Online Journal of Animal and Feed Research

Volume 6, Issue 6: 125-129; Sep 25, 2016 ISSN 2228-7701

IMPACT OF GENDER DETERMINATION THROUGH VENT SEXING ON COBB-500 BROILER PERFORMANCE AND CARCASS YIELD

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ABSTRACT: The study was conducted in order to explore the effect of separated sex rearing of broiler production performance. Total no of (n=24,000) Cobb-500 birds were reared for 42 days and divided in two group's A =12000 male and B= 12,000 females, according to their sex with 4 replication in each treatment where each replication had 3000 birds. They were provided the same feed and water *ad libitum* for the whole study. Initial body weight, temperature, humidity, feed intake, weekly body weight, mortality and final live weight of broiler were recorded. The study clearly shows significant differences (P<0.05) in term of body weight gain and FCR for males chicks compare to females. Male birds also showed significantly (P<0.05) better dressing percentage than female group. Male chicks had significantly (P<0.05) larger chest circumference females birds. The cross with the fastest growth rate also had the highest mortality. Mortality percentage was high in male chicks 4% then female's chicks 2%. The most profitable choice will be dependent on whether whole birds or parts are marketed and the relative values of the parts. All these findings together revealed that in separate sex growing male chicken showed better performance in terms of more production.

Keywords: Cobb-500 broiler, Vent Sexing, Growth Performance, FCR, Carcass

ORIGINAL ARTICLE
pii: S222877011600017-6
Received 28 Oct. 2016
Accepted 20 Nov. 2016

INTRODUCTION

Poultry industry plays a key role in GDP of countries (FAO, 2011), which provided fresh meat and full fill from the protein (Hussain, 2015). To enhance the daily production of poultry scientific and technological development of poultry is crucial now a day (Hussain, 2015). In order to worldwide scale, there is great tendency to provide chicken meat especially boneless and skinless broiler breast meat as increase consumption (Abdullah et al., 2010). This change put in the poultry industry is prominence to improve the breast meat yield and mass muscles development in young chicks (Abdullah et al., 2010). Improving the performance of growth and meat production breeder industry are continues strives on this (Mehaffey et al., 2006).

The main conditions which influence the meat yield in broiler are feed, sex, age, body weight and environmental condition at poultry house (Lopez et al., 2011). However, to achieve targeted goals it is strongly related to getting high carcass yield and growth performance at poultry house in less FCR. In poultry broiler strain are generally raise to fulfill the nutrition requirements in short period and also a very short source of income, for maximizes their profitability selection of bird on basis of sexing are reared. It was noted that local farmer buys sexed chicks and raised it separately sheds male & females in their poultry house, male's growing fast as compared to female chicken (Musa et al., 2006). So, the present study was undertaken to know the effect of separate sex growing on the incidence of metabolic disorders and the production performances of broilers reared under separate sex growing.

MATERIALS AND METHODS

All procedures in this study were approved by the Animal Care and Pakistan Poultry Association as international standers.

Site Selection

The study was carried out at Sadiq Poultry (Pvt) Limited, Chakri Hatchery Rawalpindi. Which is full fill from the latest hatchery automation ISO 1900-2000 certified hatchery. This is the largest eggs capacity hatchery of south Asia, which is producing the best quality of chicks through single stage incubation system.

To cite this paper: Yousaf A. 2016. Impact of gender determination through vent sexing on Cobb-500 broiler performance and carcass yield. *Online J. Anim. Feed Res.*, 6(6): 125-129.
Scienceline/Journal homepages: www.science-line.com ; www.ojafr.ir

Eggs Classification

Eggs (wt. 53-60 g) from broiler breeders (Cobb-500, 42-46 weeks of age) were selected. Hatchable eggs were selected on the basis of shell quality, weight and color. Only oval shape good quality intact eggs were selected for hatching. The substandard eggs such as cracked, misshapen, blood-stained, dirty, toe-punched and elongated were rejected. These eggs were collected at farm and stored at 20°C and 75% relative humidity until used in hatching trail. Before, trail eggs were fumigated with 20 g $KMnO_4$and 40ml formalin (40%) and 40 ml of water for 100ft 3 areas for 15 minutes. All the hatchable eggs were pre-heated at 82 °F for 5 hours in the incubator. Completion of pre-heating stage the incubation stage started automatically (Ross prime age). It prevents condensation and reduced variation in eggs internal temperatures.

Incubation stage Program

Stander single stage incubation stage program was used in the setter, with gradually decreasing machine temperature on every stage, starting from 100.3°F. Both of groups were treated with same incubation program (Ross Prime age Recommended by Chicks Master USA). After 449 hours (18.07 days) fertility was checked through the candling process, only fertile eggs were shifted to hatcher for next 56 hours. Water loss was recorded for all flocks' eggs. The normally average water loss is about 11-13%. While in the single stage incubation system water loss were recorded between 10.5-11.5%. Fertility of eggs was checked through the candling process; only fertile eggs were transferred to the hatcher. A standard hatching program (Ross Prime age recommended by chicks master USA) was used in the hatcher, where the stage beginning at a set point temperature of 98.5°F at day18.7, which was gradually decreased to 96.6°F at day 21. Normally approximately 21.08 days (after 506 h of incubation including drying), the hatching process was ended.

Chicks Grading/Yield Measure

Chick yield was measured with the average weight of fresh eggs at the setting time, with the average weight of day-old chicks. Chicks were treated for full-time incubation period 21 days (506 hours). Body weights of chick were determined immediately after chick collection. Female chicks hatched earlier than male chicks. Hatch out chicks was graded through conveyor. Only stranded chicks were shifted to box after counting, while dead, week, and unhealed naval chicks were removed as the international standard recommended by International Poultry Association.

Vent Sexing of Chicks

Chicks (male 12000 and female's 12000) were isolated through vent sexing. The qualified team identified male and females chicks.

Chick's group classification

Total 24000day-old Cobb 500 chicks (Male 12000, Females 12,000) were taken for entire study from SP Hatchery Chakri. The study was conducted at the Sadiq Broiler Farm, Khilari (Chakri, Rawalpindi) for a period of 42 days. The broiler chicks were separated by vent sex. Males and females can be separated through vent sexing (Austic and Nesheim, 1990). The chicks were sexed at day-1 at Sadiq Poultry (Pvt) Limited, Chakri Hatchery to establish separate male and female flocks. There were two treatments i.e male chicks and female chicks 4 replications in each treatment. Three thousand chicks were allocated for each replication. Fresh, clean and sun-dried rice husk was used as shallow litter (5-inch depth) on the floor.

Poultry House Conditions/Feed

The chicks were delivered to poultry houses through environmentally controlled vehicles (24^0C temperature and 65% humidity). At the farm, chicks were offered water and feed immediately. All the chicks were fed and watered *ad libitum* on proprietary broiler starter and finisher diets. Round plastic feeders and drinkers were used. SB feed was offered to chicks during the whole period of study. The continuous light was applied during the whole study. For the first 2 weeks, four 40-watt tube lights were used at night to facilitate eating and drinking of the birds. Rest of the week's 1-hour dark was allowed at night in two times. The chicks were brooding for 7 days; brooding temperature was adjusted (95 ^{0}F) with house temperature (Table 1). The chickens were fed with starter diets from 1 to 13 d (3010 Kcal ME/kg, 22% crude protein), grower diets from 14 to 30 d (3175 Kcal ME/kg, 20% crude protein) and finisher diets from 31 to 42 d of age (3227 Kcal ME/kg, 18% crude protein). Water and feed were supplied *ad libitum*. The diet was formulated according to the recommendations of the NRC (1994) using WUFFDA formulation software program. Intake of feed and water was taken daily, while body weight and total feed consumed was recorded on weekly basis. Organ weight and carcass measurements were also taken at the end of

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the study. Poultry house conditions were same for all group's temperature. For Ventilation Viper Touch (Big Dutchman) system was installed.

Table 1 - Environmental condition of Poultry House

Parameters	1st Week	2nd Week	3rd Week	4th Week	5th Week
Temperature (^{0}F)	95-86	86-83	83-77	77-75	75
Humidity (%)	65	65	65	65	65
Ventilation (m^3/hour/bird)	0.07	0.25	0.40	0.59	0.87

Statistical analyses

Statistical analysis of data collected in this completely randomized design was performed using the SAS® statistical program. The descriptive analyses of data were conducted to verify the assumptions of analysis of variance (T-test), which demonstrated the need to transform the feed conversion, livability and yield variables. This transformation was done by the base 10 log scales.

RESULTS AND DISCUSSION

Results from this study clearly show significant differences in body weight gain between broilers (Male & Females) at various ages. These results are similar to those reported by (Mehaffey et al., 2006). Isolation of sex difference the effect on the weight of the birds is usually observed in broilers as such it was documented by (Fanatico et al., 2005). There was the significant effect ($P<0.05$) of interaction between sex male and females chicks. The detail sex difference on growth characteristics among male and females cobb-500 broiler chicks is presented in Table No2. Male broilers are often heavier carcass and body weight than females (Young et al., 2001). In their entire study, it was documented that the male's chicks remain heavier than the females. Group **A** Males show better result in term of weight gain and FCR as compare to group **B** Females as showed in Table 2.

Table 2 - Average chicks weight, FCR, livability and yield by sex

Feature	Male	Females	Means
Weight gain (kg) from 0 to 21 days	0.395^a	0.370^b	0.387
Weight gain (kg) from 22 to 42 days	2.256^a	2.110^b	2.133
Feed conversion (g:g) at 21 days	1.487^a	1.677^b	1.578
Feed conversion (g:g) at 42 days	2.287^a	2.367^b	2.327
Livability (%) at 21 days	98.38^a	99.58^a	98.98
Livability (%) at 42 days	98.48^a	99.51^a	99.01
Carcass yield (%)	75.95^a	74.35^b	75.15
Breast yield (%)	23.25^b	25.31^a	24.35
Leg yield (%)	28.03^a	26.65^b	27.45

^{a,b} means in the same row with different superscripts differ significantly ($P<0.05$)

Regarding FCR, the sex effect was not observed at the age of 20 days. In all other ages, males had better feed conversion than females, indicating their greater feed efficiency. Feed intake and FCR their existence significant effect ($P<0.05$) difference in the parameters. With the numerical females consumed more feed and gain less weight which presented poor FCR, which is the economically poor result as compared to males. (Malone et al., 1979) reported male is significantly better in term of live weight than females. Males can get prepared before then females chicks which are as result of less FCR (Lana et al., 2000, Viana et al., 2000). Differences in growth performance between female and male broilers were in agreement with those previously reported (Lopez et al., 2011). Although there was no incidence of diseases during the whole study periods, mortalities of 2% for group B (females), whereas as 4% for group A (males) were recorded. The result of sex isolation rearing on carcass measure of cobb-500 broiler shows significant ($P<0.05$) expect in the neck length Table no 3. Males show higher neck length then female's chicks as documented by (Al-Qamashoui et al., 2014) generally males are superior to females (Guni and Katule, 2013). Shanks of female's chicks were recorded smaller than males (Munira et al., 2006). The results in tables were collected for strains under the same environmental conditions. There was no effect of sex on bird's

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livability, a result also observed by (Hellmeister Filho, 2002). Fast-growth resulted in increased appetite, lower feed conversion, higher BW, and greater meat yield (Joseph and Moran, 2005). The findings of this work tended to show that male Cobb-500 broilers had better performance significant ($P<0.05$) in terms of weight gain and carcass parameters measured, when compared to their female as documented by (Kidd et al., 2005). The male showed considerably improved growth rate; this rapid growth was accompanied by an increase in fat deposition (Griffin, 1996). However, this work did not go into measuring the fat deposits.

Table 3 - Effect of sex difference on carcass characteristics of broiler chicken

Parameters	Male	Females
Average carcass weight (kg)	0.85 ±0.95	0.65 ± 0.36
Body girth (cm)	38.08 ± 0.22	37.06 ± 0.41
Body length (cm)	39.65 ± 0.25	36.87 ± 0.42
Breast (cm)	11.12 ± 0.12	10.45 ± 0.12
Shank length (cm)	16.96 ± 0.23	15.24 ± 0.23
Thigh (cm)	14.15 ± 0.23	13.45 ± 0.25
Neck (cm)	3.25 ± 1.23	2.75 ± 1.00

CONCLUSION

For the purpose of increased maximization of profit in broiler industry, broiler production can be carried out based on sex separation. Males can be raised separately from females and fattened for market or as cut-up carcass parts and sold as such.

Acknowledgments

The author is thankful to respectable Director of Sadiq Poultry (Pvt) limited Mr. Salman Sadiq and Project Coordinator Engr. Jawad Kiwan Qazi for their full support, motivation, fruitful suggestions and encouragement during the whole period of research work. The author is also grateful to Dr. Kashif for their cooperation.

Conflict of interests

The authors declare that they have no conflict of interest with respect to the research, authorship, and/or publications of this article.

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