SHORT COMMUNICATION

Effect of Sex on Some Growth Criteria and Carcass Yield in Cobb Broiler Strain

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Abstract

The effects of sex on some growth criteria in Cobb broiler strain were studied. A total of two hundred and sixty-four chicks comprising one hundred and thirty-four males and one hundred and thirty females were used. Analyses of the results showed no significant ($P > 0.05$) sex variation in all growth criteria: body weight, body length, keel length, drumstick length, shank length and shank thickness at 3 and 6 weeks of age. The males were however, significantly heavier than the females at 9 and 12 weeks of age: the difference being 114.94g at 9 weeks and 186.67g at 12 weeks of age. The eviscerated weight of the female expressed as a percentage of live weight was marginally higher than of males (63.76% and 62.50% respectively). The proportion of breast in female broilers was also higher than male broilers. It could be inferred from this study that females had less inedible parts (blood, intestine and feathers) than males.

Key words: Broiler cut parts, sex variation, growth criteria.

Introduction

The most important factors in today's broiler industry are the "end product" traits - body conformation, absence of breast blister, grade quality, carcass appearance and yield of saleable broiler meat. These traits are useful information to geneticists in improving the market quality of breeding stocks. Phenotypic relationships between body weight and live body conformation in broiler strains have been studied extensively under different management systems (Chamber

and Fortin, 1984; Adeniji and Ayorinde, 1990; Monsi, 1992; Okon *et al.*, 1997).

The relationships existing among linear body traits provide useful information on performance, productivity and carcass characteristics of animals. Besides, body weight and linear body measurements of meat animal have been found useful in quantifying body size and shape (Ibe, 1989). Significant sex difference has been recorded for body weight at 12 weeks of age in some broiler strains (Wahid *et al.*, 1974; Monsi,

1992). In all the observations, males were heavier, have longer shanks and longer keels than females of the same age and similar ancestry. The female birds, on the other hand, are fatter than males because female hormones stimulate fat deposition (Adeniji and Ayorinde, 1990; Rondelli *et al.*, 2003). This sexual dimorphism of meat type chicken usually pose problem in situation where homogeneity of the group is required (Rondelli *et al.*, 2003). The development of poultry industry in recent times demanded the evaluation of different commercial broiler lines in order to improve production efficiency and help in decision making. The objective of the present study therefore, was to determine the extent of the variation due to sex on some growth criteria in the Cobb broiler strain and the quality of the saleable yield at 12 weeks of age.

Materials and Methods

Experimental Animals and Management

Two hundred and sixty-four (134 males and 130 females) day-old Cobb broiler chicks obtained from a commercial hatchery were used for this study. The experiment was carried out at the Faculty of Agriculture, Teaching and Research Farm, University of Ilorin, Ilorin, Kwara State, Nigeria. All birds used were weighed on arrival on the first day and wing banded. The birds were reared on deep litter house throughout the experimental period and were brooded on the floor using electric brooder from day old up to three weeks of age. They were fed *ad-libitum* with the commercial broiler starter and finisher mash (Pfizer® livestock feeds) containing 23% and 20% crude protein respectively. Water was also made available free choice.

Data Collection and Analysis

Measurements of all the growth criteria considered namely: body weight (BWT), body girth (BDG), body length (BDL), keel length (KL), Shank length (SHL), drumstick length (DSL) and shank thickness (SHIT) were taken on the birds at an interval of 3 weeks (3, 6, 9 and 12 weeks) early in the morning before feeding the birds. Body weight and body measurements were taken on all birds. All measurements of the legs was taken on the right leg of each bird. Body weight of individual birds was taken with a top loading scale in grams and corrected to two places of decimal. Body length, body girth, keel length, shank length and drumstick length were measured in centimeters using a tape rule and shank thickness was measured in centimeters with a pair of vernier calipers.

At twelve weeks of age, 20 birds (10 males and 10 females) were randomly selected and kept off feed overnight. These birds were allowed access to water till time of weighing prior to slaughtering. The birds were killed and thoroughly bled to get rid of almost all the blood. Special attention was given to keeping the methods of dressing, evisceration and separation of the carcass parts as uniform as possible. The dressed weight was the weight of the birds after removal of feather and blood. Evisceration was accomplished by removing the head close to the skull and the legs at the hock joint. This was followed by a complete removal of the trachea, oesophagus, crop, intestine, giblets, spleen, lungs, kidneys, oil gland and reproductive tract. The remaining carcass was then weighed as the eviscerated weight. Each carcass was cut up into parts-breast, leg (thigh and drumstick), wing and

back plus neck and weighed separately. The various weights were expressed as percentages of the live weight. All data obtained during the experiment were subjected to one-way analysis of variance, according to the procedures described by Steel and Torrie, (1980) with sex as the fixed effect. Where significant differences were obtained, the Least Significant Difference (LSD) t-test was used in separating the means. The coefficient of variation in the result shows an estimate of the relative variation generally in both male and female broilers.

Results and Discussion

The mean body weight, body length, body girth, keel length, shank length, shank thickness and drumstick length at 3, 6, 9 and 12 weeks of age for males and females are presented in Table 1. The results showed no significant ($P > 0.05$) sex difference in all the growth criteria under study at 3 and 6 weeks of age (Table 1). However, males were significantly ($P < 0.05$) heavier than females at 9 and 12 weeks of age; the difference being 114.94g at 9 weeks of age and 186.67g at 12 weeks of age. The difference could be related to variations in hormonal balance resulting in faster deposition of muscles in males than in the female birds. While females deposited more fat, their male counterparts deposited more muscles (Adeniji and Ayorinde, 1990). The coefficient of variation in the result shows an estimate of the relative variation in both male and female broilers. The males were generally more uniform in body weight and body measurements than the females as indicated by the lower coefficient of variability (2.53% versus 3.38% for body weight at 3 weeks).

The result also showed no significant sex difference ($P > 0.05$) for BDL, BDG and KLL at 9 weeks of age whereas sex effect was significant for SHL, DSL and SHT at the same age. At 12 weeks of age, all body measurements (BDL, BDG, KLL, SHL, DSL and SHT) exhibited significant ($P < 0.05$) sex difference (Table 1). This result agrees with earlier reports of linear body development with age (Crawford, 1994).

At 12 weeks old carcass yield of the broilers showed that the males were significantly ($P < 0.05$) heavier than their female counterparts in live weight, dressed weight and eviscerated weight (Table 2). There were also significant ($P < 0.05$) difference in leg weight, wing and back plus neck weight due to sex. This result corroborates the findings of Horn *et al.* (1998) who stressed that the coefficient of live weight variation increased more in male chicks in the second part of the rearing period compared to the females with less pronounced increase.

Furthermore, carcass yields expressed as percentage of live weight showed that females had numerically higher percentages of breast and back plus neck weight than the males being 12.6% versus 10.8% and 17.83% versus 16.57% respectively. Although the males were significantly ($P < 0.05$) heavier than females on live weight and eviscerated weight bases, the females eviscerated weight expressed as a percentage of live weight was marginally higher than that of males (63.79% versus 62.50%). This implies that the females have less inedible parts (feathers, blood and intestine) and yield more efficiently than the males. The proportions of major carcass parts [breast, leg, thigh and drumstick) and wing weight] established by this

Table 1: Effect of sex on growth criteria in Cobb Broiler strain

Age	3 weeks						6 weeks						9 weeks						12 weeks					
Sex	M		F		M		F		M		F		M		F		M		F		M		F	
Quantifier	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV
BMT (g)	276.71	2.53	275.53	3.38	856.18	2.37	857.33	2.45	1397.94 ^a	2.57	1283.0 ^a	2.70	1830.0 ^a	2.61	1663.3 ^a	3.07								
BDL (g)	20.8	0.82	20.6	1.37	30.13	0.85	30.12	0.87	38.5	1.28	37.19	1.04	44.4 ^a	0.88	42.54 ^a	1.27								
BDG (g)	16.10	0.82	16.19	1.35	23.26	1.03	23.08	1.14	28.45	1.10	27.98	1.46	32.02 ^a	0.94	30.46 ^a	0.95								
KLL (g)	5.06	1.45	5.20	1.47	7.84	1.30	7.82	1.22	9.91	1.38	9.50	0.94	12.41 ^a	1.37	11.80 ^a	1.13								
SHL (g)	4.32	1.04	4.24	1.05	6.36	1.01	6.15	1.28	8.76 ^a	1.26	8.41 ^a	1.22	10.10 ^a	1.07	9.22 ^a	1.03								
DLL (g)	6.97	1.78	6.89	1.88	9.61	1.57	9.66	1.36	13.40 ^a	1.51	12.53 ^a	1.42	16.12 ^a	0.99	15.25 ^a	1.15								
SHL (g)	1.29	2.32	1.23	2.35	1.86	2.03	1.87	1.70	2.34 ^a	0.76	2.26 ^a	1.05	2.46 ^a	0.59	2.39 ^a	0.66								

Within each week, means having different superscripts differed significantly ($P < 0.05$)

CV = Coefficient of Variation; M = Male; F = Female; BMT = Body Weight; BDL = Body Length; BDG = Body Width; KLL = Keel Length; SHL = Shank Length; DLL = Dinnick Length; SHT = Shank Thickness

Table 2: Carcass Evaluation at 12 Weeks of Age in Cobb Broiler Strain

Parameter	Male		Female	
	Mean $\pm$ s.e.	% of LW	Mean $\pm$ s.e.	% of LW
Live weight (g)	2,080 $\pm$ 217.71 ^a	-	1,700 $\pm$ 1,68.07 ^a	-
Dressed Weight (g)	1,780 $\pm$ 182.75 ^a	85.58	1,450 $\pm$ 122.47 ^a	85.29
Eviscerated Weight (g)	1,300 $\pm$ 162.02 ^a	62.50	1,084 $\pm$ 146.44 ^a	63.76
Breast Weight (g)	225.14 $\pm$ 25.42 ^a	10.82	214.24 $\pm$ 25.20 ^a	12.60
Leg Weight (g)	401.16 $\pm$ 37.61 ^a	19.29	332.10 $\pm$ 24.36 ^a	19.54
Wing (g)	254.22 $\pm$ 21.36 ^a	12.22	208.16 $\pm$ 16.98 ^a	12.24
Back + Neck (g)	344.62 $\pm$ 47.68 ^a	16.57	303.18 $\pm$ 22.39 ^a	17.83

Means having different letter superscripts differed significantly ($P < 0.05$)

S.E. = Standard Error
 % of LW = Percentage of live weight
 % of EW = Percentage of eviscerated weight

study were somewhat lower than the results obtained by some authors (Rondelli *et al.*, 2003 and Bogosavljevic-Boskovic *et al.*, 2006). The differences observed in the results of these investigation may be attributed to both genetic (breed or line hybrid used for fattening) and numerous non-genetic factors (nutrition, duration of the fattening period, live weight of chicken prior to slaughter, dressed carcass weight etc).

Conclusion

In conclusion, the findings from this study indicate that the proportion of breast to live weight in females was higher than that of males. There may be preference for the females of this strain of broiler if single-sex lots is required at the finishing stage.

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