COMPARATIVE ASSESSMENT OF EGG PRODUCTIVITY TRAITS IN FUNAAB ALPHA, NOILER AND ISA BROWN CHICKENS

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ABSTRACT
The milestones in the improvement of the Nigerian ecotype chicken have led to the development of new chicken breeds such as the FUNAAB Alpha and the Noiler chicken breed. This research was designed to to evaluate egg productivity indices in Nigerian improved and exotic chicken. A total of forty-five (45) birds comprising of 15 each of the Noiler, FUNAAB Alpha and the Isa Brown at 18 weeks were used for the study. Egg production characteristics, Hen- housed production and Hen-day production were assessed and data generated during the study were subjected to analysis of variance and mean separated using Duncan multiple range test. The result revealed that the Noiler chicken had a significantly higher body weight at 18th week, age at first lay (20th week) and at 25th weeks than that of Isa-Brown layer and FUNAAB Alpha. In terms of genetic variability recorded in egg production, egg weight for Isa-Brown was higher at Ist lay, 23rd week of lay and 25th week of lay and had a higher mean Hen-day (80.05%) and Hen-housed production (80.45%) than Noiler and FUNAAB Alpha chickens. The results highlighted breed-specific variations in the relationship between body weight, egg weight, and age at first lay among Isa Brown, FUNAAB Alpha, and Noiler layers. Based on the findings of this study, the Isa Brown demonstrated greater efficiency in egg production as a specialized layer line.

INTRODUCTION
The poultry sector, recognized for its critical role in human nutrition, constitutes the most rapidly expanding segment within the agricultural domain, particularly in nations characterized by developing economies (FAO, 2020). Chickens serve as significant sources of revenue through the production of meat and eggs (Abioja *et al.,* 2020). Poultry eggs represent one of the most esteemed sources of animal protein advocated for human consumption and provide a viable solution to the pervasive issue of animal protein deficiency, particularly in rural regions across numerous African nations (CSA, *2021*).
Egg production is regarded as one of the principal performance metrics for laying birds. It is posited that egg production represents a complex qualitative trait influenced by the interactions between genotype and environmental factors, which can occasionally lead to diminished performance and elevated mortality rates (Izundu *et al.,* 2019). Likewise, performance indicators such as the hen-day egg count and egg weight exhibit variability across different strains of both exotic and enhanced indigenous chickens.
The productive capacity of a superior layer strain is more accurately evaluated based on the quantity and dimensions of eggs produced throughout its lifespan and its final mass as a spent hen. Although management and feeding protocols serve as critical determinants of egg production, the genetic lineage of the laying hen also significantly influences egg yield. The adaptability rate and egg production quality of exotic chickens versus Nigerian improved breeds exhibit variability when subjected to diverse climatic conditions and environments (Mosobalaje, 2021).
Genetic diversity in egg production has been documented among various breeds, strains, and lines (Akintunde and Toye, 2022). The ISA Brown represents a prevalent exotic commercial strain of egg-type chickens reared by farmers in Nigeria. It is recognized for its high efficiency in egg production and lays brown eggs, boasting a considerable hen-day production percentage (Udeh *et al.,* 2022; Mosobalaje, 2021).

MATERIALS AND METHODS
Location and Duration of the Study
The experiment was conducted at the Poultry unit of University of Abuja Teaching and Research Farm which is located along Airport Road, Gwagwalada, FCT-Abuja. The experiment lasted for a period of 10 weeks.

Experimental Animals and Management

Total of forty-five chickens both exotic and Nigerian improved chickens, comprising of fifteen each of the Nigerian improved indigenous FUNAAB Alpha point of lay, fifteen Nigeria improved indigenous Noiler brown point of lay and fifteen exotic Isa brown point of lay, were source from a reliable farm and used in the study. The birds were fed commercial layer's diet (18% crude protein and 2750ME KCal/kg) *ad libitum* and clean drinking water was provided. Routine health and management practices were employed throughout the experimental period.

Data Collection

Data was collected on age at first egg, weight of the first egg, body weight at first egg, egg number, egg weight, hen housed production, and hen day production

Statistical Analysis

All data collected were subjected to one-way analysis of variance (ANOVA) using SPSS software (26.0) while means were separated using Duncan's New Multiple Range Test.

RESULTS AND DISCUSSION

Egg Productivity indices of Isa Brown, FUNAAB Alpha and Noiler chickens

The result presented in table 1 reveals that egg egg productivity indices were significantly($p<0.05$) different at the initial weight at arrival (18th week of Age) and Final weight at the end of the experiment (25th week of age). However significant differences were not observed across all the groups for age at first egg and all egg weight indices in the experiment, the Noiler had a faster Age at First egg (152days) and body weight at first lay (1.88Kg), while the Isa Brown, had better egg weight throughout the experimental period.

Table 1: Egg production characteristics of Isa Brown, FUNAAB Alpha and Noiler chicken.

Parameters	ISA BROWN	FUNAAB ALPHA	NOILER	SEM
Age at first lay (Days)	154.17	155.33	152.00	1.78
Initial Body weight (kg)	1.28[b]	1.33[b]	1.50[a]	0.02
Body weight at first lay(kg)	1.42	1.50	1.62	0.05
Final Body weight (kg)	1.57[b]	1.61[b]	1.88[a]	0.05
Egg Weight at first lay (g)	47.09	45.41	45.85	0.89
Egg Weight at Week 21 (g)	45.73	46.82	47.69	0.52
Egg Weight at Week 23 (g)	48.58	47.05	48.56	0.69
Egg Weight at Week 25 (g)	49.04	48.72	47.98	0.71

[a,b] Means in the same row with different superscripts are significantly different ($P<0.05$)

Hen Day and Hen House Egg Production of the Isa Brown, FUNAAB Alpha and Noiler chicken

The Hen Day (HDEP) and Hen housed egg production (HHEP) of Isa Brown, FUNAAB Alpha and Noiler chicken presented in Table 2, revealed significant ($p<0.05$) difference in both HDEP and HHEP indices. The Isa-Brown chicken demonstrated a significantly higher mean HDEP (80.05%) and HHEP (80.45) compared to the Noiler and FUNAAB Alpha chickens.

Table 2: Hen day and Hen housed Egg Production of the Isa Brown, FUNAAB Alpha and Noiler chicken

Parameters	Isa Brown	FUNAAB Alpha	Noiler	SEM
Hen-day egg production (HDEP) (%)	80.05[a]	59.38[b]	56.53[b]	4.31
Hen- housed egg production (HHEP) (%)	80.48[a]	48.18[b]	55.23[b]	5.50

[a,b] Means in the same row with different superscripts are significantly different ($P<0.05$).

DISCUSSION

FUNAAB Alpha showed a higher age at first egg lay (155days) than the Isa Brown and Noiler. The age at first egg obtained in this study for Isa-Brown, Noiler and the FUNAAB alpha was similar to the values reported by Dalhatu *et al.*, (2023), but however, within the values (148-169) reported by Izundu *et al.*, (2019). Variability in the age of sexual maturation is influenced by genetic factors. Avens *et al.* (2020) and Olawumi (2014) documented that both the genotype and the age of the avians substantially

($P < 0.01$) impact body weight, linear measurements, and various production attributes of commercial pullets. In general, body weight exhibited an increase corresponding with the age of the birds across the

three studied strains (ISA-Brown, FUNAAB Alpha, and Noiler). Avens *et al.* (2020) and Olawumi (2014) documented discrepancies in the growth patterns of layers as they age. The observed increase in body weight among the three strains as they mature can be ascribed to physiological development (Oyedapo *et al.*, 2009).

The average egg weight was greater in Isa-Brown hens compared to Noiler and FUNAAB Alpha, however, the Noiler hens had better age at first egg and bodyweight at first egg than both Isa-Brown and FUNAAB Alpha, with Isa-Brown achieving a higher egg production rate than the other two breeds. Isa-Brown eggs were heavier than those produced by FUNAAB Alpha and Noiler. These findings align with Mosobolaje and Adedoyin (2021), who also noted that Isa-Brown eggs were heavier than Noiler eggs. Anene *et al.*, (2020) and Oyedapo *et al.*, (2013) similarly observed that Isa-Brown hens produced heavier eggs. Additionally, Mack *et al.*, (2013) documented genetic differences in egg production among various breeds and strains, which is support Yakubu, *et al.*, (2019), whom indicated that egg production varies between different strains of laying hens.

The Isa-Brown chicken demonstrated a significantly higher mean hen-day egg production (80.04%) and hen-housed egg production (80.45%) than Noiler, and FUNAAB Alpha. These findings align with that of Olawumi (2014), whom stated that among the strains, the Isa-Brown is the most efficient producer of eggs, followed by FUNAAB Alpha and Noiler. The mean Hen-day production (HDP) and Hen-housed production (HHP) for Isa-Brown were greater than the findings of Izundu *et al.* (2019), who reported HDP of 28.94 and HHP of 26.56 for Isa Brown and HDP of 38.92 and HHP of 37.96 for FUNAAB Alpha. Additionally, the mean HDP and HHP for Isa-Brown in this study were lower than those of Dalhatu *et al.*, (2023), who recorded an HDP of 64.23 and HHP of 69.31 for Noiler.

CONCLUSION

This study reveals distinct egg production characteristics among Isa Brown, FUNAAB Alpha, and Noiler chickens. Isa Brown demonstrated the best performance, with the highest egg production, superior hen-day egg production, and greater external egg weight compared to the other breeds. Noiler chickens had higher bodyweight at first egg, these findings suggest that Isa Brown is optimal for egg production, while FUNAAB Alpha and Noiler performance though not at par with the Isa brown for egg production due to their potential as a dual-purpose bird are still excellent birds due to their comparative advantage as a dual-purpose bird.

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