

## INVESTIGATION ON PERFORMANCE AND CARCASS CHARACTERISTICS OF CROSS-BRED (RIR X FAYOUMI, F<sub>1</sub>) COCKERELS AT DIFFERENT AGES

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### ABSTRACT

The research was conducted to investigate the profitable market age of Cross-bred (RIR X Fayoumi) cockerel reared for meat purpose on semi-scavenging system. One hundred and twenty birds were used in the experiment which was distributed randomly into 4 groups such as A1, A2, A3 and A4 depending on rearing age. Each group contains 10 birds. Data on group A1, A2, A3 and A4 were recorded at the age of 12, 14, 16 and 18 weeks respectively with similar type of ration. The data of the present study showed that average live weight of the birds at 12, 14, 16 and 18 weeks were 738.33g, 919.00g, 1099.33g and 1276.67g respectively and all the treatment groups were significantly different ( $P < 0.05$ ) among them. Feed intake was varying from 3457.33g to 6535.00g and all the treatment groups were significantly different ( $P < 0.05$ ) at 5% level. The FCR value was significantly lower ( $P < 0.05$ ) in A1 (4.68) and followed by A2 (4.91), A3 (4.95) and A4 (5.12). Lower FCR value indicates positive performance. The lower mortality mean value 6.67% was found in A2 and no significant differences was found among the treatments. The mortality mean value was 8.33%, but no significant difference ( $P > 0.05$ ) was found in mortality. The cost benefit ratio (CBR) of A2 (1.14) and A3 (1.14) groups were significantly higher ( $P < 0.05$ ) than A1 (1.09) and A4 (1.11) groups, no difference ( $P > 0.05$ ) was found between A2 & A3 and A1 & A4 groups. The dressing % and carcass parts of A1, A2, A3 and A4 were statistically non significant ( $P > 0.05$ ). According to Cost Benefit Analysis, 14 weeks were the best profitable marketing age for sonali cross-bred male chicken, although dressing percent and carcass weight percent of breast, thigh, drumsticks, back, wings and neck was not affected ( $P > 0.05$ ) by different age groups.

**Key words:** carcass, cross-bred, cockerels, ages.

### INTRODUCTION

The number of commercial hatchery in Bangladesh has been estimated to be nearly 100 but the leading hatcheries in the country will not exceed 10. About 85% of the production of hatcheries is broiler DOCs, the remaining being layer DOCs (Chand *et al.*, 2009). There are about 0.18 million layer parent stocks exist in Bangladesh, which producing 106.6 million day-old chicks per year (Saleque, 2009). Male chicks from layer hatchery are usually sold at low price. Some farmers are interested to purchase those chicks to produce cockerels by feeding broiler feeds and earn profit by selling on cash payment. In this study, it is important to report the profitable age and weight at marketing of the Sonali cockerels of RIR x Fayoumi genotype reared in semi-scavenging system.

The Sonali (RIR x Fayoumi) chicks are available in some government hatcheries and private sectors and chick price is reasonable. This crossbred is popular and demandable to the customers and growers

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due to its phenotypic outlook similar to indigenous chicken. About 8.54 million Sonali chicken were produced in 2010 (WAPSA-BB, 2011). The layer farmers have to purchase straight run Sonali (RIR x Fayoumi) chicks, because the hatcheries sell such crossbred without sexing at day-old. Therefore, efforts are needed to sell only male chicks of such crossbred at day-old following sexing. The confinement system of rearing is profitable for large flock, but in case of family poultry production semi-scavenging system is important. Poultry sector contributes about 37% of the total animal protein available in Bangladesh (Ahmed and Islam, 1990). According to the latest data appeared in a national daily, Bangladesh is producing more than 400 million broilers and 6600 million pieces of eggs in commercial sector which represent 60-70% of country's total poultry meat and egg production and the remaining 30-40% production is being added from traditionally reared free range scavenging native chicken. (Chowdhury, 2011). Demand of chicken meat is increasing day by day. Production of broiler and Indigenous chicken are not adequate to fulfill the meat requirement. Sonali (RIR x Fayoumi) cockerels have the greater prospect to fulfill the demand of chicken meat. Sonali females are used for egg production; male chicks can be used for meat production. It has good scavenging habit and less susceptible to diseases. Previous research finding regarding the economic marketing age of Sonali male in scavenging or semi-scavenging system is not available. Considering the above factors the researchers felt necessity to conduct this research to fulfill the following objectives.

1. To determine the performance of Sonali male chicken.
2. To investigate carcass characteristics of Sonali birds.
3. To identify the profitable marketing age of Sonali cockerel by using same ration of different age groups.

## MATERIALS AND METHODS

The research was conducted to investigate the proper marketing age of Sonali cockerel for meat purpose under semi-scavenging system for 18 weeks. The trial period was July-November, 2010. A total of 120 Sonali birds were used for the experiment. The treatments groups were A1 (12 week age), A2 (14 week age), A3 (16 week age) and A4 (18 week age). Each groups had three replications. There were 10 birds in each replication. A1, A2, A3 and A4 were raised up to age groups of 12, 14, 16 and 18 weeks, respectively. The day old birds were brooded as per poultry husbandry regulations. During brooding period the temperature was 33<sup>o</sup> - 30<sup>o</sup>C.

**Feed:** The feed ingredients were purchased from the market and properly mixed after grinding to formulate ration (19.25% CP and 2875 ME Kcal/ Kg) for the experimental birds (Table 1).

**Table 1. Feed ingredients used in the ration of experimental birds**

| <i>Feed ingredients</i> | <i>Amount (Kg)</i> |
|-------------------------|--------------------|
| Maize                   | 48                 |
| Wheat bran              | 12                 |
| Rice polish             | 13                 |
| Til oil cake            | 15                 |
| Protein concentrate     | 10                 |
| Bone meal               | 1.5                |
| Common salt             | 0.5                |
| Total                   | 100                |

**Data Collection:** The following data were calculated.

Live weight, feed intake, and mortality of birds, cost benefit ratio, dressed weight, eviscerated weight, breast weight, thigh weight, leg (drumsticks) weight, wing weight, back weight and neck weight.

The following formula was used to calculate Feed Conversion Ratio (FCR), Cost Benefit Ratio (CBR), Dressing yield and Dressing percent:

$$\text{FCR} = \frac{\text{Total feed intake}}{\text{Final Body weight}}$$

$$\text{CBR} = \frac{\text{Total income per bird}}{\text{Total cost per bird}}$$

### **Dressing procedures**

Two birds were picked up at random from each replicate at the end 12, 14, 16 and 18 weeks of age and sacrificed to estimate dressing percent and weight of breast, thigh, drumstick, back, neck and wing. All birds to be slaughtered were weighed and fasted for over night (12 hours) but drinking water was provided *ad-libitum* during fasting to facilitate proper bleeding. All the live birds were weighed again prior to slaughter. Birds were slaughtered by severing jugular vein, carotid artery and the trachea by a single incision with a sharp knife and allowed to complete bleed out at least for 2 minutes. Then the slaughtered birds were weighed again. To remove feather easily the birds were immersed into the boiled water of 123 to 128<sup>o</sup> F at 1.5 to 2.0 minutes in order to loosen the feathers from the carcass. The scalded loose feathers of birds were defeathered by a rotating drum having long rubber fingers. Then the carcasses were washed manually to remove loose singed feathers and other foreign materials from the surface of the carcass. All the defeathered carcasses were singed through gas flame to burn hair like pin feathers. Then the carcasses were eviscerated and dissected according to the methods by Jones (1984). Dressing yield was found by subtracting blood, feathers, head, shank, liver, heart and digestive system from live weight.

Dressing yield /Meat yield= Live weight - (blood + feather + head + shank + liver + heart + digestive system)

**Dressing % of broiler chicken** = (Meat yield/ Live weight) x 100

### **Management**

Three small unit tin shed roofed houses with brick wall were made for each replication in the poultry farm premises only for night shelter. Forty birds were kept in each shed and divided into group A1, A2, A3 and A4 by leg banding. For semi-scavenging rearing free space in front of each unit was surrounded by wire-net. The feed particles and water were supplied in round plastic feeders and drinkers in the open area of the shed.

### **Vaccination**

The birds were vaccinated against infectious bronchitis, Newcastle disease (Ranikhat) and Gumboro disease.

### **Statistical analysis**

Collected data and information were compiled. Excel program was used for preliminary data calculation such as number, range, average, mean. MSTAT-C statistical program was used. Data was analyzed in factorial experiment with Completely Randomized Block Design (CRBD) for ANOVA. Duncan's Multiple Range Tests was done for comparison at 5% level of significance.

## **RESULTS AND DISCUSSION**

The production performance parameter such as live weight, feed intake, FCR, CBR is presented in Table-2. The data of present study showed that average live weight of A1, A2, A3 and A4 was 738.33, 919.00, 1099.33 and 1276.67g, respectively and all treatment groups differed significantly ( $P < 0.05$ ). These results might be due to different age of treatment group. This research result seems better performance than Dhar *et al.*, (2007) who showed that body weight of crossbred (RIR male X Fayoumi female) chicken was 404.5g in 9<sup>th</sup> week and 1096.6g in 20<sup>th</sup> week. This difference might be

management concerned. Other scientists showed that body weight of RIR male X Fayoumi female chicken was 1449g in 23<sup>rd</sup> week (Rahman, *et al.* 2004). Mostageer *et al.* (1975) who demonstrated that body weight of males at 12 wk of age averaged 549g for Fayoumi, and Rizk and El-Ibiary (1960) in Egypt reported that the mean weight of Fayoumi chicks reared up to 16 weeks of age was 734g. Feed intake varied from 3457g to 6535g and all the treatment groups differed significantly ( $P<0.05$ ). These results could be due to different age of the treatment group. Feed intake couldn't express the actual productivity, because it depends on feed efficiency.

FCR is an indicator of expressing best or worst result, even actual productivity. Lowest FCR means good result. The lowest FCR was found in A1 (4.68) and followed by A2 (4.91), A3 (4.95) and A4 (5.12). Azharul *et al.* (2005) found FCR 4.61 during 9 to 14 week of age in crossbred chicken (RIR x Fayoumi).

**Table 2. Production performance of Cockerel (RIR male x Fayoumi female) at different ages**

| Treatments   | Parameters                |                              |                             |                   |                          |
|--------------|---------------------------|------------------------------|-----------------------------|-------------------|--------------------------|
|              | Average Live wt. (g/bird) | Average Feed Intake (g/bird) | FCR (Feed Conversion Ratio) | Mortality (%)     | Cost benefit ratio (CBR) |
| A1 (week-12) | 738.33 <sup>d</sup>       | 3457.33 <sup>d</sup>         | 4.68 <sup>c</sup>           | 6.67 <sup>a</sup> | 1.09 <sup>b</sup>        |
| A2 (week-14) | 919.00 <sup>c</sup>       | 4512.33 <sup>c</sup>         | 4.91 <sup>b</sup>           | 6.67 <sup>a</sup> | 1.14 <sup>a</sup>        |
| A3 (week-16) | 1099.33 <sup>b</sup>      | 5447.00 <sup>b</sup>         | 4.95 <sup>b</sup>           | 10.0 <sup>a</sup> | 1.14 <sup>a</sup>        |
| A4 (week-18) | 1276.67 <sup>a</sup>      | 6535.00 <sup>a</sup>         | 5.12 <sup>a</sup>           | 10.0 <sup>a</sup> | 1.11 <sup>b</sup>        |

Means within a column with different superscripts are significantly different ( $P<0.05$ )

The mortality data varied from 6.67 to 10.0%. There was no significant difference ( $P>0.05$ ) in mortality. Mortality was found 6.67, 6.67, 10.0 and 10.0 % in A1, A2, A3 and A4 group respectively. Azharul *et al.* (2005) found mortality 9.80% during 9 to 14 weeks of age in crossbred chicken (RIR x Fayoumi). Sarkar *et al.* (2008) found 8.3% mortality in confinement system at 13 weeks of age.

The Cost Benefit Ratio (CBR) of A2 (1.14) and A3 (1.14) groups also differed significantly ( $P<0.05$ ) from A4 (1.11) and A1 (1.09), but there was no significant difference between A2 & A3 and A1 & A4 groups. It is revealed from the result that highest (14%) profit margin was achieved from the A2 & A3 groups and lowest (9.0%) from A1 group. According to Cost Benefit Analysis, 14<sup>th</sup> weeks might be the best profitable marketing age for crossbred cockerel of Sonali chicken. Sarkar *et al.* (2008) found out the most profitable target weight (850g) of cross-bred Sonali cockerel than 1250g at 13 weeks of age in confinement system.

The carcass characteristics parameter such as dressing yield, carcass parts such as breast, thigh, drumsticks, back, wings and neck weight are presented in Table-3. The weight of carcass parts were not affected ( $P>0.05$ ) by different age groups. Islam and Dutta (2014) reported that all carcass characteristics enhanced significantly ( $P<0.001$ ), except dressing percent.

**Table 3. Carcass characteristics of cockerel (RIR male X Fayoumi female) at different ages**

| Treatments   | Parameters |                          |       |           |      |      |      |
|--------------|------------|--------------------------|-------|-----------|------|------|------|
|              | dressing % | Weight of carcass part % |       |           |      |      |      |
|              |            | breast                   | thigh | drumstick | back | wing | neck |
| A1 (week-12) | 56.0       | 13.0                     | 10.0  | 10.0      | 13.0 | 6.0  | 4.0  |
| A2 (week-14) | 55.0       | 14.0                     | 9.5   | 9.0       | 13.5 | 5.5  | 3.5  |
| A3 (week-16) | 54.5       | 14.5                     | 9.0   | 9.5       | 12.0 | 5.5  | 4.0  |
| A4 (week-18) | 55.0       | 13.5                     | 10.0  | 10.0      | 12.0 | 5.5  | 4.0  |
| LSD (0.05)   | NS         | NS                       | NS    | NS        | NS   | NS   | NS   |

NS= Non significant ( $P>0.05$ )

## CONCLUSION AND RECOMMENDATION

The productive performance varied at different ages as would be expected. There was no remarkable variation in carcass parts at different ages. According to cost benefit analysis, 14<sup>th</sup> weeks of birds might be the best for marketing of cross-bred (RIR x Fayoumi, F1) Sonali cockerels. So, male cross-bred Sonali chicks are profitable to produce cockerels in semi-scavenging rearing. Further study is needed to investigate its adaptability and profitability at rural condition in scavenging system.

**Acknowledgement:** The author grateful to the UGC Bangladesh for funding the research work.

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