

PRODUCTIVE AND REPRODUCTIVE PERFORMANCES OF INDIGENOUS AND BROILER PARENT LINE CROSSED WITH INDIGENOUS CHICKENS

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ABSTRACT

This study was conducted to compare the productive and reproductive performances of indigenous chicken and a flock of broiler parent line X indigenous chicken in deep litter system of rearing. The body weights (g) at different ages were significantly ($P < 0.05$) higher in group V than indigenous groups, but among indigenous groups no significant difference was observed. The birds of group V matured earlier than that of indigenous groups. Among indigenous groups, group III showed the earliest age at sexual maturity followed by group I, group IV and group II . The egg production was significantly higher in group V than indigenous groups. Among indigenous groups, group III showed higher egg production followed by group I, group IV and group II . From this study it can be concluded that the productive and reproductive performances in terms of body weight, age at sexual maturity and egg production were found to be far better in crossed (broiler parent line X indigenous chicken) than indigenous groups. Among indigenous chicken groups, group II (black with brown hackle), crossed chickens (broiler parent line X indigenous) was found to be higher in growth performances, earlier age at sexual maturity and higher egg production respectively.

KEY WORDS : Indigenous chicken, Broiler parent line, Plumage colour pattern, Body weight, Age at sexual maturity, Egg production.

INTRODUCTION

The indigenous chickens are known for their adaptation superiority in terms of their resistance to endemic diseases and other harsh environmental conditions. Indigenous chickens are widely distributed in rural and semi-urban areas where they play an important role of income generation and food production. They provide their owners with economic and nutritional benefits with little or without any inputs (Moreki et al., 2010).

The management system is primarily of the free range type which is characterized by lack of supplementary feeding, minimal housing and litter with no health services to the birds. The detailed characterization of native chicken with respect to its egg, hatchability and growth performance traits and plumage color pattern is scanty. Crossing of indigenous chicken with improved breeds, strains, line is one avenue to increase the productivity of indigenous chicken. It seems therefore a laudable proposition that more attention should be given to the genetic improvement and development of the largely neglected native bird in order to ameliorate the present acute animal protein shortage.

Indigenous fowl possesses great potentials for genetic improvement through breeding programme such as selection and or cross breeding (Adebambo et al., 2009 and Adedeji et al., 2008). Hence an attempt was made to study the body weight, age at sexual maturity and egg production of different indigenous chicken on the basis of plumage color pattern and its cross with broiler parent line in Deep litter system of management.

MATERIALS AND METHODS

The experiment was conducted in the sheds of All India Co-ordinated Research Project on Poultry

Breeding, Directorate of Research (vety.), Assam Agricultural University, Khanapara, Guwahati, Assam, India. A total of 750 numbers of indigenous and broiler parent line X indigenous chicken were reared in the deep litter system of rearing. The broiler parent line chosen was PB-2, (PB-2; Punjab broiler-2) is a synthetic broiler parent line developed by Directorate of Poultry Research, Rajendranagar, Hyderabad, Telangana, India. The indigenous chickens were grouped on the basis of plumage color pattern as group I (black), group II (black with brown hackle), group III (brown) and group IV (barred). Another group V (PB-2 X indigenous chicken) was included in the study for comparison.

The mean body weights (g) were recorded at 0th day, 8th, 14th, 20th, 40th weeks of age in the morning hours before offering any feed or water with the help of a 0.5, 2 and 5 kg capacity weighing balance. Age at sexual maturity (days) was calculated when 20 % of birds came into production. The egg production (nos.) was recorded upto 40 weeks of age. Experiment was conducted as per the guidelines of Institutional Animal Ethics Committee.

The data obtained were analyzed according to the methods given by Snedecor and Cochran (1994). Significant differences between the groups for various traits were tested by one way-ANOVA.

RESULTS AND DISCUSSION

Body weight

The mean body weight (g) of males and females of different groups at 0th day, 8th, 14th, 20th and at 40th weeks of age is given in table 1 and 2. Statistical analysis revealed a significant ($P < 0.05$) difference in body weight among the groups (Table 1 and 2).

Table 1. Body weight (g) of different groups of male chicken at different weeks at different weeks of age

Groups	Body weight (g)				
	0 th d	8 th wk	14 th wk	20 th wk	40 th wk
Group I	26.01 ^a ±0.20	381.36 ^a ±4.21	818.55 ^a ±11.08	1060.00 ^a ±22.85	1368.88 ^a ±26.58
Group II	26.83 ^a ±0.43	389.04 ^a ±4.22	821.25 ^a ±10.78	1071.41 ^a ±19.12	1371.81 ^a ±28.11
Group III	25.93 ^a ±0.38	375.96 ^a ±5.16	807.10 ^a ±9.57	1044.58 ^a ±19.32	1347.27 ^a ±26.21
Group IV	25.87 ^a ±0.17	373.64 ^a ±5.48	802.61 ^a ±9.09	1050.90 ^a ±18.46	1342.50 ^a ±24.25
Group V	29.56 ^b ±0.21	670.68 ^b ±4.22	1712.27 ^b ±12.99	2272.00 ^b ±32.65	3530.00 ^b ±37.23

NB: Means having same superscript within a column do not differ significantly.

The results obtained are in line with Krishna et al. (2007) with superior body weight gain in colored layers compared to desi birds. The body weight of indigenous groups were recorded lower than

Table 2. Body weight (g) of different groups of female chicken at different weeks at different weeks of age

Groups	Body weight (g)				
	0 th d	8 th wk	14 th wk	20 th wk	40 th wk
Group I	22.92 ^a ±0.13	249.63 ^a ±4.31	633.53 ^a ±8.19	917.94 ^a ±15.67	1346.33 ^a ±19.55
Group II	23.75 ^a ±0.15	251.78 ^a ±4.29	636.59 ^a ±8.93	884.68 ^a ±11.57	1351.02 ^a ±18.23
Group III	23.75 ^a ±0.15	248.14 ^a ±5.04	624.52 ^a ±9.13	920.18 ^a ±14.02	1331.09 ^a ±18.72
Group IV	22.77 ^a ±0.16	239.31 ^a ±3.51	621.39 ^a ±5.84	891.15 ^a ±13.12	1325.17 ^a ±15.58
Group V	24.92 ^b ±0.16	659.80 ^b ±9.4	1340.00 ^b ±14.24	1715.39 ^b ±16.86	3041.31 ^b ±19.85

NB: Means having same superscript within a column do not differ significantly.

group V (PB-2 X indigenous), which is due to the fact that the indigenous chickens are known to be lighter and have compact body to escape from predators in free range system of rearing. Also, their lower body weight might be due to lower response to improved feeding management. The higher body weight in the group V may be attributed to the broiler inheritance of PB-2, which is a synthetic broiler line. In regards to the body weight in group V, similar findings were also reported by Gonmei (2012) and Kalita et al. (2011) with higher body weight in Vanaraja-a cross variety when compared to indigenous chicken. In the present study, males were found to have higher weight gain than females in each group which is in accordance with various reports (Gonmei 2012, Haunshi and Doley (2011) and Iqbal et al. 2008). Among the indigenous groups, the males and females of group II showed non significant higher body weight (g) followed by groups I, III and IV at different ages.

Age at sexual maturity

The mean age at sexual maturity (days) of groups I, II, III, IV and V chicken were 187.51 ± 0.32 , 189.25 ± 0.58 , 186.19 ± 0.69 , 188.03 ± 0.48 and 146.35 ± 0.60 respectively.

Statistical analysis revealed a significant ($P < 0.05$) difference, with group V chicken attaining earlier sexual maturity than indigenous chicken groups. The present finding in regards to indigenous chickens are in agreement with King'ori et al. (2007), Choudhuri et al. (2010) for. An early age at sexual maturity was recorded for group V which is in agreement with Gonmei (2012) which might be due to genetic influences on the sexual maturity, crediting to early age at sexual maturity.

The age at sexual maturity of group III was found to be earlier (days) among the indigenous groups, which might be due to higher body weight when compared to other indigenous chicken groups. The findings obtained are similar to the value reported by various authors (Gonmei 2012, Dutta et al., 2013 and Pathak et al., 2013).

Egg production

The mean egg production (nos.) from sexual maturity upto 40 weeks of production of groups I, II, III, IV and V chicken were 33.09 ± 0.16 , 32.84 ± 0.21 , 33.20 ± 0.14 , 33.00 ± 0.16 and 36.66 ± 0.33 respectively.

Statistical analysis showed significantly ($P < 0.05$) higher egg production in group V as compared to the other groups. The higher egg production in group V might be due to lack of broody character unlike the indigenous chicken. Also early attainment of sexual maturity in group V chicken contributes to the higher egg production. The present findings were in close agreement with the findings of Gonmei (2012), Haunshi et al. (2011) and Krishna et al. (2007) who reported a significantly higher egg production in Vanaraja- a cross variety, the colored birds than desi/ indigenous chicken respectively. Group III showed higher egg production among the indigenous groups followed by group I, group IV and group II which is due to early attainment of sexual maturity. The present finding is similar to the reports of Gonmei (2012) and Haunshi et al. (2009) for indigenous chicken.

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