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GROWTH PERFORMANCE AND FEED UTILIZATION POTENTIAL OF FUNAAB BROILER ALPHA CHICKEN IN COMPARISON WITH TWO EXOTIC BROILER BREEDS

Ojoawo, H.T[1*]; Wheto, M.[2]; Ogunpaimo, O.J[3]; Odah, E. O[4]; Ladejobi A.K.; Oluyide T.I
*Centre of Excellence in Agricultural Development and Sustainable Environment
FUNAAB
Department of Animal Breeding and Genetics, FUNAAB
Directorate of University Farms, FUNAAB
*Department of Animal Production and Health, Federal University Wukari, Taraba State
*Corresponding Author: ojoawohenry@gmail.com
Phone Number: +2347031953311

ABSTRACT

The use of genetic improvement programs in the development of indigenous broiler chicken has become a foray of discovery. In this study, the growth performance and feed utilization potential of the FUNAAB-Alpha broiler in comparison to two exotic broiler chickens (Abor acre and Cobb) for 8 weeks was evaluated. A total of 150 birds were used for this study (50 FUNAAB-Alpha, 50 Abor acre and 50 Cobb broiler chickens). The birds were managed intensively and fed ad-libitum and allowed free access to water. Data collected (8 weeks) were analysed using a two analysis of variance (ANOVA) and significant means were examined ($p<0.05$). The Cobb breed had the highest body weight at 8 weeks of age (1951.83±71.83g) followed by the Abor acre (1836.51±61.38g) and the least observed is the FUNAAB-Alpha broiler breed (1730.34±53.24g), though not statistically different from the Abor acre breed. However, the Abor acre breed had the best feed conversion ratio (1.46± 0.01) compared to the FUNAAB-Alpha (1.16± 0.08) and Cobb (1.26± 0.03) at 8 weeks of age. Higher values for feed conversion ratio were recorded at the early stages of ages for all three breed of chickens. The FUNAAB-Alpha broiler chicken had the lowest feed conversion from 6 weeks to 8 weeks of age (1.36±0.11 to 1.16±0.08) when compared to it exotic counter parts. This study therefore indicates that the FUNAAB-Alpha broiler chicken is highly comparable to the exotic broiler breeds; Abor acre and Cobb in both growth performance and feed utilization potential.

Key Words: FUNAAB-Alpha Broiler, Abor acre, Cobb, Body weight, FCR.

INTRODUCTION

Poultry production has remained an imperative and most diverse component of all livestock enterprise, constituting a vital role in improvement of food and nutrient security (Alabi *et al.,* 2017). Chicken largely serves a pivotal role as a source of animal protein; contributing to health stability and empowerment among rural household. This therefore presents an appropriate system for the supply of the fast growing populace with high quality protein and additional income (Adeleke *et al.,* 2011). In years gone by, improvement program has led to the production of fast growing chickens known as Broiler. Modern broiler selection programs have produced rapidly growing chickens with high feed utilization/conversion potential and meat yield (Gonzales *et al.,* 1999), hence their popularity with the small scale subsistence farmers. Nevertheless, this increasing demand for indigenous chicken offers an opportunity for medium to large scale production of Nigerian indigenous chicken (Bamidele *et al.* 2020). Improved growth and high feed utilization potential has been an obvious interest of breeders of meat type chickens, such that adult body weight at slaughter and other growth traits, at early ages is directly aimed at attracting better price at marketing (Malik *et al* 2005), which is the bases of the present day breeding programmes. Due to this favourable attributes, a call to the improvement of our local stock of indigenous origin has led to the development of a more productive and adaptive chicken of Nigerian origin, known as the FUNAAB-Alpha (Udoh, 2014).

MATERIALS AND METHOD

A total of 150 birds were used for the experiment, which comprised of two exotic strains; Abor Acre (50) and Cobb (50) and FUNAAB-Alpha (Improved Nigerian indigenous broiler chicken) broiler chickens (50). The exotic strains

were purchased from a commercial hatchery while the improved Nigerian indigenous chickens were generated through artificial insemination at PEARL Farm (Programme for Emerging Agricultural Research Leaders) Federal university of Agriculture Abeokuta, Ogun state. All chicken breeds were wing tagged for identification purpose. The chicks were brooded for four weeks. A digital hydrometer was suspended in the brooder pen to monitor the temperature and relative humidity. The birds were raised on a deep litter system and fed *ad-libitum* using a commercial feed (Top Feed from Premier Feed Manufacturing Industry Limited) for a period of 8 weeks at different phase of growth; starter phase (0-4 weeks) and finisher phase (5-8 weeks). The birds were also allowed free access to fresh and clean water throughout the period of experiment.

Body Weight: The initial live weight of the chicks was measured, after which weekly body weight for each breed of chicken was taken using a sensitive weighing scale with sensitivity of 0.01g (Max. 5kg)**.**

Feed intake*:* The obtained live weights were used to calculate the feed conversion ration of the three different chicken breeds. However, difference in the parameters due to sex, age and breed effect were estimated on weekly basis. Feed conversion ratio = $\frac{\text{Feed consumed average (g/kg)}}{\text{Body weight of the bird (g/kg)}}$

Statistical Analysis

Data on body weight feed intake and feed conversion ratio of the three chicken breeds were analyzed using a two way analysis of variance (ANOVA). Means were separated using Duncan multiple range test as per SAS (2009).

The statistical model used is:

$$Y_{ij} = \mu + G_i + S_j + (GS)_{ij} + \varepsilon_{ijk}$$

Where:

Y_{ijk} = Observed value of the dependent variable

M = Population mean

G_i = Effect of the i^{th} chicken breed (i = 1, 2, 3)

S_j = Effect of the j^{th} sex (j = 1, 2)

GS_{ij} = Interaction of the i^{th} chicken genotype by j^{th} sex

ε_{ijkl} = Random residual error

RESULTS AND DISCUSSION

The effect of chicken breed on growth performance (Table 1) was significant ($p<0.05$). The Abor acre breed had the heaviest body weight within the first 4 weeks of age (148.91±3.52g to 1060.00±21.41g) but not significantly different form the Cobb breed. While the FUNAAB-Alpha breed had the lowest body weight value (139.99±4.17g to 833.69±22.08g). The Cobb breed had the heaviest body weight at the 8 weeks of age (1951.83±71.83) when compared to the Abor acre breed and FUNAAB-Alpha chicken breed**.** This was consistent with the reports of Adebambo *et al*. (2005) and Adedeji *et al*. (2008), which implies that the FUNAAB-Alpha broiler chicken still has a pool of indigenous background, unlike the exotics; which has undergone directional selection for high growth rate. This was also in accordance with the findings of Katule (1992), who observed that the highest growth performance is expected in the breed which had been developed purposely for higher performance in specific traits. Furthermore, Oleforuk-Okoleh (2011) reported a rapid weight gain in the Cobb breed of chicken at three to six weeks of age, while Ojoawo *et al.* (2021) observed that meat breeds of chicken were heavier than chickens of indigenous origin**.** The effect of sex on growth of the different chicken breed (Table 2) was significant ($P<0.05$). The male chickens consistently had the heavier body weight when compared to their female

counterparts, but not significantly different from the female birds at weeks 2 and 4 (585.89±11.14 and 906.42±18.21 g). This can be attributed to the differential sex hormone (Peters *et al.*, 2005) and testosterone levels of the sexes. This could also be referred to as an adaptive feature used in dominating their environment (Alabi *et al.* 2012). This is in acquiesce with the report of Adedeji *et al*. (2008), stating that the aggressiveness of males over the females especially when reared together would put the females at a disadvantage for feed and water. The effect of chicken breed by sex interaction on chicken body weight (Table 3) was significant (P<0.05). Both the male and female chicken sex of the Abor acre had the heaviest body weight at the starter phase. On the other hand, the Cobb male and female chicken had the heaviest body weight value at the finisher phase, though not significantly different from the Abor acre breed. Both the male and female FUNAAB-Alpha chicken had the least body weight when compared to their exotic counterparts. The effect of chicken breed on feed conversion ratio (Table 4) was significant (P<0.05). The FUNAAB-Alpha chicken breed consistently had the highest feed conversion ratio from week 1 (6.34±0.01) to week 5 (4.20±0.10) of age, while the Abor Acre breed had the least. In addition, the Cobb breed had the highest feed conversion from week 6 (1.97±0.11) to week 8 (1.26±0.03), while the lowest feed conversion ratio was observed in the FUNAAB-Alpha breed. These observed performance of the FUNAAB-Alpha breed was pronounced only at the latter stages of life (6- 8 weeks), which could also be premised on the fact that FUNAAB-Alpha broiler breed of chicken can therefore be referred to as a slow growing, but early maturing broiler chicken through domestic breeding programme (Ojoawo *et al.*, 2020). However, the closeness of the FUNAAB broiler chickens to their exotic counterparts suggests the possibility of a common ancestry at one stage or the other, which may require further molecular study with the aim evaluating the genetic diversity of the three broiler breeds.

Table 1. Effect of Chicken Breed on the Body Weight (Means ± SEM)

Weeks	Abor Acre	Cobb	FUNAAB Alpha
1	148.91±3.52	142.67±2.89	139.99±4.17
2	362.70±9.25^{a}	346.77±7.08^{a}	310.01±8.04^{b}
3	660.72±15.60^{a}	643.40±14.41^{a}	588.71±14.53^{b}
4	1060.00±21.41^{a}	1019.38±23.94^{a}	833.69±22.06^{b}
5	1448.72±28.29^{a}	1463.08±38.57^{a}	987.86±21.67^{b}
6	1624.24±43.26^{a}	1733.53±57.88^{a}	1118.48±34.46^{b}
7	1734.57±43.58^{b}	1860.74±51.29^{a}	1418.55±43.66^{b}
8	1836.51±61.38^{ab}	1951.83±71.83^{a}	1730.34±53.24^{b}

^{ab}: Means on the same row with different superscripts are significantly different (p<0.05).

Table 2. The Effect of Sex on the Body Weight (LSM ±S.E.M)

Weeks	Male	Female
1	150.66±2.46^{a}	138.38±2.97^{b}
2	368.77±6.55	322.11±6.73
3	691.88±10.81^{a}	585.89±11.14^{a}
4	1084.92±19.45	906.42±18.21
5	1474.13±36.80^{a}	1226.84±30.10^{b}
6	1778.03±54.35^{a}	1499.29±46.44^{b}
7	1737.73±47.00^{a}	1499.31±35.32^{b}
8	2029.11±55.30^{a}	1692.58±44.08^{b}

^{abc}: Means on the same row with different superscripts are significantly different (p<0.05).
SEM: Standard error of mean.

Table 3: Means and Standard errors of the Interaction of the Genotype by Sex on the body weight

	Abor Acre		Cobb		FUNAAB Alpha	
Weeks	Male	Female	Male	Female	Male	Female
1	158.29±3.79^{a}	139.13±5.35^{b}	144.25±3.42^{ab}	141.08±4.71^{b}	148.42±5.78^{b}	133.54±5.51^{b}
2	383.75±11.27^{a}	340.74±13.58^{c}	366.79±9.68^{ab}	326.75±8.73^{c}	340.40±9.91^{bc}	290.35±8.87^{d}
3	715.58±15.04^{a}	603.48±22.38^{c}	697.21±17.41^{a}	589.58±17.14^{bc}	633.80±22.51^{b}	556.88±15.20^{c}
4	1138.43±22.75^{a}	984.83±28.62^{b}	1118.29±28.55^{ab}	920.46±26.03^{b}	915.58±33.25^{b}	775.88±20.28^{c}
5	1552.21±29.22^{a}	1340.74±38.08^{b}	1619.21±44.09^{a}	1306.96±44.91^{b}	1027.83±39.68^{c}	959.65±22.75^{c}
6	1713.35±62.83^{ab}	1531.09±53.76^{b}	1875.10±87.11^{a}	1598.41±66.44^{b}	1209.17±62.28^{c}	1054.47±32.30^{c}
7	1791.50±69.09^{b}	1675.17±50.92^{b}	2038.16±58.93^{a}	1659.14±64.50^{b}	1544.08±75.89^{b}	1329.94±41.34^{c}
8	1939.95±92.61^{b}	1728.14±74.96^{bc}	2217.90±80.34^{a}	1709.95±89.84^{bc}	1877.92±94.33^{bc}	1626.18±50.03^{c}

^{abc}: Means on the same row with different superscripts are significantly different ($p<0.05$)

Table 4:Effect of chicken breed on Feed conversion ratio (L.S.M ± S.E.M)

Weeks	Abor acre	Cobb	FUNAAB Alpha
1	5.33 ± 0.09^{b}	5.67 ± 0.09^{b}	6.34 ± 0.01^{a}
2	5.01 ± 0.03^{b}	5.25 ± 0.03^{ab}	5.36 ± 0.03^{a}
3	4.94 ± 0.25^{b}	5.03 ± 0.06^{ab}	5.75± 0.01^{a}
4	4.49 ± 0.03^{b}	4.70 ± 0.03^{b}	4.90 ± 0.04^{a}
5	3.74 ± 0.02^{b}	3.78 ± 0.01^{b}	4.20 ± 0.10^{a}
6	1.96± 0.07^{a}	1.97± 0.11^{a}	1.36± 0.11^{b}
7	1.18± 0.01^{c}	1.63± 0.01^{a}	1.29± 0.07^{b}
8	1.46± 0.01^{a}	1.26± 0.03^{b}	1.16±0.08^{c}

^{ab}: Means on the same row with different superscripts are significantly different ($p<0.05$)

CONCLUSIONAND RECOMENDATION

The FUNAAB-Alpha broiler breed had comparative growth performance and feed utilization potential to the two exotic breeds (Cobb and Abor acre) of chicken. However, the male of the different chicken breed perform better in both body weight and feed conversion ratio for the period of 8 weeks. Moreover, the FUNAAB-Alpha broiler chicken had a much lower feed conversion ratio at the lower stages of age, rather than the high values obtained at the earlier stages.

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