APR -05

Comparative Evaluation of Growth Performance and Carcass Characteristics of Three Broiler Strains Raised in South Eastern Nigeria

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Abstract
The growth performance and carcass characteristics of three commercial broiler strains reared in southeast Nigeria were investigated in this study. 288 day-old broiler chicks of Arbor acre, Hubbard and the Ross strains were assigned to six treatment groups (48 each) in a completely randomized design; each treatment was replicated three times at the rate of 16 birds per replicate. The treatments were designated as follows: Arbor acre female (AF), Arbor acre male (AM), Hubbard female (HF), Hubbard male (HM), Ross female (RF) and Ross male (RM). The birds were reared for 8 weeks. Data were collected on growth performance, 4th and 8th week carcass characteristics. Result on the growth performance parameters showed that average values for final body weight, total body weight gain, daily body weight gain, daily water intake and feed conversion ratio were significant ($p<0.05$). Result for 8th week carcass composition showed significant differences ($p<0.05$) for live weight, dressed weight, and weights of: wings, breast, back, legs, thigh, drumstick and shank in all treatments. It was concluded from this study that comparative sex evaluation revealed that the males of the three strains were superior in most of the traits studied at 8 weeks of age compared to their female counterparts. Subsequently, comparative strain evaluation revealed that the Ross had better performances in most of the traits studied than the Arbor acre and Hubbard.

Keywords: Broiler strain, arbor acre, hubbard, ross, carcass characteristics

Introduction

Poultry production especially the broiler enterprise, has great potentials for increasing protein supply in Nigeria. While broiler meat is an excellent source of high quality and readily digestible protein, it is a good source of micronutrients. Aside from providing high quality animal protein, poultry production also generates quick returns on investment and employment opportunities due to its short generation intervals (Olawunmi and Fagbuaro, 2011). The expansion of commercial broiler production in Nigeria has a great potential for the partial fulfillment of huge protein gap of the country. Broiler production is being raised by both large scale and small scale commercial entrepreneurs under farming conditions for fulfilling the protein need of the country. Many people are now being encouraged in this enterprise, as maximum return can be achieved shortly by investing minimum capital in broiler production (Sarker *et al.,* 2001).

The genetic constitution of the broiler chicken as well as non-genetic factors such as nutrition and sex were reported to have significantly influenced carcass value of broiler birds (Olawunmi and Fagbuaro, 2011). Orr *et al. (*1984) and Ojedapo *et al.* (2008) reported significant effect of breeds on growth performance of broilers. Also Smith and Pesti (1998) and Musa *et al.* (2006) observed significant effect of sex on live weight and carcass characteristics of broiler birds. The rapid growth and boom of modern broiler is now accompanied by increased carcass and abdominal fat that are of concern to the consumer and the processer .The continuing effort made by breeders to produce broiler chickens with improved production traits necessitates continuing evaluation of the various broiler strains.The development of suitable strains of broiler chickens for the tropical environment is a research interest which has engaged the attention of a number of poultry geneticists and breeders for the past two decades as reported by Ojedapo *et al*. (2008).

This research is therefore aimed at comparing the growth performance and carcass characteristics of three commonly reared broiler strains in the South eastern region of Nigeria.

Materials and Methods

The experiment was carried out at the Poultry Unit of Ebonyi State University Teaching and Research Farm of the Department of Animal Science, Faculty of Agriculture and Natural Resource Management, Abakaliki. A total of 288 day old chicks, 96 each of Arbor acre, Hubbard and Ross strains were used for the experiment. The birds were randomly allotted to six treatments: Arbor acre female, Arbor Acre male, Hubbard female, Hubbard male, Ross female and Ross male. Each treatment was replicated into 3, at the rate of 16 birds per

replicate, and total of 48 birds per treatment. The birds were housed in a deep litter with wood shavings as litter material. The experiment lasted for 56 days. The birds were fed commercial feed. Feed and water was provided *ad-libitum*. Growth performance parameters (Initial body weight was taken at the day of chick arrival.

Subsequently, the birds were weighed on weekly basis to obtain their weight gain. The body weight gains (BWG) was obtained by subtracting the initial body weight (IBW) from the final weight (FW). Daily weight gain (DWG) was obtained by dividing the body weight gain (TBWG) by the number of days the experiment lasted. Feed conversion ratio) were obtained. At the 56th day, a bird from each replicate was taken, starved and slaughtered. The dressed weight and the weights of different cut out parts of the bird were recorded.

Data collected was subjected to one way analysis of variance in a completely randomized design experiment and means were separated using Duncan's Multiple Range test.

Results and Discussion

The growth performance of the three strains of broiler is shown in Table 1 below. The results show that final body weight, total weight gain, average daily weight gain and Feed conversion ratio were significantly different ($p<0.05$). The Ross male had the highest final body weight (3286.67g), total weight gain (3249.97g), average daily weight gain (61.32g) and the best feed conversion ratio (1.54). The Arbor acre male had the highest value (510.98 ml) for the average daily water intake. This result is in agreement with the result of Amao *et al*. (2011), where they attributed this to the genetic merits of the Ross strain over other strains in the derived savanna zone of Nigeria. This result also shows that the male broilers, irrespective of strain had higher values compared to their female counterpart. The fact that the males had heavier body weight show that they are able to convert feed into flesh more efficiently than their female counterpart. Though the feed intake was not significantly different, the males are shown to consume more feed compared to their female counterpart. Smith *et al.* (1998) reported that strain and sex can affect feed intake and feed conversion ratio. However, in contrast, the poor performance and reduced feed intake of the females of broiler strain may be due to adverse environmental impact. Female strain is supposed to be less heat tolerant than the males, which might have affected their feed consumption capacity and other performance as well. Baghel and Pradhan (1989) and Islam (2000) reported that broiler performance is reduced significantly when they are raised under hot-humid and dry seasons than the cold-climatic condition.

Table 1: Growth performance of the Abor acre, Hubbard and Ross strains of broiler in South east Nigeria

Parameters	AF	AM	HF	HM	RF	RM	SEM
Initial BW (g)	38.7	39.7	36.7	37.2	36.5	36.7	0.29
Final BW (g)	2416.67^{d}	3090.00^{b}	2283.33^{d}	2376.67^{d}	2723.33^{c}	3286.67^{a}	94.00
Total WG (g)	2377.97^{d}	3050.00^{b}	2246.63^{d}	2339.47^{d}	2686.83^{c}	3249.97^{a}	93.94
Av. Daily WG (g)	44.87^{d}	57.55^{b}	42.39^{d}	44.14^{d}	50.70^{c}	61.32^{a}	1.77
Total Feed Intake (g)	4417.15	5012.62	4342.48	4682.19	4701.04	5010.49	97.57
Av. Daily FI(g)	83.34	94.58	81.94	88.34	88.70	94.54	1.84
Av. daily water intake (ml)	404.11^{b}	510.98^{a}	437.14^{b}	517.26^{a}	431.06^{b}	443.71^{b}	43.64
FCR	1.85^{bcd}	1.65^{ab}	1.93^{cd}	2.00^{d}	1.75^{abc}	1.54^{a}	0.05

abcd: Means with the same superscript in the same row are not statistically significant ($p>0.05$). AF – Abor acre Female, AM – Arbor acre male, HF – Hubbard female, HM – Hubbard male, RF – Ross Female, RM – Ross male, SEM-Standard Error of Means

Table 2 shows the 8th week carcass characteristics of the three strains. The result shows that the Ross male had the highest values for all the significant carcass traits. This shows that at the finisher phase the Ross male had a rapid growth compared to the other strains. These results show that the Ross strain grows faster at the finisher phase and converts less feed to meat which meets the consumers demand.

Conclusion and recommendation

It was concluded from this study that the males of the three strains were more superior in bodyweight after 8 weeks compared to their female counterparts. Subsequently, the Ross strain had better performances in most of the traits studied than the other two strains. Based on superiority of bodyweight at 8 weeks, the Ross strain would be recommended for commercial production compared to the Arbor acre and Hubbard strains.

Table 2: 8th week carcass characteristics of the Abor acre, Hubbard and Ross strains of broiler chicken in South east Nigeria

Parameters	AF	AM	HF	HM	RF	RM	SEM
Body weight(g)	2416.67 d	3090.00 b	2283.33 d	2376.67 d	2723.33 c	3286.67 a	94.00
Dressed weight(g)	1923.00bc	2405.67 ab	1632.00 c	1830.67 c	2032.00bc	2622.67 a	93.00
Dressing %	79.50	77.77	70.93	77.18	74.64	80.05	2.07
Wings(g)	197.33 ab	237.33 a	174.67 b	194.33 ab	199.67 ab	228.67 a	6.98
Head(g)	50.67 b	61.00 a	49.00 b	62.00 a	51.33 b	63.67 a	1.77
Neck(g)	129.67	155.00	140.00	122.33	130.67	163.67	5.96
Breast(g)	658.00bc	814.67 ab	455.33 c	568.33bc	767.33abc	992.00 a	54.12
Back(g)	297.33	355.00	285.00	286.00	286.00	355.00	10.54
Legs(g)	590.00 b	782.67 a	509.00 b	597.67 b	598.00 b	820.00 a	30.57
Thigh(g)	293.33bc	396.00 ab	240.00 c	288.67 c	300.67bc	430.00 a	17.05
Drumstick(g)	207.67 b	286.33 a	190.00 b	218.00 b	206.33 b	293.67 a	11.75
Shank(g)	89.00 b	94.00 ab	79.00 c	91.00 ab	90.00 ab	96.33 a	1.5

abc: Means with the same superscript in the same row are not statistically significant (p>0.05). AF – Arbor acre Female, AM – Arbor acre male, HF – Hubbard female, HM – Hubbard male, RF – Ross Female, RM – Ross male, SEM-Standard Error of Means

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