
EVALUATION OF GROWTH PERFORMANCE AND SURVIVABILITY OF TWO STRAINS OF LAYER CHICKEN AT STARTER PHASE OF PRODUCTION

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ABSTRACT

The Nigeria poultry industry has over the years witnessed the introduction of different strains of layer chicken. The growth and productivity of these strains largely depend on the nutritional and climatic variables as well as genetic make-up of these strains. This implies that chicken producers should consider strains with high genetic potential for better production under their climatic conditions. Therefore, a study was conducted to evaluate growth performance and survivability of two strains of layer chicken at starter phase of production. A total of 120 birds (60 each of Isa brown and Nera black) were used. The birds were divided into two treatment groups according to strain and each group was randomly replicated four times with 15 birds per replicate and was raised for eight weeks in deep litter system. Parameters measured were body weight, daily weight gain, total weight gain, daily feed intake, total feed intake and feed conversion ratio. Data were subjected to Independent T-test of SPSS. Nera Black had the most superior body weight, weight gain and feed conversion ratio ($1271.04 \pm 15.30\text{g}$, 1236.54 ± 6.57 and 2.44 ± 0.06) respectively. The result also indicated that strain had significant ($p < 0.05$) influence on survivability, with Nera Black (91.1%) being superior to Isa Brown (88.80%) strains. Based on the results of this study, it was concluded that Nera black layers had better growth performance and survivability than the Isa Brown layers at starter phase. It was therefore, recommended that Nera black should be used since it offers a better growth performance at the early phase of production which may eventually leads to better lay during the laying phase.

Keywords: Growth performance, survivability, layer chicken, strains, starter phase

INTRODUCTION

The greatest potential for poultry production remains in the tropics, where per capita egg and meat consumption levels are increasing due to increase in population (Aggrey *et al.*, 2003). In Poultry production, growth performance, survivability and fertility need to be improved upon so as to get more chicks and invariably eggs for production (Ewuola *et al.*, 2020). The Nigeria poultry industry has over the years witnessed the introduction of different strains (Essien and Adeyemi, 1999). The growth potentials of these strains largely depend on the nutritional and climatic variables as well as genetic make-up of these strains. This implies that chicken producers should consider stocks with high genetic potential for better production under their climatic conditions. Researchers has intensified effort recently to study the genetic, physiological, nutritional and growth performance of different strains (Essien and Adeyemi, 1999; Sam *et al.*, 2010; Essien and Sam 2018; Sam and Okon 2022).

Growth is the single most important phenotype for evaluating the productivity of livestock species Aboul-Seoud, 2008). It helps in evaluating the efficiency of management and optimum managerial practices that will sustain gain. (Aboul-Seoud, 2008). Several factors affect the growth performance of chickens, and these include strain, sex, nutrition, housing and stocking rate. Survivability refers to the rate at which an animal survives and reproduce within a define environment (Barker, 2009). The rate of survival of chicken could be dependent on conditions like feeding, disease condition, physiological stress and response to other environmental conditions. In order to maximize profit, farmers should consider improved strains that can mature early (Shim *et al.* 2012). Therefore, the aim of this study was to evaluate growth performance and survivability of two strains of layer chicken raised in the tropics.

MATERIALS AND METHODS

Experimental Site

The study was carried out at the Teaching and Research Farm, Department of Animal Science, Faculty of Agriculture, Akwa Ibom State University Obio Akpa. Obio Akpa is located between latitudes

4°30'N and 5°00'N and longitudes 70°30'E and 80°00'E. The area is characterized with an annual rainfall ranging from 3500 – 5000 mm and average monthly temperature of 25°C, and relative humidity between 60 – 90 %. It is in the tropical rainforest zone of Nigeria. The people in the study areas depend on livestock and crop production (AKSG, 2022).

Experimental Birds and Management:

A total of 120 (60 each of Isa brown and Nera black) 1-day-old pullets were purchased from a reputable vendor at Uyo, Akwa Ibom State Nigeria. The chicks were weighed and identified using wing tags and thereafter randomly distributed into two treatment groups according to strain and each strain was further replicated into four groups with 15 birds per group.

The chicks were brooded for two weeks in the restricted brooding section of the Teaching and Research Farm of Department of Animal Science, Akwa Ibom State University. Electric bulb and charcoal stoves were used as source of heat. After brooding chicks were transferred to the rearing house where collection of data for starter phase lasted for eight weeks. All necessary routine management practices and the recommended vaccination schedule were strictly observed throughout the period of the study.

They were raised in deep litter pens according to their strains and given the same management procedure and fed the same diet throughout the eight weeks experimental period. Chick starter mash containing 20% crude protein and 2970ME were given to the birds. Feed and water were supplied *ad libitum* throughout the experimental period.

Data Collection:

The following growth Parameters (initial body weight, final body weight, feed intake and feed conversion ratio) were measured as follows:

Body Weight: The birds were weighed at the beginning of the experiment and weekly thereafter using Camry weighing balance.

Feed intake (FI) was obtained as the difference between the quantity feed offered the previous day and the left over.

The daily weight gain (WG) was calculated by dividing the total weight gain by the number of days the experiment lasted.

Feed conversion ratio (FCR) was calculated by dividing the feed intake by weight gain.

Survivability Parameters measured:

Data for survivability was obtained for the two strains from day-old to 8 weeks of age. The incidence of death (mortality) was recorded per bird per day throughout the experimental period.

$$\text{Survival (\%)} = \text{mortality} \div \text{Total number of birds} \times 100$$

Statistical Analysis:

Data obtained was subjected to independent T-test of SPSS (2007). The statistical model used was as follows:

$$Y_{ijk} = \mu + S_i + e_{ijk}$$

Where;

Y_{ijk} = Observation on each layer

μ = overall mean

S_i = Effect of the i^{th} strain (i = Isa brown and Nera black)

e_{ijk} = Random error

RESULTS AND DISCUSSION

The results on the growth performance of the two strains of layer chicken at starter phase (0-56days) are presented in Table 1. Results indicated that the initial body weight, final body weight, total weight gain, daily weight gain, total feed intake, daily feed intake and feed conversion ratio were $34.09 \pm 0.34\text{g}$, $1197.05 \pm 11.95\text{g}$, $1162.96 \pm 11.81\text{g}$, $20.76 \pm 0.13\text{g}$, $3100.86 \pm 1.39\text{g}$, $55.35 \pm 0.01\text{g}$ and 2.67 ± 0.11 respectively for Isa brown whereas for Nera black it was $34.50 \pm 0.24\text{g}$, 1271.04 ± 15.35 , 1236.54 ± 6.57 , 22.08 ± 0.17 , 3020.07 ± 6.51 , 53.92 ± 0.07 and 2.44 ± 0.06 , respectively. The Nera black strain significantly ($p < 0.05$) recorded higher values in final body weight, weight gain and a better feed conversion ratio than Isa brown. The weight gain recorded by the Nera black strain was also significantly ($p < 0.05$) higher than Isa brown strain, despite the fact that the two strains consumed similar quantity of feed. The differences observed in body weight and weight gain in Isa brown and Nera black strains of chicken in this study could be attributed to difference in genetic makeup and of

the two strains. This result is in line with the work of Mohammed *et al.*, (2005) also observed significant differences between indigenous and exotic crosses of chicken. Variation in body weight due strain of chicken is an indication that selection could influence body weight in chicken (Varkoohi *et al.*, 2010). Feed intake was similar ($p>0.05$) in the two strains during the starter phase of the two strains production. However, there was a significant ($p<0.05$) difference in Feed conversion ratio between the two strains. The Nera black strain had a better feed conversion ratio than Isa brown. This finding is in agreement with those of Sam and Okon (2022); Ajaji and Ejiofor (2009) who indicated significant difference in FCR at different ages of the birds they studied.

The results of work disagreed with the reports of Amao *et al.* (2009) who observed no significant differences ($p>0.05$) in feed conversion of Anak and Marshall strains of birds. Feed conversion ratio is one of the major criteria used in defining the performance of domestic animals (Sam *et al.*, 2010). Skinner-Noble and Teeter (2003) described feed efficiency as feed intake per weight gain which measures how efficiently the feed is being utilized, and this is obviously of economic importance because feed represent about 75 % of the total cost of production in poultry (Amao *et al.*, 2009). Sam *et al.* (2010) indicated that the lower the feed conversion ratio, the better the performance of birds. The pattern of variation between strains on growth traits in this present study reveals genetic differences which have been supported by findings of Amao *et al.* (2009).

The overall percentage survivability showed that Nera black layers had higher (93.3%) over Isa Brown with 91.1.% at the end of 8 weeks of age. The variation in survival between strains at the early growth phase could be attributed to genetic makeup of the birds (Adebambo *et al.*, 1999). The high survival rates in Nera black birds suggest that they adapt well in the tropics at this growth phase which could be attributed to the utilization of the good adaptive features of Nera black strain.

Table 1: Growth performance of two Strains of layer chicken at starter phase of production

Traits	Strain	
	Isa brown	Nera black
Initial body weight(g)	34.09 ± 0.34	34.50 ± 0.24
Final body weight(g)	1197.05 ± 11.95	1271.04 ± 15.30
Weight gain(g)	1162.96 ± 11.81	1236.54 ± 6.57
Daily weight gain(g)	20.76 ± 0.13	22.08 ± 0.17
Total feed intake(g)	3100.86 ± 1.39	3020.07 ± 6.57
Daily feed intake(g)	55.35 ± 0.001	53.92 ± 0.07
Feed conversion ratio	2.67 ± 0.11	2.44 ± 0.06
Survivability (%)	88.8	91.1

CONCLUSION

The Nera black perform better in almost all the growth performance traits studied. It was therefore, recommended that Nera black should be used since it offers a better growth performance at the early phase of production which may eventually leads to better lay during the laying phase.

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