm has a poultry unit which is a large hall constructed for deep litter production with two sections. One section was used for production of Noilers and the other section for Isa brown chickens.

Preparation of the Poultry House

The two sections of the poultry house had fourteen pens with each section having 75 birds of Noilers and Isa Brown, respectively. Wooden partitions with wire mesh was used to separate the pens in each section. The wire mesh is meant to permit good ventilation and prevent predators from entering into the pens. The poultry house and the environment were kept in good sanitary condition.

Management of the Experimental Birds

A total of one hundred and fifty (150) chickens were used for the experiment and consisting of seventy five (75) birds in each of the strains: Noilers and Isa Brown. Each group of 75 birds was further divided into five replicates of 15 birds per replicate. The pullets were eighteen weeks of age on arrival.

Data Collection

Data was collected on the body weight of the birds at arrival, age at first egg, weight of the first egg, bodyweight of the birds at first egg, hen-day egg number, final weight gain, average feed intake, feed efficiency, and egg weight at different periods.

i. **Body weight**: The birds were weighed individually on the day of arrival, and at weekly intervals thereafter with a weighing scale.
ii. **Age at first egg**: This was taken, on replicate basis, as the age at which the birds produced their first egg.
iii. **Bodyweight at first egg**: The birds in each replicate were weighed at their first egg to obtain their bodyweight at first egg.
iv. **Weight of first egg**: An Optra top-loading digital weighing balance was used to determine the weight of the first egg up to the nearest 0.1g.
v. **Egg number on hen-day basis**: This was taken as the mean daily egg production expressed as a percentage of the total number of hens housed at the beginning of laying period.
vi. **Hen-Housed egg production:** This was taken as the mean daily egg production expressed as a percentage of the total number of birds at the final stage.

vii. **Feed intake**: The birds were supplied a weighed quantity of feed daily. The left over feed was always collected at the end of the day, weighed and subtracted from the weight of the feed provided initially to obtain the feed intake.

Data Analysis

The data was subjected to one-way analysis of variance in a completely randomized design, and significantly different means were separated using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

The Table below shows the body weights of the chickens on arrival, at first lay, at 32 weeks and their age at first egg given in days.

Table 1: Mean ± Standard deviation values of the body weight (kg) and age at first egg of the two strains of layers

Period of weighing	**Body weight in kg**	
	Isa-Brown	**Noiler**
On arrival (18 weeks)	1.36 ± 0.03^{a}	1.46 ± 0.02^{b}
First lay	1.51 ± 0.02^{a}	2.10 ± 0.03^{b}
32 weeks	1.84 ± 0.03^{a}	2.21 ± 0.01^{b}
Age at first egg (days)	148 ± 1.27^{a}	156 ± 2.00^{b}

a,b: Means within row are significantly (P<0.05) different

The Noiler strain on arrival at 18 weeks of age had significantly higher mean body weight (1.46kg), a higher mean body weight at first lay (2.10 kg) and at 32 weeks of age (2.21kg) than the Isa-Brown strain. However, the Isa-Brown strain showed a significantly lower mean age at first egg (148 days) than the Noiler chicken. The mean age at first egg obtained in this study for Isa-Brown is lower than what was obtained by Izundu *et al.*, (2019) who got 169 days as age at first egg. Also, the age at first egg for Noilers in this study is similar to that of Dogara *et al.*, (2021). similarly, the mean body weight at first egg observed in the present study is close to the value obtained by Tumova *et al.*, (2017), for Noiler chickens.

Table 2 gives the values of standard deviation of the two starains in terms of egg weight at first lay and at different periods.

Table 2: Mean ± Standard deviation values (g) of the egg weight at first lay and egg weight at different periods by the two strains

Period	**Egg weight in (g)**	
	Isa-Brown	**Noiler**
1st lay	41.26 ± 0.52^{a}	38.91 ± 0.47^{b}
24th week	51.72 ± 0.38^{a}	49.37 ± 0.50^{b}
28th week	53.68 ± 0.44^{a}	51.16 ± 0.33^{b}
32nd week	55.27 ± 0.01^{a}	53.55 ± 0.28^{b}

a,b: Means with different superscripts within rows are significantly (P<0.05) different

Egg weight at first lay was significantly (P<0.05) higher in Isa-Brown (41.26g) than in Noiler (38.91). Similarly, Isa-Brown eggs were significantly (P<0.05) heavier that that of Noiler chicken at the 24th, 28th and 36th weeks of age. The Isa-Brown layers commenced laying at an earlier age and produced higher percentage of eggs than Noilers. This result is in agreement with Roushdy *et al.*, (2008) who indicated that the Isa-Brown strain commenced

egg laying at an earlier age than that of two other breeds. Data of egg weight for both strains are shown in Table 2. The Isa-Brown eggs were significantly heavier than Noiler eggs. Our results agree with the findings of Scott and Silversides (2000) who found that eggs from Isa-Brown hens were heavier than those from Noilers. The same results were found by Singh *et al.*, (2009) and Riczu *et al.*, (2004) also found that eggs from Isa-Brown hens were heavier than other eggs. However, no significant differences between the two strains for egg number up to 32 weeks from the onset of egg production. These results were in consonance with those obtained by Badawe (2006) who found that no significant differences between Isa-Brown and other starins in terms of egg number.

Table 3 below gives the mean differences in hen-day and hen-housed egg production of Isa-Brown and Noiler chickens.

Table 3: Variations in mean hen-day and hen-housed egg production with the two strains

Weekly	**Percentage egg production**	
	Isa-Brown	**Noiler**
Hen-day egg production (%)	76.96±1.08[a]	64.23±2.07[b]
Hen-Housed egg production (%)	72.26±2.18[a]	69.31±1.60[b]

a,b: Means within rows with the same superscript are not significantly (P<0.05) different

For the Isa-Brown chicken, there was a significantly (P<0.05) higher mean hen-day egg production (76.96±1.08) than that of Noiler chicken (64.23±2.07). The results revealed the same trend in the hen-housed egg production in which the Isa-Brown strain recorded a significantly higher mean hen-housed egg production, depicting that the Isa-Brown strain is the most efficient egg producer compared to the Noiler chicken. Furthermore, the Isa-Brown laid its first egg earlier at the 21st week, attained its peak production at 31st week and continued steadily thereafter. On the other hand, the Noiler laid its first egg at the 22nd week, peaked at 33rd week and the production remained constant thereafter. The mean Hen-day production (HDP) and Hen-housed production (HHP) for Isa-Brown in this study are higher than that of Izundu *et al.*, (2019) who got HDP of 28.94 and HHP of 26.56.

Table 4 is the tabulation of the weekly feed intake of the two strains of chickens

Table 4: Mean and Standard deviation mean value of the weekly feed intake (g/bird/week) of the two strains of layer chickens

Weeks	Weekly feed intake (g/bird/week)	
	Isa-Brown	Noiler
18	96.43±6.26[a]	100.20±0.92[b]
19	98.04±1,78[b]	112.13±2.60[a]
20	99.26±0.11[a]	112.26±0.10[b]
21	99.87±2.13[a]	114.81±0.62[b]
22	100.66±0.68[a]	115.16±1.96[a]
23	101.09±0.09[a]	120.01±0.33[b]
24	101.88±1.17[a]	122.23±0.64[b]
25	115.22±0.66	124.66±1.83[b]
26	120.18±1.18[a]	124.12±0.92[a]
27	121.02±0.16[a]	126.61±1.26[b]
28	124.81±0.23[a]	130.24±0.11[b]
29	124.12±1.96[a]	131.77±0.06[b]
30	125.51±0.15[a]	131.91±1.17[b]
31	125.12±1.81[b]	135.22±0.55[a]
32	127.22±0.85[a]	137.15±1.73[b]
Overall	112.03±1.26	122.56±0.99

a,b: Means with different superscripts within the same row are significantly (P<0,05) different

Results in Table 4 revealed the weekly feed intake of the two layer strains from 18 weeks to 32 weeks of age. Feed intake of the two starains exhibited a similar trend with their body weights. The Noiler, which had a higher mean body weight than the Isa-Brown consumed significantly (P<0.05) higher quantity of feed throghout the 32 week period. Mosobolaje and Adedoyin (2021) pointed that the mean feed intake per day of layer strains confirmed the assertion of Rose (1997) that birds eat 5% of their body weight per day. However, this finding disagreed with Leeson and Bamidele *et al.*, (2020) who suggested that energy intake of the growing pullet is the limiting factor to growth rate, since regardless of diet specification, pullets seem to consume similar quantities of energy. Thus genetic make-up is another factor responsible for feed intake of growing pullets. The feed conversion ratio of Isa brown and Nera black were higher to that of Noiler despite the higher feed consumption of Noiler (Mosobolaje and Adedoyin, 2021). Noiler pullet strain was the most efficient in feed conversion to body weight, a quality attributed to heavy breed of domestic fowl (Oluyemi and Robert, 2000).

CONCLUSION AND RECOMMENDATION

From the results obtained in this study, body weight on arrival, body weight at first lay and body weight at 32 weeks for Noiler layer is significantly higher than that of Isa-Brown layer and that the Isa-Brown layer begins egg production earlier than the Noiler. In terms of genetic variability recorded in egg production, egg weight for Isa-Brown is higher at 1st lay, 24th week, 28th week and 32nd week and had a higher mean Hen-day and Hen-housed production than that of Noiler chicken. For maximum production of high quality eggs in terms of egg number and egg weight, the Isa-Brown layer is therefore recommended to farmers.

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