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Study on effect of genetic groups on growth performance of poultry

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Abstract

Local chicken varieties like Aseel and Kadaknath are picking up significance throughout the years because of their unique characteristics. Present investigation was carried out on a total of 1082 chicks on growth performances (hatch weight to weight at first egg) belonging to seven genetic groups viz. Aseel, Kadaknath, desi, Black Australorp (BA), the crosses of desi with other recognized breeds as Rhode Island Red (RIR), BA and Aseel. The body weight of each and every chick was taken with the help of an electronic balance having least margin of error (accuracy) of 2 gms. Body weight was taken at the age of '0' day, 2-week, 4-week, 6-week, 12-week and weight at first egg. Genetic groups had significant influence on weight at all the ages under study. Significantly higher hatch weight was noticed in exotic birds BA. Among indigenous birds, significantly higher hatch weight was observed in Aseel in comparison to *desi* and their crosses with exotics (BA and RIR). At 12th week of age, significantly higher and lower body weight was observed in BA (559.16±6.659 g) and *desi* (397.41±9.615 g) birds, respectively. The weight in all the three crossbreds did not differ significantly among themselves. In general, weight at different ages from '0' day to weight at first egg was higher in BA followed by Aseel. On the contrary, lowest weight at different ages mentioned above was lower either in *desi* or in Kadaknath. The present study suggested rearing of purebred as backyard farming, BA birds are superior from dual purpose poultry birds, whereas Kadaknath and Aseel birds get higher price due to their specific good properties.

Keywords: Aseel, Genetic Groups, Growth Performance, Kadaknath, Poultry

Introduction

Poultry farming is one of the fastest growing segments of agriculture in India. It carries a pivotal position in current Indian economy and has evolved as an extremely business oriented enterprise (Sreenivas *et al.*, 2013) [13]. Village poultry is of very significant importance as a major source of meat, table egg and as a source of income (Zaman *et al.*, 2004) [17], mainly for the most deprived populations. Genetic resources making up that aviculture in traditional farming system are formed of a multitude of often poorly characterized populations. Poultry breeds have been artificially selected over many generations for two main economic traits, egg production and growth rate. As growth is a complex phenomenon and it is influenced by various factors, the role of genotype in the control of growth rate need not be over-emphasized. In poultry, age and breed are some of the many important factors influencing the rate of body weight gain.

Local chicken varieties like Aseel and Kadaknath are picking up significance throughout the years because of their unique characteristics. Aseel, a game chicken variety with tanish yellow hued plumes and long legs and neck is ordinarily utilized for meat purposes. Then again Kadaknath breed having fibromelanosis character normally utilized both for meat and egg production in tribal and rural areas of India. The dark flesh is very delicious, well known among tribal individuals and utilized for the treatment of numerous diseases by tribal, which needs appropriate logical intercession (Thakur *et al.*, 2006) [15]. Whereas, BA exotic dual

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purpose breed was introduced to crossbred with desi birds in India. The objective was to produce crossbred chicken that would provide more meat and lay more eggs while at the same time, would be more adapted to local environment. Therefore, present study was planned to see the effect of different genetic groups on growth pattern of poultry.

Materials and Methods

The present study was conducted on chicken maintained at Avian Research and Development Centre (ARDC) of Ranchi Veterinary College, Birsa Agricultural University, Ranchi (Jharkhand). A total of seven genetic group i.e. four purebred (Assel, Kadaknath, BA and desi) and three crossbred (RIR X desi, BA X desi and Assel X desi) were produced through artificial incubation from the egg of their respective parents. They were reared under proper care and management along with scheduled vaccination programme. The body weight of each and every chick was taken with the help of an electronic balance having least margin of error (accuracy) of 2 gms. Body weight was taken at the age of '0' day, 2-week, 4-week, 6-week, 12-week and weight at first egg.

The data were analyzed by analysis of variance technique to see the effect of genetic groups on growth rate according to Snedecor and Cochran (1994) [12]. In case of significant effect

of genetic groups, pair-wise comparison was made with the help of critical difference test.

Results and Discussion

'0' day weight: Genetic groups had significant ($P < 0.01$) influence on hatch weight (Table-1). Further Table-2 showed significantly higher hatch weight in exotic bird (BA). Among indigenous birds, significantly higher hatch weight was observed in Aseel in comparison to *desi* and their crosses with exotics (BA and RIR). This was possible due to fact that egg weight of these genetic groups i.e. BA were higher than other genetic groups.

Our findings are in conformity to those of Aggarwal *et al.* (1971) [11] who also reported almost similar hatch weight in *desi* (33.00 g) and their crosses with RIR (32.90 g). On the contrary, Sah *et al.* (1984) [7] observed lower hatch weight in indigenous birds than present one. Sapra and Chhabra (1972) [8] noticed slightly higher hatch weight in *desi* (30.89 g) birds than present findings (27.43±1.34 g). Our Hatch weight of Kadaknath was comparable with the findings of Thomas and Rao (1988) [14]; Sharma and Narayankhedker (2004) [10] and by Hanushi *et al.*, (2011) [4]. Hatch weight of Aseel birds were 31.06±0.299 g which is lower than 33.18±0.91 g reported by Valavan *et al.*, (2016) [16].

Table 1: Analysis of variation showing the effect of genetic groups on body weight at different ages

Source of variation	d.f.	Mean squares					
		Hatch wt.	2-wk. wt.	4-wk. wt.	6-wk. wt.	12-wk. wt.	Wt. at 1 st egg
Between genetic groups	6	1645.53**	3920.52**	126855.5**	25420.59**	177077.32**	240435.97**
Error	-	3026 (1075)	144.96 (969)	1217.98 (887)	2031.75 (808)	7100.25 (701)	70787.87 (116)

Figures in parentheses show error degree of freedom, ** $P < 0.01$

2-week weight: Almost similar trend was noticed for weight at 2-week of age as was noticed for hatch weight. It was observed that pure indigenous breeds and their crosses with exotics except with Aseel were lighter in weight (Table-2). Our findings are also supported by Chhabra and Sapra (1973)

[2] who got lower body weight in indigenous birds than exotic one. They also got higher weight in Aseel in comparison to other indigenous birds. Gajbhiye (2004) [3] reported lower body weight of indigenous birds at the age of 2 week (30.08 g) as compared to 38.41 g in our finding.

Table 2: Average body weight (gm) at different stages of growth

Genetic Groups	Hatch wt.	2 nd week	4 th week	6 th week	12 th week	Wt. at 1 st egg
Aseel	31.06±0.299 ^c (309)	46.38±0.657 ^a (279)	107.20±1.648 ^b (264)	197.79±2.811 ^c (239)	529.48±6.129 ^c (199)	1256.08±50.219 ^b (26)
Kadaknath	27.32±0.156 ^a (314)	44.77±0.877 ^a (280)	93.37±2.766 ^a (249)	175.43±3.203 ^b (220)	525.06±6.378 ^c (178)	1069.33±51.884 ^a (30)
BA	34.57±0.524 ^d (227)	53.20±2.891 ^c (207)	118.05±2.056 ^c (192)	200.79±3.332 ^c (82)	559.16±6.659 ^d (173)	1338.84±56.122 ^b (20)
Desi	27.43±1.34 ^a (54)	38.41±1.825 ^b (49)	83.23±9.251 ^a (44)	151.88±7.018 ^a (41)	397.41±9.615 ^b (37)	1004.20±147.158 ^a (15)
RIR x Desi	28.31±1.162 ^a (42)	45.87±1.954 ^a (38)	94.06±5.474 ^a (35)	176.91±6.974 ^b (32)	481.34±16.319 ^a (29)	1019.60±71.554 ^{ab} (10)
BA x Desi	27.67±0.683 ^a (74)	44.22±1.018 ^{ab} (67)	94.63±3.329 ^a (60)	177.00±5.219 ^b (55)	481.25±11.610 ^a (51)	1191.00±82.317 ^{ab} (10)
Assel x Desi	24.79±0.342 ^b (62)	41.32±1.061 ^b (56)	94.24±3.359 ^a (50)	176.35±5.739 ^b (46)	449.02±11.380 ^a (41)	1131.14±118.634 ^{ab} (12)

Figures in parentheses are number of observations; Superscripts are read column wise for comparison of mean. Different superscripts differed significantly ($P < 0.05$)

4-week weight: Average body weight at 4 week of age (Table-2) showed significantly higher weight in BA (118.05±2.056 g) and Aseel (107.2±1.648 g) than other 5 genetic groups, which did not differ among themselves. Significant difference in body weight among BA, Aseel and indigenous birds are natural because BA is a heavy breed with a genetic makeup of increased meat production, while *desi* is a lighter breed. Aseel lies in between these two genetic

groups.

The weight at 4 week of age in *desi* bird during present study was higher (83.23±9.251 g) to those of Sah *et al.* 1984 [7] (78.33 g in males and 65.45 g in females) and Gajbhiye, 2004 [3] (49.25 g) and lower to the finding of Sapra and Chhabra 1972 [8] (121.57 g) and Chhabra and Sapra 1973 [2] (114.05 g). Chhabra and Sapra (1973) [2] reported somewhat higher body weight in Aseel (141.17 g) at 4 wk. of age as compared to our

finding (107.20 g). In the present study, Kadaknath weighed 93.37 ± 2.766 g which is lower than with the 4th week body weight reported by Parmar *et al.*, (2003) ^[5] as 105 g.

6-week weight: Significantly higher body weight was observed in BA (200.79 ± 3.332 g) and Aseel (197.79 ± 2.811 g) whereas significantly lowest weight was observed in *desi* (151.88 ± 7.018 g). Gajbhiye (2004) ^[3] observed lower body weight at 6 week of age in indigenous birds (77.35 g) in comparison to that in indigenous birds as well as other birds of our study.

12-week weight: Genetic groups had significant influence on weight at 12th week of age (Table-1). The weight at 12 week of age in *desi* bird (397.41 g) observed during present study was higher to those of Sah *et al.* 1984 ^[7] (302.22 g in females and 322.22 g in males) and Gajbhiye, 2004 ^[3] (283.62 g) but lower to those of Aggarwal *et al.*, 1971^[1] (521.10 g), Chhabra and Sapra, 1973 ^[2] (603.86 g) and Sapra and Chhabra, 1972 ^[8] (590.40 g). The body weight in Kadaknath breed observed during present study was almost similar to those of Sharma and Narayankhedker (2004) ^[10] and Thomas and Rao (1988) ^[14]. The weight at 12 week of age in Aseel bird (529.48 ± 6.129 g) observed during present study was lower to those of Shanmathy *et al.* 2018 ^[9] (637.99 ± 6.71 g), whereas weight at 12 week of age in Kadaknath bird (525.06 ± 6.378 g) observed during present study was higher to those of Shanmathy *et al.* 2018 ^[9] (437.58 ± 5.04 g).

Weight at first egg: Significantly higher body weight of bird at first egg was observed in BA (1338.84 ± 56.122 g), Aseel (1256.08 ± 50.219 g), BA X *desi* (1191.00 ± 82.317 g) and Aseel X *desi* (1131.14 ± 118.634 g) while significantly lower weight at first egg was noticed in *Desi* (1004.20 ± 147.158 g) and Kadaknath (1069.33 ± 51.884 g). Sah *et al.* (1984) ^[7] reported somewhat lower weight at first egg (963 g) for female indigenous chicken as compared to that in present finding. Almost similar weight at first egg of Kadaknath breed was also reported by Thomas and Rao (1988) ^[14] against that in present study. Among these two native breeds, the growth rate of Kadaknath breed is significantly lesser as compared to Aseel breed also reported by Singh and Singh (2004) ^[11], Haunish *et al.* (2011) ^[4] and Pathak *et al.* (2015) ^[6]. Higher body weight in Aseel may be due to taller stature attained in course of selection for fighting and natural tendency for robust muscle development (Shanmathy *et al.* 2018) ^[9].

Conclusion

The present study suggested rearing of purebred as backyard farming, BA birds are superior from dual purpose poultry birds, whereas Kadaknath and Aseel birds get higher price due to their specific good properties. Kadaknath birds sold relatively in higher price due to its black flesh which is very delicious, high protein meat and with high medicinal value.

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