

COMPARATIVE GROWTH AND CARCASS ATTRIBUTES OF NOILER, BROILER AND COCKEREL AS MEAT CHICKENS

^{*1}Mosobalaje, M. A., ¹Oloko, A. B., ²Adebayo, B. F., ³Adeogun, J. B., ⁴Ogunniyi, F. B., ⁴Akanbi, T. K. and ⁵Adedoyin, A. A.

¹Department of Animal Health and Production, Oyo State College of Agriculture and Technology, Igboora; ²Department of Training and Internship, Nigerian Institute of Animal Science, Abuja; ³Department of Animal Science, University of Ibadan, Ibadan; ⁴Department of Animal Health Technology, Oyo State College of Agriculture and Technology, Igboora; ⁵Department of Agricultural Education, Animal Nutrition and Biotechnology Unit, Oyo State College of Education Lanlante, Oyo State, Nigeria.

*mosobahs@yahoo.com; jamademosobalaje@gmail.com 08034780805

Abstract

Noiler, a dual-purpose breed has a good meat yield per bird. This study was designed to compare growth and carcass attributes of male and female Noiler chicken with broiler and Isa brown cockerel. The four meat types constituted the four experimental treatments. One-hundred (100) each were used and there were four (4) replicates of 25 birds each. At eighth (8th) week of broilers and fourteenth (14th) week for Noilers and cockerels, two (2) birds per replicate were slaughtered for carcass analysis. Data collected for growth parameters included initial weight, final weight, weight gain, feed intake, FCR (Feed Conversion Ratio) and mortality. While live weight, plucked weight and head weight were measured for carcass parameters, however, carcass cut parts were weighed and expressed as percentage of the live weight. Results of final weight, weight gain, average feed intake and FCR were significantly different ($P < 0.05$). Mortality was not affected ($P > 0.05$). Average daily feed intake for broilers, Noiler males, Noiler females and Isa brown cockerels were 60.48, 57.21, 45.39 and 41.43g/bird/day, respectively and significantly different ($P < 0.05$) among themselves across the treatments. Meanwhile, cockerel had significantly higher ($P < 0.05$) value of FCR, while broilers and Noilers recorded similar values ($P > 0.05$). Values of plucked weight of broilers, Noiler male, Noiler female, and Isa brown cockerels were significantly different ($P < 0.05$) across the treatments except Noilers males and females (2370.00g/bird; 2095.00g/bird; 2072.67g/bird; 1087.67g/bird, respectively). Conclusively, growth performance of broilers significantly surpass Noiler males and females, however, Noiler chicken recorded feed conversion ratio similar to value reported for broilers which implies that Noiler can attain values attained in eight weeks by broiler at longer period than fourteen weeks.

Keywords: Comparative growth; Meat chicken; Poultry industry; Developing Nation Weight gain

Introduction

The development of indigenous poultry as a commercial enterprise is highly dependent on whether or not consumers find that the product meets their demands in terms of meat quality (chemical and sensory), factors dependent on growth rate and genetics. More recently, focus has shifted to the quality aspects of meat as opposed to the quantity of meat produced, which has been the norm, thereby providing an opportunity for market segmentation (Fanatico *et al.*, 2007). Since the development of the commercial poultry industry, genetic selection has largely been focused on enhanced production (Hoffmann, 2005). Thus, the need to identify breeds that suit these demands and quantify their suitability with regards to production performance is essential. Although the production potential of indigenous chicken lines is low in comparison to commercial broilers, they have the added advantages of having

evolved the ability to adapt and survive under a range of challenging environmental and ecological conditions. They are hardy and require low levels of input for production (Van Marle-Köster *et al.*, 2009 and Dyubele *et al.*, 2010).

Recent decades have seen the consumption of poultry meat in developing countries increase by more than double the increase seen in developed countries (Sandilands and Hocking, 2012). Selective breeding in conjunction with improved genetics, well-organized production systems, highly specialised nutrition and regular veterinary attention has produced a large, fast growing bird with high breast muscle yield that can reach market weight in as little as 5 weeks (Fanatico *et al.*, 2007).

Broilers are known for their efficient feed conversion into essential nutrients required by man. According to Wilson (2005), broiler has the capability to attain table weight of 2.0kg in 33days. However, this depends on

the genetic makeup of the strain, housing standard, feed quality and management strategy adopted (Idahor *et al.*, 2013). Cockerel rearing, on the other hand has attained great importance due to its hardiness and relatively high survival rate, though its production does not appear profitable due to its relatively long maturity period. However, it is well documented that its live weight increases with age unlike in spent hens in which the live weight decreases with increasing egg production and age (Okosun, 1987).

Kuroilers (known as Noiler in Nigeria) are derived from crossing either coloured broiler males with Rhode Island Red females, or, White Leghorn males crossed with female Rhode Island Reds (Sandilands and Hocking, 2012). Noilers, a dual-purpose breed producing meat and eggs, can live on a diet of kitchen and agricultural waste. The meat yield per bird of Kuroilers is greater; males weigh approximately 3.5 kg and females about 2.5 kg whereas the native male bird weighs 2.5 kg and females 1.2 kg. Also, the Kuroiler is resistant to diseases due to its unique genetic features (www.kuroiler.com/en). The kuroiler chick is a potential bio-converter of low cost agricultural, household and natural waste abundant in villages into human protein food and substantial incomes for rural households (www.kuroiler.com/en). It was introduced in the early 1990s, the breed was created by VinodKapur of Kegg Farms Private, Ltd., and the name is a portmanteau of Kegg and Broiler. (Sandilands and Hocking, 2012). Noiler is bred in Nigeria by Amo Farms.

Noiler proved superior in growth performance compared to Isa brown and Nera black as replacement pullets (Mosobalaje and Oloko, 2021). More so, Mosobalaje and Adedoyin (2021) stated that Noiler chicken showed better growth performance, however, egg production performance was comparatively very poor. This study was therefore designed to compare growth performance and carcass quality of male and female Noiler chicken with broiler and Isa brown cockerel chickens.

Materials and methods

The study was conducted at the Poultry Unit of Teaching and Research Farms of Oyo State College of Agriculture and Technology Igboora. One-hundred (100) each of Noiler male (cockerels), Noiler female (pullets), broilers, and Isa brown cockerels were used to compare growth performance of Noilers with two other poultry meat types. The experimental birds were allotted into four (4) treatments comprising Noiler male, Noiler females, broilers and Isa brown cockerels representing treatments 1 – 4, respectively. There were four (4) replicates per treatment and each

replicate contained 25 birds. The experimental design was Complete Randomized Design (CRD). Data collection lasted 86 days and data collected for growth parameters included initial weight, weight gain, feed intake, feed conversion ratio, final weight and mortality.

Carcass analysis

At the eighth (8th) week of broilers and fourteenth (14th) week for Noilers and Isa brown cockerels, two (2) birds per replicate were slaughtered for carcass analysis. The birds were inserted into hot water for about 1 minute (60 seconds) for the removal of the feathers. The abdomen of the birds was opened and the internal organs were carefully removed, carcass dismembered and weighed. Live weight, plucked weight, feather weight and head weight, were carefully cut and weighed using sensitive electronic scale. The following were measured as percentage of the plucked weight; neck, wing, back, breast muscle, thigh muscle, drum stick, shank and leg. Data were subjected to Analysis of Variance (ANOVA) and where differences exist between means, Duncan Multiple Range Test was used to separate the means at 5% probability level (SAS, 1997).

Results

Performance characteristics of the four different meat types of birds were presented in Table 1. All the parameters were significant ($P < 0.05$) except mortality. Cockerel recorded the significant ($P < 0.05$) least value (135.00g/bird) of the initial weight. Values for Noiler males (214.33g/bird) and Noiler females (202.00g/bird) were similar but significantly ($P < 0.05$) lower to value recorded for broiler that was the highest (263.67g/bird). The final weight was also affected by the types of bird, broilers had value (2585.33g/bird) that was significantly higher ($P < 0.05$) than Noiler males (2290g/bird) and Noiler females (1906.67g/bird), cockerel recorded value (1180.00g/bird) that was significant lower than other types.

Average weight gain and total weight gained followed the same trend and values for broilers, male Noilers, female Noilers and Isa brown cockerels were 27.00g/bird/day and 2321.66g/bird; 24.14g/bird/day and 2075.67g/bird; 19.82g/bird/day and 1704.67g/bird; 12.15 g/bird/day and 1045g/bird, respectively. Average daily feed intake for broilers, Noiler males, Noiler females and cockerels were 60.48, 57.21, 45.39g/bird/day and 41.43g/bird/day, respectively. All the values were significantly different ($P < 0.05$) among themselves across the treatments



Feed conversion ratio was also significantly affected ($P<0.05$), cockerel had the highest value (3.41) followed by Noiler males (2.37), Noiler females (2.29) while broiler had the least feed conversion ratio value with (2.24). However, only cockerel had value

significantly higher ($P<0.05$) than other types. The Mortality values obtained from the birds were similar ($P<0.05$) Noiler males and Noiler females had the same value (2.08) so also cockerel and boiler recorded the least value (1.96).

Table 1: Performance characteristics of the four different meat types of birds

Parameter(gram)	Noiler females	Noiler males	Broilers	Isa brown cockerels	SEM
Initial weight (g/bird)	202.00 ^b	214.33 ^b	263.67 ^a	135.00 ^c	14.60
Final weight (g/bird)	1906.67 ^c	2290.00 ^b	2585.33 ^a	1180.00 ^d	214.77
Total weight gained (g/bird)	1704.67 ^c	2075.67 ^b	2321.66 ^a	1045.00 ^d	0.21
Average weight gain (g/bird/day)	19.82 ^c	24.14 ^b	27.00 ^a	12.15 ^d	2.32
Average total feed intake (g/bird/day)	45.39 ^c	57.21 ^b	60.48 ^a	41.43 ^c	3-93
Feed conversion ratio	2.29 ^a	2.37 ^a	2.24 ^a	3.41 ^b	0.15
Mortality (%)	2.08	2.08	1.96	1.96	0.86

^{abc}: Means differently subscripted are significantly different from one another ($P<0.05$)

Carcass analysis of Noiler strain, broilers and cockerels is presented in Table 2. The live weight, plucked weight, head (weight and percentage), and neck percentage were significant different ($P<0.05$) while shank, thigh, breast muscle, leg, neck, gizzard and feather percentages were not significantly affected ($P>0.05$)

The highest values of plugged weight were recorded for broilers (2370.00g/bird) followed by Noiler males (2095.00g/bird), Noiler females (2072.67g/bird) while the cockerels had the lowest values (1087.67g/bird). These values were significantly different ($P<0.05$) across the treatments except Noilers males and females that were similar ($P<0.05$).

Head weight of the Noiler males was the highest, however, similar to values recorded for Noiler female (69,47g) and the broilers (66.83g). Isa brown cockerel recorded the value (56.78) that was significantly lower than other types. Values of head and neck percentage of Isa brown cockerels were the highest, followed by Noiler male, Noiler female and broilers, sequentially (3.58 and 5.58; 3.32 and 5.41%; 2.25 and 3.68%; 5.22 and 5.77%, respectively). The values were significantly across the treatments. Other parameters were not significantly affected.

Table 2: Carcass characteristics of the four different poultry meat birds

Parameter	Noiler females	Noiler males	Broiler	Cockerel	SEM
Live weight (g/bird)	1906.67 ^b	2290.00 ^b	2585.33 ^a	1180.00 ^c	216.36
Plucked weight (g/bird)	1875.00 ^b	2092.67 ^b	2370.00 ^a	1087.67 ^c	188.21
Head weight (g/bird)	69.47 ^a	73.04 ^a	66.83 ^{ab}	56.78 ^b	2.45
Head (%)	3.32 ^c	3.58 ^b	2.25 ^d	5.22 ^a	0.33
Neck (%)	5.41 ^c	5.58 ^b	3.68 ^d	5.77 ^a	0.03
Wing (%)	9.42	9.92	10.14	10.76	0.41
Back (%)	17.03	17.08	17.36	14.58	0.47
Breast muscle (%)	18.41	20.09	29.57	15.57	1.74
Thigh muscle (%)	11.09	11.83	12.84	11.09	0.42
Drum stick (%)	13.30	11.34	13.10	10.93	0.43
Shank (%)	5.93	3.89	3.65	5.86	0.37
Empty gizzard (%)	2.68	2,74	1.75	3.65	0.22
Leg (%)	0.71	0.58	0.51	0.87	0.06
Feather (%)	8.09	9.22	12.69	11.04	0.99

^{abc}: Means differently subscripted are significantly different from one another ($P<0.05$)

Discussion

Results obtained on performance characteristics of the experimental birds revealed that almost all the performance parameters were affected. The result showed that Noiler males and pullets had similar values while Isa brown cockerels had the lowest value for most of the values. The final weight attained by Noiler was comparatively high and agreed to Mosobalaje and Adedoyin (2021) that reported high final weight for Noiler females. Feed conversion ratio of cockerel contradicted the value presented by Imouokhome (2012). The values were higher to that of Noilers and broiler despite their higher feed consumption, this is as a result of the high rate of conversion of feed to weight by Noilers (Mosobalaje and Oloko, 2021) and broilers (Leeson and Summer, 2005).

The values obtained in respect of live weight, plugged weight and head were significant, however, values for neck, wing, back, thigh muscle, drumstick, leg and feather were not significant. The final weight attained by the birds were affected by meat types, it might be due to feed intake and feed conversion ratio factors that were influenced by genetics and environment (Leeson and Summer, 2005). The four meat chicken types value contradicted the weight presented by Ayorinde *et al.*, (2009) in 16-week experiment. The weight of the broiler was higher than other three meat chicken types as it proved superior between genotype among the four meat types, this could be due to the fact that broilers were bred to be fast growing bird with high breast muscle yield that can reach market weight in as little as 5 weeks (Fanatico *et al.*, 2007). Noilers, especially males being a dual purpose chicken (Harth, 2011) are promising and compared favourably with broilers. The poultry industry is seeing a continuing trend in consumer preference from whole birds to further/secondary processed products, although in countries where the use of slow growing/indigenous lines is developing as the majority is sold as whole birds (Zhao *et al.*, 2012). The various parts as proportion of the plucked weight were not significantly different, this showed that cutting to sizes did not affect the proportion. Today, the majority of poultry is being marketed in a manner that targets the yield of high value products such as breasts and boneless filets (Young *et al.*, 2004).

Conclusion

Growth performance of broilers significantly surpass Noiler males and females, however, Noiler chicken recorded feed conversion ratio similar to value reported for broilers. This showed that Noiler can attain values attained in eight weeks by broiler at

longer period than fourteen weeks. Broilers had highest values of live and plucked weight, however, proportion of the cut parts to the plucked weight was not significantly affected.

Reference

- Ayorinde K. L and Oke, U. K. 2009. The influence of juvenile body weight and two feeding regimes during the growing phase on growth performance and early lay characteristics of pullets. *Nigerian J Animal Prod*, 22: 101-107.
- Dyubele, N. L., Muchenje V., Nkukwana T. T., and Chimonyo M. 2010. Consumer sensory characteristics of broiler and indigenous chicken meat: A South African example. *Food. Qual. Prefer.* 21(7): 815-819.
- Fanatico, A. C., Pillai, P. B., Emmert, J., and Owens C. M. 2007. Meat quality of slow-and fast-growing chicken genotypes fed low-nutrient or standard diets and raised indoors or with outdoor access. *Poult. Sci.* 86 (10): 2245-2255
- Harth, R. 2011. A new breed, highly productive chicken helps raise Ugandans for poverty. The bio design Institute. <http://asunews.asu.edu/node/21034>.
- Hoffmann, I. 2005. Research and investment in poultry genetic resources - challenges and options for sustainable use. *World Poultry Science Journal*. 61(1): 57-70.
- Idahor K. O., Yakubu A., Gwaza D. S., Egahi J. O., Dogo O. A. and John A. D. 2013. Physiological Indices of Four Broiler Strains on Feed Restriction in the Middle Belt of Nigeria. *J. Anim. Prod. Adv.* 3(9): 283-289
- Imouokhome, S. L. 2012. Effects of ascorbic acid and baobab fruit pulp meal supplementation as source of ascorbic acid in layer diets. A Ph.D. dissertation (unpublished) submitted to the Department of Animal Science, Ahmadu Bello University, Zaria, Pp 96-98.
- Leeson, S. and Summer, J. D. 2005. *Commercial poultry nutrition*. 3rd Edition, University Books, Ontario Canada. ISBN 978-1904761-78-5.
- Mosobalaje, M. A. and Adedoyin, A. A. 2021. Comparative study on pre and post point of lay performance of Noiler and two commercial pullets. *Nig. J. Anim. Prod.* 2021, 48(5): 165 – 172.
- Mosobalaje, M. A. and Oloko, A. B. 2021. Growing attributes of Noiler, Isa brown and nera black strains as replacement pullets. The Proceedings of the 55th Annual Conference of the Nigerian Society of Agriculture. Rufus



- Giwa Polytechnics, Owo, Ondo State. October 25 – 29, 2021. pp 719 - 721.
- Okosun, S.E. 1987. Studies on calorie and protein requirements of cockerels. Ph.D. Thesis. University of Ibadan. Ibadan. Nigeria. pp. 21-35
- Sandilands, V. and Hocking, P. M. 2012. *Alternative Systems for Poultry: Health, Welfare and Productivity*. CABI, p. 119
- SAS. Statistical analysis system. User guide SAS/STAT. 6th Edition SAS Institute Inc. Cary, NC USA, 1997.
- Van Marle-Köster, E., Hefer C. A., Nel L. H., and Groenen M. A. M. 2009. Genetic diversity and population structure of locally adapted South African chicken genotypes: Implications for conservation. *South Africa Journal of Animal Science* 38(4): 271-281.
- Wilson R.T. 2005. *Animal Husbandry in the Tropics*. (5th ed.). Oxford: *Blackwell Science*. *Pharm Bull*, 39: 1612-1614.
- www.kuroiler.com/en
- Yeung, E., Yong, E., Wong, F. 2004. Renal dysfunction in cirrhosis: diagnosis, treatment and prevention. *Med Gen Med*. 2004; 6:9.
- Zhao, J. P., Zhao G. P., Jiang R. R., Zheng M. Q., Chen J. L., Liu R. R., and Wen J. 2012. Effects of diet-induced differences in growth rate on metabolic, histological, and meat-quality properties of 2 muscles in male chickens of 2 distinct broiler breeds. *Poult. Sci*. 91(1): 237- 247. Stellenbosch University <http://scholar.sun.ac.za>