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PERFORMANCE STUDY OF CROSSBRED DUCK (BEIJING X DESI WHITE DUCK) IN COMPARISON WITH THEIR PARENTS

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ABSTRACT

The experiment was undertaken to compare the performance of crossbred duck (Beijing x desi white) F_1 with that of their parents (native Desi white (DW) and Beijing duck). Live weight of Beijing showed highly significant difference at 8 weeks of age compared to white duck but no statistical difference observed at 10 and 12 weeks of age. Dressing yield and breast muscle percent differed significantly at 8 and 12 weeks of age among the genotypes except at 10 week. Abdominal fat percent of F_1 (0.73) was significantly lower than Beijing (0.88) ducks. The maturity age was 161±9.75, 182±10.01 and 154±9.58 days for DW, Beijing and F_1 ducks, respectively. The average body weight (g) at maturity of Desi white, Beijing and white (F_1) ducks were observed to be 1479±25.34, 2530.65±150.30 and 2250.24±35.18g, respectively. The average values for egg weight (g) of DW and F_1 duck at 40 weeks of age were 55.14 ± 4.50, 64.15 ± 3.80, 60.35 ± 6.24, respectively and at 60 weeks of age were 56.27 ± 5.30, 68.00 ± 5.70, 60.34 ± 6.24, respectively. Crossbred ducks produced higher egg than desi and beijing ducks. The average shape index values obtained in DW, beijing and crossbred duck (Beijing × Desi white) were 76.37±. 86 76.20 ± 1.10 and 75.33±1.17, respectively. The average Breaking Strength values obtained in DW, beijing and crossbred duck were 4.23±. 28, 3.22 ± 0.25 and 2.26 ±..32, respectively. The average eggshell thickness (mm) values obtained in DW, beijing and crossbred duck were 0.43±1.7, 0.44 ± 4.15 and 0.44±5.17, respectively. The eggshell value was higher in crossbred duck than desi and beijing duck. Haugh unit was 77.49±4.5, 90.21 ± 7.60 and 80.86±6.7 for Desi duck and crossbred duck, respectively. Desi duck is more resistant than other ducks. Mortality rate was found higher in crossbred duck.

Key words: Performance, crossbred duck, parents

INTRODUCTION

Waterfowl in Bangladesh including ducks, common native birds and migratory birds are found in water bodies or wetlands. Duck has the economic importance due to its productive and reproductive performance as well as the potentiality under farmer's condition and reared commercially than the other birds. From ancient times domestic ducks have served as a source of food and income for people in many parts of the world. Ducks are good sources of meat, eggs and down-feathers. Duck meat and eggs are good dietary sources of high protein, energy, several vitamins and minerals. There is about 36 million ducks in Bangladesh (WAPSA, 2007). The broiler type duck is the contribution of a series of research activities worldwide especially in Taiwan, Chaina, Malaysia, Philippine France and Germany. It is a unique 3-way crossbred meat duck having higher growth, quality meat texture and lean meat. Their parents are Muscovy drake and F_1 (Beijing x Desi white) duck. Selection of parents is the prime importance in any breeding program for ensuring higher productivity. Desi ducks are more resistant to disease (George, 1980).

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Crossbreeding helps in combining two divergent sets of characters for maximum production and endows heterosis of varying magnitude in the performance of various traits (Kalita, 1983). Crossbreeds including Desi ducks, under any management system, perform better than their parents for various traits under rural condition (Eswaran, 1985; Haque and Hussain, 1991; Jalil, 1997; Kalita, 1997; Nageswara, 1999; and Das, 2000). Pekin×White Campbell × Wild duck gave a carcass with lower fat, which met the market requirements (Kociova *et al.* 1971). The potentiality of F_1 ducks depends on their parents. Thus a study was conducted to compare the following performances of crossbred duck with their parents i.e. Desi White and Beijing: live weight gain, carcass yield, egg production and livability of ducks.

MATERIALS AND METHODS

A total of 58 ducklings of 3 different genotypes were studied up to 60 weeks age for assessing their production performance and carcass quality traits. Three genotypes were Desi white, Beijing, Beijing x Desi White (F_1). The experiment was conducted on January to June, 2007 in Bangladesh Livestock Research Institute (BLRI). The birds were reared under intensive and identical management. The diets of the birds were provided as per recommendation. At 8, 10 and 12 weeks of age 3 birds from Beijing and Beijing x Desi white (F_1) were slaughtered for assessing their meat yield traits. For assessing egg production and egg weight of the duck genotypes of 25 weeks to 60 weeks of age were considered. For measurement of egg quality traits, a total of 30 eggs were examined from Desi white and F_1 duck. Shape index was calculated as per the method described by Reddy *et al.* (1979). The egg shell thickness of each egg was estimated in mm as the average thickness of three pieces of egg shell from two poles and center at widest diameter of the egg and measured by a spherometer. Haugh unit score was calculated by the method of Haugh (1937). Mortality percentage was calculated by the number of ducks that died during the experimental period, recorded in each of the groups and expressed in percent mortality. The data were analyzed using SPSS computer software program.

RESULTS AND DISCUSSION

A total of 18 birds F_1 and Beijing were slaughtered at 8,10 and 12 weeks of age. The results were summarized in Table 1.

Table 1. Live weight and meat yield traits of Beijing and F_1 (Beijing x DW) ducks at different weeks

Parameter	Age (Wks)	Beijing(Bj) (Mean+SE)	F_1(Bj×DW) (Mean+SE)
Live wt (g)	8	2002^{b}±56.01	1725^{a}±10.40
	10	2153.33±301.40	2160.00±105.98
	12	2416.66±145.29	2233.33±35.27
Dressing yield (%)	8	61.78^{a}±1.20	66.50^{b}±0.47
	10	67.05±0.39	67.65±0.39
	12	71.18^{a}±2.11	65.21^{b}±1.26
Breast meat wt (%)	8	6.65^{a}±.70	9.28^{b}±0.43
	10	10.47±0.89	9.46±0.62
	12	10.30±0.69	10.94±0.51
Abdominal fat (%)	8	0.82±0.17	0.73±0.17
	10	0.88±0.06	0.73±0.12
	12	1.33^{a}±0.18	1.04^{a}±0.33

Means bearing the different superscripts within a column differ significantly ($p<0.05$)

Live weight of F_1 and Beijing showed highly significant difference at 8 weeks of age (Table 1). But at 10 and 12 weeks there were no difference in live weight among the genotypes. Dressing yield percent differed significantly at 8 and 12 weeks of age among the genotypes (Table1).The F_1 possessed (66.50%) dressing yield at 8 weeks age compared to Beijing 61.78%. Beijing had 71.18% dressing yield compared to 65.21% in F_1 at 12 weeks of age. No difference was observed in this trait at 10 week of age (Table 1). Breast meat weight percent differed significantly ($P<0.05$) in F_1 duck (9.28%) compared to Beijing duck (6.65%) at 8 weeks of age (Table 1). At 10 and 12 weeks no difference ($P>0.05$) were found in breast meat percent among the genotypes (Table 1). Abdominal fat percent of F_1 (Beijing × Desi white) duck (1.04%) is found significantly lower than Beijing (1.33%) duck at 12 weeks of age. No difference was observed at 8-10 weeks of age. Evans (1972) compared to fat deposition in Mallard and Aylesbury duck and found that fat deposition occurred later in the latter breed. Aylesbury ducks, despite of more rapid growth and more breast meat than Beijing ducks, are less efficient in converting feed to gain. In both breeds, the greatest proportion of fat occurred in the subcutaneous depots. Crossing Beijing with Muscovy ducks has given a carcass with low fat content Olver *et. al.*, (1977). They reaches these ducks slaughter weight much later than white Beijing ducks, with some advantages in feed efficiency but little in dressing percentage (Pilla and Quilichi, 1973)

Maturity age and body weight

The maturity age for the different groups is presented in Table 2. It was 161±9.75, 182±10.01 and 154±9.58 for Desi white, Beijing and Beijing × Desi white (F_1) ducks, respectively. It was observed that the maturity age was reduced by 7 days in F1 ducks compared to Desi ducks and 32 days to Beijing ducks. The average body weight (g) at maturity of Desi white, Beijing and Beijing × Desi white (F_1) ducks 1479±25.34, 2530.65±150.30 and 2250.24±35.18 respectively (Table 2). The Beijing × Desi white (F_1) ducks had higher body weight than that of desi ducks and medium compared to both the parents (DW and Beijing).

Table 2. Mean and standard error for body weight at maturity and maturity age

Genetic group	Maturity age (days)	Body wt at maturity (g)
Desi white	$161^a \pm 9.75$	$1479^a \pm 25.34$
Beijing	$182^b \pm 10.01$	2530.65 ± 150.30
Beijing×Desi white	$154^b \pm 9.58$	2250.24 ± 35.18

Means bearing the different superscripts within a column differ significantly ($p<0.05$)

Egg weight: The average values for egg weight (g) at 40 and 60 weeks of age were 55.14 ± 4.50, 60.35 ± 6.24 and 56.27 ± 5.30, 60.34 ± 6.24, respectively (Table 3). The crossbred ducks (Beijing × Desi white) laid heavier eggs by 5.21 g and 4.07 g than those of desi duck egg. Baruah (1988) and Goswami (1998) reported similar findings desi and crossbred ducks.

Percent Egg production: The average percent egg production of 40 and 60 weeks of age were 67.37 ± 7.57, 71.43 ± 8.96 and 69.38 ± 8.05, 79.59 ± 9.15, respectively (Table 3). Crossbred ducks produced higher egg than desi ducks. These findings were supported by Nageswara (1999), and he reported that the Khaki Campbell × Desi ducks produced more eggs in compare to desi ducks at all ages.

Table 3. Mean and standard error for egg weight (gms) and percent egg production

Genetic group	Traits			
	Egg weight (g)		Egg production (%)	
	40 weeks of age	60 weeks of age	40 weeks of age	60 weeks of age
DW	$55.14^{a} \pm 4.50$	$56.27^{a} \pm 5.30$	67.37 ± 7.57	$69.38^{a} \pm 8.05$
F1	$60.35^{b} \pm 6.24$	$60.34^{b} \pm 6.24$	71.43 ± 8.96	$79.59^{b} \pm 9.15$

Means bearing the different superscripts within a column differ significantly ($p<0.05$)

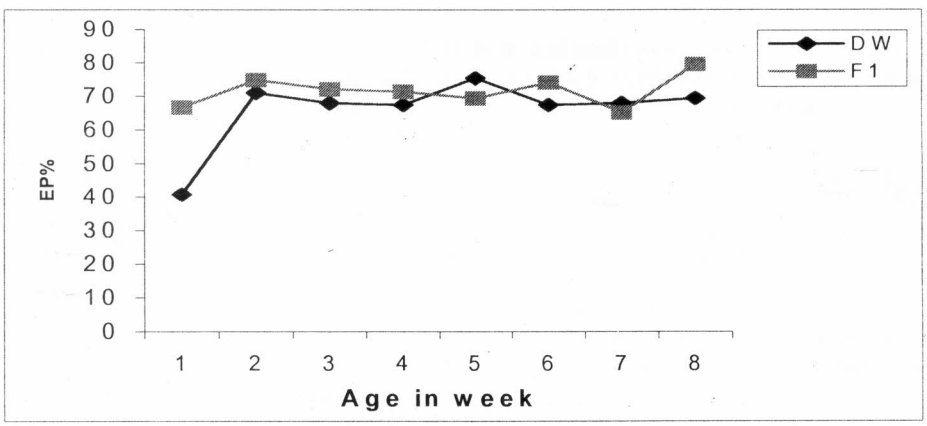

Figure 1. Egg production rate of DW and F_1 ducks

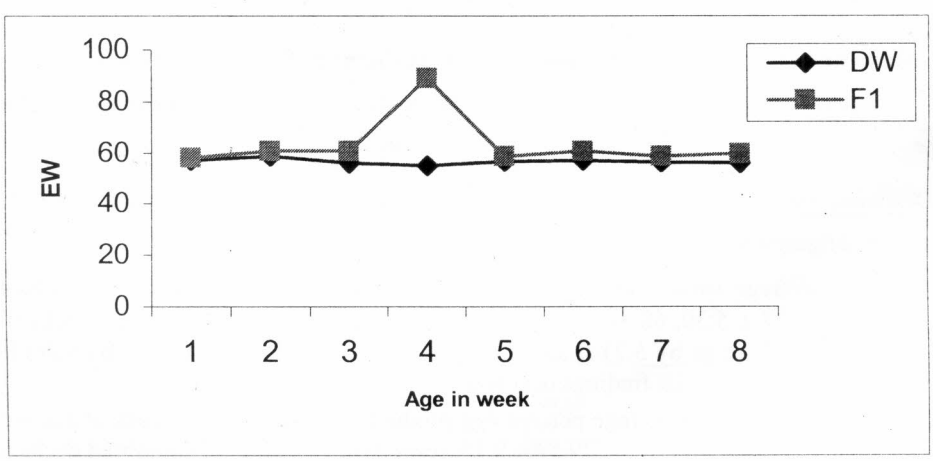

Figure 2. Egg weight of DW and F_1 ducks at different weeks at different weeks

From the Figure 1, it was observed that from 25 to 60 weeks of age F_1 duck showed higher egg production rate than desi duck except 45 weeks of age. Egg weight of F_1 ducks was always heavier than desi ducks.

External egg quality traits: The average shape index values obtained in DW and crossbred duck (Beijing × Desi white) were 76.37±. 86 and 75.33±1.17, respectively (Table 4). Similar findings were also reported by George (1980) for desi ducks and by Das (2000) for Khaki Campbell × Desi ducks. The averages Breaking Strength values obtained in DW and crossbred duck (Beijing × Desi white) were 4.23±. 28 and 2.26 ± .32, respectively.

Internal egg quality traits: The averages eggshell thickness (mm) values obtained in DW and crossbred duck (Beijing × Desi white) were 0.43±1.7 and 0.44±5.17, respectively (Table 4). The eggshell value is higher in crossbred duck than desi duck. Eswaran (1985) observed higher values than this for Desi and Khaki campbell ducks eggs. The average values for Haugh unit were77.49±4.5 and 80.86±6.7 for Desi duck and crossbred duck (Beijing × Desi white) respectively.

Table 4. Means with standard error for egg quality traits of different genetic groups

Genetic group	Traits				
	Egg weight (g)	Shape index	Egg shell thickness (mm)	Haugh unit	Breaking strength (/cm^2)
DW	54.04 ± 1.81	76.37 ± .86	0.43^b ± 1.7	77.49± 4.5	4.23^a ± 0.28
F1	60.59 ± 1.46	75.33 ± 1.17	0.44^a ± 5.17	80.86 ± 6.7	2.26^b ± 0.32

Means bearing the different superscripts within a column differ significantly ($p<0.05$)

Livability: In the present study, the average livability at 60 weeks of age was recorded as 96.60% and 92.0% for Desi and crossbred duck, respectively. Haque and Hossain (1991) observed lower values in a study on ducks during a period of 19-58 weeks of age in crossbred duck (Khaki campbell × Desi).

Finally it can be concluded that productive performance of desi ducks could be improved through crossbreeding with Beijing, since the introduction of exotic genetic material improved production performance of native ducks. For more authentic recommendation further works in this field is necessary.

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