Morphometric and Growth Performance Variations of Naked Neck, Frizzled Feathered and Normal Feathered Crosses with Exotic Giri-Raja Chickens

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ABSTRACT

A total number of 424 day-old chicks were generated from Naked neck(Naked), Frizzled feather(Frizzle) and Normal feathered(Normal) indigenous chickens and an exotic breed Giri-raja(Giri) to evaluate their morphometric and growth performance. Body weight, body length, breast girth and keel length were recorded for 12 weeks. At day old, chicks from Giri x Naked cross had the highest body weight of 36.29±0.72g. Progenies from Giri x Normal cross had significantly better morphometric values and heavier body weight (1.629.00± 86.36g) than those bred from Giri x Naked (1.423.5±55.7g) while Frizzle x Giri had the least body weight of (1039.18±47.65g) at week 12. Giri x Normal chicks were heavier than their reciprocal cross (Normal X Giri). Sex had significant effect ($p<0.05$) on morphometric traits at 12 weeks in favour of males. In conclusion, the progenies of Giri X Normal had the best morphometric and growth performance among the crossbreds.

Keywords: Growth, indigenous chickens, exotic Giri-raja breed.

INTRODUCTION

Animal growth involves increase in size and changes in functional capabilities of the various tissues and organs of animals from conception through maturity (Adeleke et.al., 2010). The growth performance of chicken is an important trait to be considered in meat type chicken development. Growth is normally accompanied by an orderly sequence of maturational changes and involves accretion of protein and increase in length and size not just an increase in body weight. The Nigeria indigenous chickens are characterized by slow growth; nevertheless they possess major genes that assist in early adaptation to the environment as these genes cause a reduction in tropical heat stress (Peters, 2005).

The occurrence of major genes of feather structure, and feather distribution, dwarf conditions and modifier effects in the indigenous local chickens have been reported by some authors (Adedeji *et. al.*, 2008 and Peters *et. al.*, 2005). Olori (2009) indicated that there was a need to identify, develop and conserve those unique features of indigenous chickens that could be of potential value in future. According to Olawoyin (2006) it is imperative to utilize indigenous chickens in parent stock development for better adaptability. Genetic improvement of indigenous breed of livestock is very valuable because of high adaptability to harsh environmental condition of climate and disease compared with exotic breed (Fitzhugh et. al., 1992 , Ajayi, 2010). Breeding and selection strategies can therefore be exploited to achieve the best in livestock

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production. The reports of Adedeji *et. al,.* (2004) showed a significant variation in the growth performance of purebred Naked neck, Frizzle feathered and Normal feathered indigenous chickens. The genetic profile of the chickens can then be improved through different breeding strategies. Crossbreeding with the exotic breeds improved body weight greatly at 12 weeks of age (Adebambo *et. al*., 2006).

This study was therefore designed to compare the morphometric traits of crossbred progenies of Nigerian indigenous chickens in matings involving an *Indian Giri-raja* breed.

MATERIALS AND METHODS

The research environment and experimental birds

This study was conducted at the Poultry Breeding Unit of the Teaching and Research Farm of the University of Agriculture, Abeokuta, and Ogun State, Nigeria. The area lies in the south-western part of Nigeria and has a prevailing tropical climate with a mean annual rainfall of about 1,037mm. The vegetation is an inter-phase between the tropical rainforest and the derived savannah (Ilori, 2010) .The chickens consisted of parent stock of pure exotic breed (Giri raja), indigenous chickens (Normal-feather, Frizzled-feathered and Naked neck) and their crossbreds. Giri-raja (Giri) which originated from India, is a heavy breed with a good growth performance. The breed has gone through selections for a meat-type chicken. The breed utilized feed well by converting them into muscle mass (Adebambo *et. al.*, 2006). Normal feathered indigenous chicken (Normal) has straight feather covering the entire skin. The Frizzle-feathered chickens (Frizzle) are characterized by the possession of gene which modifies the structure of feather, causing the curling of all the feathers while the Naked neck indigenous birds (Naked) possess gene that alters the feather distribution by reducing the number of feather tracts, causing a wider apteria that contain no down or semi-plume feather around the neck (Peters *et. al*., 2002).

The crosses made were Giri x Normal, Giri x Frizzle, Giri x Naked. The reciprocal crosses of Normal x Giri, Frizzle x Giri and Naked x Giri were also made as well as pure crosses which were Giri x Giri, Normal x Normal, Frizzle x Frizzle. Semen was collected from the cocks using the massage technique and artificial insemination was carried. The mating ratio was 1:4 (1cock to 4 hens) and 2 replicates of the mating groups were made for each of the crosses stated above.

Egg collection and Identification

An average of sixty eggs was collected for each the 10 crosses made. The eggs were cleaned, disinfected, fumigated and pedigreed along sire and dam line before setting in the incubator. Chicks resulting from the use of each dam and sire strains were properly wing-tagged for identification purpose.

Feeding, management and data collection

The breeder chickens were fed with a breeder's ration containing 16% crude protein, 2,616.0 kcal/kg metabolisable energy, 2.5% calcium and 0.45 % available phosphorus. The chicks were fed ad-libitum with chicks starter mash diet that supplied 21.49% crude protein and 2,416.kcal/kg metabolisable energy from 0 to 4 weeks of age. They were later fed with grower's mash that contains 18% crude protein and 2546 kcal/kg metabolisable energy. The birds had free access to water. Growth data which included body weight, breast girth, and body length and keel length of the birds were taken on a weekly basis from day-old till 12 weeks of age .The body weight of each chick was measured individually using a sensitive weighing scale with a maximum capacity of 2.0kg. Breast girth was taken as the circumference of the breast around the deepest region

of the breast using a tape rule. Body length was measured as the distance between the base of the neck and the pygostyle with a tape rule. Keel length was measured as the length of the sternum region with the use of a tape rule.

Data Analyses

The growth data of four hundred and twenty four progenies were analysed using the General Linear Model procedure of Statistical Analysis System – SAS (SAS, 2005). The model was fitted for the effects of chick genotype, sex and chick genotype by sex interaction on growth traits. Significant means were separated using Duncan's new multiple range test of SAS (2005)

The model used was as described below

$Y_{ijk} = \mu + C_i + S_j + (CS)_{ij} + e_{ijk}$

Y_{ijk} = Variable of measurement

μ = overall mean

C_i = random effect $_i$th chick genotype (i=1 to 10)

S_j = effect of $_j$th sex (j = 1 and 2)

CS_{ij} = effect of chick genotype by sex interaction

e_{ijk} = random residual error

Results and Discussions

The body weight performance of chicks resulting from the crosses involving the Giri raja sires (Giri x Normal, Giri x Frizzle, Giri x Naked), their reciprocal crosses (Normal x Giri, Frizzle x Giri, Naked x Giri) as well as the straight bred (Giri x Giri, Normal x Normal, Frizzle x Frizzle, Naked x Naked) are presented on Table 1. At a day old, the straight bred Giri-raja chicks (Giri x Giri) had the highest body weight of 40.05± 0.27g followed by chicks sired by Giri breed with Naked neck hens. The least body weight (31.83± 0.32) at day old was recorded for chicks sired by Normal feathered breed with - Giri hens.

Nevertheless, at week 8, the body weight of chicks resulting from Giri x Normal (707.42±21.12g) ranked next to the body weight of Giri x Giri (998.36± 25.83g). This was followed by Giri x Naked (690.50± 19.13g) and Giri x Frizzle. The straight bred Giri raja attained 2.412.74 ±75.67 at 12 weeks while the progenies sired by Giri-raja feathered dams had significantly heavier body weight (1629.00± 86.36g) than those bred from Giri x Naked (1423.5±55.7g) and Giri x Frizzle (1352.00± 64.57g). This showed that Giri x Normal performed better among the crossbreds. This corroborated the findings of Adebambo et.,al.(2011) that the Normal feathered indigenous chicken had a positive general combining ability (GCA) with the exotic breed with regards to body weight. Among the reciprocal cross, the least mean weight (1039.18±47.65g) was recorded for chicken from Frizzle x Giri at week 12.

Differences existed in performance of progenies resulting from reciprocal crosses as the mean body weights of chicken with Giri raja sires were significantly higher than their counterparts with Giri-raja dams. Giri x Normal chicks were heavier than Normal x Giri by 361g (1629.00± 86.36 vs 1268±47.65g) at week 12. This was also observed with Giri x Frizzle and Giri x Naked versus their reciprocal crosses (Frizzle x Giri, Naked x Giri respectively). The growth performance of the progenies resulting from Giri raja cocks and Normal-feathered hens was better than their counterparts from Normal-feathered cocks and Giri raja hens. This suggests that there could be a better growth performance of the crossbred chick if the exotic breed (Giri raja) is used as a sire line. Peters et. al. (2002) advocated for the use of exotic breed for sire line as this could help in generating more progenies since a cock can be used for mating a good number of hens especially with artificial insemination.

Comparatively, Giri-raja x Normal feathered (1,629±86.36g) ranked next to pure bred Giri-raja chicken (2,212.74± 75.62g). This was followed by Giri x Naked and Naked x Giri weighing 1423.50±55.79g and

1306.33±92.35g respectively at week 12.

The least square means of body length as affected by chick genotype are presented on Table 2. Pure Giri-raja chicks had the longest body from a day old to week 12 with mean values increasing from 7.88 ±0.06cm to 30.09±0.43cm. Giri-raja x Frizzle feathered recorded the longest body (26.59±0.38cm) at 12 weeks among the crossbred chicken though the value was not statistically different from that of Giri-raja x Normal feathered chicken.

Table 1: Least square means of bodyweight ± SEM (gm) as affected by chick genotype

Genotype	Age (week)				
	0	1	4	8	12
Giri- sired chicks					
Giri X Nm	33.01± 0.57^{c}	52.06± 1.31^{c}	298.70± 3.50^{b}	707.42± 21.12^{b}	1629.00± 86.36^{b}
Giri X Friz	33.53± 0.52^{c}	54.56 ±1.20^{c}	202.68± 4.18^{c}	660.10± 10.05^{c}	1352.00± 64.57^{c}
Giri X Nak	36.29± 0.72^{b}	51.27± 1.23^{c}	211.62± 7.15^{c}	690.50± 19.13^{c}	1423.50± 55.79^{c}
Indigenous-sired chicks					
Nm X Giri	31.83± 0.32^{e}	54.59 ±0.93^{c}	158.21± 7.31^{c}	580.15± 10.60^{d}	1268.48± 47.65^{d}
Friz X Giri	33.44± 0.21^{c}	54.98 ±0.95^{c}	177.55±6.62^{de}	595.17± 14.21^{d}	1039.18± 47.65^{d}
Nak X Giri	33.22± 0.72^{c}	57.64 ±1.32^{b}	184.80± 2.21^{d}	570.13± 15.32^{d}	1306.33± 92.35^{c}
Striaghbred chicks					
Giri X Giri	40.05± 0.47^{a}	68.10± 1.41^{a}	364.33± 9.71^{a}	998.36± 25.83^{a}	2612.74± 75.62^{a}
Nm X Nm	33.17± 0.23^{c}	49.76± 0.56^{d}	147.70± 3.30^{e}	488.21± 19.01^{e}	1010.75± 21.29^{d}
Friz X Friz	31.50± 0.31^{e}	49.00± 0.68^{d}	117.68± 3.18^{f}	450.82± 12.55^{e}	992.93 ± 41.30^{e}
Nak XNak	32.92± 0.52^{d}	49.98± 0.92^{d}	154.61± 7.81^{e}	571.00± 23.42^{d}	1022.52± 42.18^{d}

^{a,b,c,d,e} Means within a column with different superscript are significantly different (P<0.05)

Nm=Normal feathered, *Friz* = Frizzled feathered, *Nak* = Naked neck, *Giri* = Giri raja

Table 2: Least square means of body length± SEM (cm) as affected by chick genotype

Genotype	Age (week)				
	0	1	4	8	12
Giri- sired chicks					
Giri X Nm	7.16 ±0.10^{c}	8.22 ± 0.11^{d}	13.80 ± 0.29^{d}	20.47 ± 0.35^{b}	25.99 ± 0.73^{b}
Giri X Friz	7.61± 0.09^{b}	8.56 ± 0.10^{b}	15.33 ± 0.25^{b}	20.52 ± 0.60^{b}	26.23 ± 0.38^{b}
Giri X Nak	7.42±0.13^{b}	8.86 ± 0.12^{a}	12.89 ± 0.24^{e}	20.41 ± 0.32^{b}	24.85 ± 0.06^{c}
Indigenous-sired chicks					
Nm X Giri	6.86 ±0.04^{d}	8.45 ± 0.07^{c}	14.04 ± 0.18^{c}	19.58 ± 0.31^{c}	23.91 ± 0.62^{d}
Friz X Giri	7.23± 0.08^{b}	8.60 ± 0.09^{b}	14.48 ± 0.19^{c}	19.81 ± 0.62^{c}	23.97 ± 0.40^{d}
Nak X Giri	7.20 ±0.10^{b}	8.52 ± 0.12^{b}	14.94 ± 0.28^{c}	19.17 ± 0.45^{c}	23.40 ± 0.21^{d}

Striaghbred chicks					
Giri X Giri	7.88± 0.06[a]	8.93 ± 0.10[a]	18.17 ± 0.23[a]	26.33 ± 0.28[a]	30.09 ± 0.43[a]
Nm X Nm	7.14± 0.24[c]	8.38 ±0.06[d]	15.28 ± 0.10[b]	19.25 ± 0.18[c]	22.25 ± 0.32[e]
Friz X Friz	6.80±0.04[d]	8.45 ± 0.05[c]	15.14 ± 0.12[b]	18.89 ± 0.21[d]	22.45 ± 0.28[e]
Nak XNak	7.09± 0.51[c]	8.55 ± 0.12[b]	15.70 ± 0.21[b]	18.97 ± 0.20[d]	23.38 ± 0.34[d]

[a,b,c,d,e] Means within a column with different superscript are significantly different (P<0.05)

Nm=Normal feathered, *Friz* = Frizzled feathered, *Nak* = Naked neck, *Giri* = Giri raja

Breast girth and kneel length are two important parameters associated with breast meat yield. The largest breast girth at day old was 7.81±0.05 cm which was measured for the purebred Giri raja chicken while the least value of 5.70±0.02cm was recorded for the purebred indigenous Frizzle feathered chicken (Table 3). Progenies of Giri-raja x Naked neck chicken had relatively higher breast girth (7.13±0.12cm) compared to their counterparts from Giri-raja and other indigenous dams (Normal feathered and Frizzle feathered) at day old. Purebred Naked-neck chicken had the highest value of breast girth (21.28±0.34cm) among the indigenous chicken at week 12. The mean breast girth of crossbred Giri raja x Normal feathered chicken was statistically similar with that of Giri-raja x Naked neck chicken at 12 weeks. The least square means of kneel length as affected by chick genotype are presented in Table 4. At day-old, straight bred Naked neck had kneel length measuring 1.81± 0.05cm followed by pure bred Giri raja with 1.73cm ± 0.04cm while the crossbred, Giri-raja x Frizzle had the least value of 1.25±0.02cm. The growth performance of straight bred Giri-raja with respect to kneel length at week 1 was not statistically different from straight bred Naked neck chicken.

However, from week 4 to 12, purebred Giri-raja had the longest kneel. Giri x Normal feathered, ranking next to the purebred Giri raja chicken, recorded the highest performance of keel growth among the crossbred chicken at week 8 and 12 (Table 4).

The effect of sex on body weight was not significant until week 8 when males were about 87g significantly ($p< 0.05$) heavier than the females (692.15±10.40g vs 505.40±12.31g). The difference was more significant ($p<0.01$) at 12 weeks when difference is about 327g in favour of males (Table 5). A sexual difference in body length was also significant at week 8. However, the effect of sex on the breast girth and keel length was not significant until week 12. Males had consistently higher values for these traits than their female counterparts.

Table 3: Least square means of breast girth± SEM (cm) as affected by chick genotype

Genotype	Age (week)				
	0	**1**	**4**	**8**	**12**
Giri- sired chicks					
Giri X Nm	7.10 ± 0.10[b]	8.20 ± 0.20[bc]	13.80 ± 0.25[c]	20.41 ± 0.30[b]	24.89 ± 0.72[b]
Giri X Friz	7.02 ±0.25[bc]	8.33 ± 0.12[b]	13.33 ± 0.21[d]	20.52 ± 0.60[b]	22.85 ± 0.80[c]
Giri X Nak	7.13 ± 0.12[b]	8.16 ± 0.24[bc]	12.87 ± 0.24[f]	20.61 ± 0.23[b]	24.88 ± 0.38[b]

Indigenous-sired chicks					
Nm X Giri	6.86 ±0.04^{bc}	8.12 ± 0.14^{bc}	14.01 ±0.16^{bc}	18.41 ± 0.32^{d}	21.71 ± 0.61^{d}
Friz X Giri	7.21 ± 0.08^{b}	8.30 ± 0.11^{b}	14.28 ± 0.17^{b}	18.58 ± 0.31^{d}	21.97 ± 0.40^{d}
Nak X Giri	6.67 ±0.24^{bc}	8.05 ± 0.23^{c}	14.44 ± 0.28^{b}	18.12 ± 0.11^{d}	21.40 ± 0.21^{d}
Striaghbred chicks					
Giri X Giri	7.81 ± 0.05^{a}	8.73 ± 0.10^{a}	17.07 ± 0.23^{a}	24.47 ± 0.35^{a}	28.01 ± 0.13^{a}
Nm X Nm	6.25 ± 0.24^{c}	7.35 ± 0.06^{e}	13.15 ± 0.10^{e}	18.25 ± 0.18^{d}	20.15 ± 0.22^{e}
Friz X Friz	5.70 ± 0.02^{e}	7.45 ± 0.05^{e}	13.11 ± 0.12^{e}	17.89 ± 0.21^{e}	20.35 ± 0.28^{e}
Nak XNak	6.09 ± 0.21^{d}	7.65 ± 0.12^{d}	13.70 ± 0.21^{c}	17.97 ± 0.20^{e}	21.28 ± 0.34^{d}

^{a,b,c,d,e} Means within a column with different superscript are significantly different (P<0.05)

Nm=Normal feathered, *Friz* = Frizzled feathered, *Nak* = Naked neck, *Giri* = Giri raja

Table 4 : Least square means of keel length ± SEM (cm) as affected by chick genotype

Genotype	Age (week)				
	0	**1**	**4**	**8**	**12**
Giri- sired chicks					
Giri X Nm	1.56 ± 0.05^{c}	2.00 ± 0.03^{d}	4.87 ± 0.07^{bc}	6.85 ± 0.27^{b}	8.87 ± 0.17^{b}
Giri X Friz	1.26 ± 0.02^{e}	2.21 ± 0.06^{b}	4.96 ± 0.09^{b}	6.78 ± 0.23^{bc}	8.51 ± 0.17^{c}
Giri X Nak	1.52 ± 0.01^{c}	2.15 ± 0.09^{bc}	4.97 ± 0.01^{b}	6.91 ± 0.22^{b}	8.65 ± 0.24^{c}
Indigenous-sired chicks					
Nm X Giri	1.42 ±0.05^{cd}	2.08 ± 0.04^{c}	4.89 ±0.05^{ab}	6.41 ± 0.12^{e}	8.67 ± 0.18^{c}
Friz X Giri	1.31 ± 0.02^{d}	2.13 ± 0.05^{bc}	4.59 ± 0.06^{c}	6.46 ± 0.11^{e}	8.56 ± 0.27^{c}
Nak X Giri	1.33 ± 0.03^{d}	2.08 ± 0.01^{c}	4.43 ± 0.16^{d}	6.63 ± 0.13^{d}	8.66 ± 0.39^{c}
Striaghbred chicks					
Giri X Giri	1.73 ± 0.04^{b}	2.32 ± 0.06^{a}	5.65 ± 0.09^{a}	8.69 ± 0.16^{a}	10.22 ± 0.24^{a}
Nm X Nm	1.46 ±0.02^{cd}	2.06 ± 0.03^{c}	4.80 ± 0.05^{bc}	6.79 ± 0.05^{bc}	8.26 ± 0.09^{d}
Friz X Friz	1.62 ± 0.02^{c}	2.02 ± 0.01^{cd}	4.63 ± 0.06^{c}	6.55 ± 0.08^{c}	7.60 ± 0.12^{e}
Nak XNak	1.81 ± 0.05^{a}	2.34 ± 0.04^{a}	4.76 ± 0.11^{bc}	6.99 ± 0.17^{b}	8.41 ± 0.15^{d}

^{a,b,c,d,e} Means within a column with different superscript are significantly different (P<0.05)

Nm=Normal feathered, *Friz* = Frizzled feathered, *Nak* = Naked neck, *Giri* = Giri raja

Table 5: Least square means of bodyweight and morphometric traits ± SEM as affected by sex

Traits	Age (week)				
	0	**1**	**4**	**8**	**12**
Body Weight (g)					
Male	33.52±0.42[a]	54.56±1.21[a]	296.71± 3.41[a]	692.15± 10.40[a]	1485.80±52.15[a]
Female	33.43±0.35[a]	54.59±0.92[a]	282.67 ±4.15[a]	505.40 ±12.31[b]	1158.20±44.52[b]
Body length (cm)					
Male	7.62 ± 0.07[a]	8.54 ± 0.12[a]	15.33 ± 0.25[a]	24.33 ± 0.37[a]	26.88 ± 0.73[a]
Female	7.58 ± 0.06[a]	8.45 ± 0.20[a]	15.28 ± 0.21[a]	19.68 ± 0.28[b]	22.10 ± 0.58[b] c
Breast Girth (cm)					
Male	6.94 ± 0.04[a]	8.20 ± 0.21[a]	13.80 ± 0.25[a]	20.52 ± 0.60[a]	24.59 ± 0.73[a]
Female	6.88 ± 0.21[a]	8.16 ± 0.26[a]	13.70 ± 0.27[a]	20.41 ± 0.35[a]	21.01 ± 0.40[b]
Keel Length (cm)					
Male	1.56 ± 0.05[a]	2.21 ± 0.08[a]	4.96 ± 0.09[a]	6.47 ± 0.12[a]	8.97 ± 0.18[a]
Female	1.52 ± 0.01[a]	2.15 ± 0.09[a]	4.97 ± 0.01[a]	6.41 ± 0.23[a]	8.56 ± 0.12[b]

[a,b,c,d,e] Means in a column(within each growth trait) with different superscript are significantly different (P<0.05)

The results showed that the best growth performance of the Giri-raja X Normal –feathered indigenous chicken ranked next to the pure exotic breed in body weight and morphometric traits at 12 weeks. This was similar with the findings of Adeleke *et. al.,* (2010). The authors reported that the chicken resulting from the crosses between Anak Titan exotic breed and Normal-feathered indigenous type ranked relatively closer to pure bred Anak Titan compared with progenies from crosses of Anak Titan with other Nigerian local chicken (Frizzle feathered and Normal feathered).

Genetic variations existed in the body weight, breast girth, body length and keel length of the progenies of pure Nigerian local chickens (Normal-feathered X Normal-feathered, Frizzled -feathered X Frizzled-feathered and Naked- neck X Naked- neck). This corroborated the report of Adebambo et. al.., 2011 that large variation were recorded among the Nigeria indigenous chicken in growth performance, suggesting a need for the genetic improvement of their growth. The mean body weight values of pure Frizzled feathered chicken obtained in this study is within the range of values reported by Fayeye *et. al.*, (2006) and Oke, (2011).

Purebred Naked neck chicken had better growth performance over the Frizzled feathered indigenous chicken. This corroborated the reports of Peters (2005), Adedeji et. *al.* (2008) and Adeleke *et. al.*., (2010). According to Ajayi (2010), the frizzling and naked neck genes conferred better feed conversion, growth rate, feed efficiency and dressing percentage than the Normal feathered chicken. The feather structure and feather

distribution genes are well adapted to the harsh tropical environment. The higher body weight exhibited by purebred naked neck over Frizzle-feathered could be attributed to the possession of a feather distribution gene (Naked neck gene) that had been reported to reduce feather mass by 20-40%. The reduction in feather mass improves heat dissipation through the naked area (Singh *et. al*., 2001). Consequent upon their thermoregulatory functions, the plumage reducing genes have been found relevant in the tropics with hot humid environment (Oke, 2011). Merat (1986) reported that several mechanisms appear to be responsible for higher meat production of chickens with reduced plumage. According to this author , the more rapid dissipation of heat results in less appetite depression and consequently better growth particularly at high ambient temperature. In addition less feather production leaves more protein for the synthesis of other tissues, mainly muscle.

Males had higher values of body weight and body length at week 8 and 12 than their female counterparts through the difference among the male and female chicken with respect to the breast girth and keel length were not significant until week 12. The observed sexual dimorphism in favour of the males had also been reported by Sola Ojo *et. al.*., (2008) and Adedeji *et. al*., (2008). This superiority of male over their female counterparts could be due to the hormone testosterone. Apart from testosterone stimulating and maintaining secondary sexual development, it also affects the growth process and the development of body parts and features that are not directly related to reproduction (Adeleke *et. al*., 2010). The aggressiveness of males over the female especially when reared together put the females at a disadvantage for feed and water.

CONCLUSIONS

Genetic variations existed in the body weight, breast girth, body length and keel length of the progenies resulting from the crossbreeding of exotic Giri-raja breed and Nigerian local chickens Normal-feathered, Frizzled-feathered and Naked- neck). As there is a need for incorporating the local chickens into breeding programmes aimed at producing an indigenous meat adapted to the tropical environment. Improvement in growth performance of indigenous local chickens can be achieved through crossbreeding with exotic types. Among the crossbreds evaluated in this study, Giri-raja (sire) X Normal feathered (dam) had the best growth performance followed by Giri-raja (sire) X Naked neck (dam). The use of the exotic Giri-raja breed as a sire line yielded a better result. Optimum growth performance of Nigeria indigenous chicken through crossbreeding with this India breed may be achieved by using Giri-raja breed as the sire line and the Normal feathered breed as the dam line.

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الاختلافات في القياسات الظاهرية وأداء النمو لتضريب سلالة دجاج محلية (عارية الرقبة من الريش، ذات الرقبة قليلة الريش وذات الرقبة عادية الريش) مع سلالة خارجية Giri-Raja

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ملخـــص

أجريت هذه الدراسة لتقييم القياسات الظاهرية وأداء النمو للدجاج. تم استخدام 424 صوصا بعمر يوم واحد من سلالات محلية (عارية الرقبة من الريش، ذات الرقبة قليلة الريش وذات رقبة عادية الريش)، مع سلالة خارجية Giri-Raja. تم تسجيل قراءات لوزن الجسم، طول الجسم، طول و محيط الصدر لمدة 12 أسبوع. على عمر يوم واحد الصيصان الناتجة من تضريب سلالة Giri مع السلالة المحلية ذات الرقبة العارية الريش كانت أعلى وزن للجسم (36.29±0.72) غم. الصيصان الناتجة من تضريب سلالة Giri مع سلالة ذات الرقبة عادية الريش أظهرت أفضل قياسات معنوياً وأعلى وزنا للجسم (1629± 86.36) غم، مقارنةً بالناتجة عن تضريب Giri مع السلالة العارية الرقبة (1423±55.7)غم. بينما الناتجة عن تضريب Giri مع السلالة قليلة الريش أعطت أقل وزن للجسم (1039.18± 47.65)غم، على عمر 12 أسبوعا. الصيصان الناتجة عن تضريب سلالة الـــ Giri مع السلالة عادية الريش كانت أثقل مقارنة مع التضريب العكسي (العادية الريش مع الـــ Giri) . كان هناك تأثير معنوي للجنس ($p < 0.05$) على القياسات الظاهرية على عمر 12 أسبوع مع أفضلية للذكور. وكنتيجة لهذه الدراسة تبين أن الصيصان الناتجة عن تضريب Giri مع السلالة المحلية عادية الرقبة كانت أفضل من ناحية القياسات الظاهرية وأداء النمو مقارنة مع باقي السلالات.

الكلمات الدالة:النمو، سلالة الدجاج، المحلية، سلالة Giri-Raja.

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