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Short Communication

Comparative Egg Production, Fertility and Hatchability of Cobb-500, Ross and Hubbard-Hi-Yield Broiler Parent Stock in Bangladesh

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Broiler parent stock of 7851 Cobb-500, 8388 Ross and 8745 Hubbard-Hi-Yield were reared in controlled (slated cum floor system) house to determine the egg production performance, fertility and hatchability. A total of 151200 hatching eggs of Cobb-500, Ross and Hubbard-Hi-Yield broiler strain were collected and set in the incubator in 10 batches having 15120 eggs in each batch and 5040 eggs in each strain to compare fertility and hatchability among the strains. From the above study, it was observed that the strains had significant effect ($P<0.01$) on egg production, fertility and hatchability of fertile, and set eggs, abnormal chicks, egg and chick weight but there was no significant effect ($P>0.05$) on normal chick production and chick weight as percentage of egg weight. Hubbard-Hi-Yield strain was the best while Ross was intermediate and Cobb-500 was the poorest in terms of egg production, fertility and hatchability. Therefore, Hubbard-Hi-Yield broiler parent stocks as well as its grand parent stock may be more profitable and suitable for broiler production in Bangladesh.

Keywords*: Broiler, parent stock, egg production, fertility and hatchability*

Performance of commercial broiler production depends on the quality of chicks and than parents. Most of the poultry breeding companies are located in temperate regions. Parent stock raising farms import day-old parent stock of different strains from temperate countries and reared in Bangladesh and produce day-old commercial broiler chicks. The reproductive fitness and the commercial broiler production performances vary with the standard of the given breeder due to non-sophisticated management, tropical environment, husbandry, feeds and feeding practices (Hocking and Bernard, 2000). Some investigators found variation among the growth of different commercial broiler strains available in Bangladesh (Sarker *et al.*, 2002; Islam *et al*., 2000). Recently, several Grand Parent raising farms like M. M. Aga (Kasila Hub chicks), Paragon poultry Ltd. (Hubbard), Aqua Breeders Ltd (Hybro-G) and Kazi Farms group (Cobb-500) have imported day-old Grand Parent (GP) chicks from abroad. Of these, only Kazi Farms have started importing day-old chicks from abroad and using in country. It is assumed

that parent stock from the said Grand Parent (GP) will reduce disease out break as well as increase their production performance at hot-humid climate. As a result, there will be no risk and chick import cost, and parent stock raising farms will receive chicks at a minimum chick price. Farmers will also be benefited having high quality chicks. However, farmers need to know what strain is performing better in Bangladesh condition to achieve the maximum profit. To get more quality chicks from parent stock, egg production, fertility and hatchability are the vital traits that need to be considered. The present study was therefore, conducted to determine egg production capability, fertility and hatchability of different broiler parents inorder to find out suitable strain for the maximum benefit.

The experiment was carried out at Kazi Farms Ltd., Nayanpur Hatchery, Gazipur, Bangladesh during mid January to mid February, 2005. Broiler parents of 7851 Cobb-500, 8388 Ross and 8745 Hubbard-Hi-Yield strains were reared in environmentally controlled slated cum floor system house providing floor space of 1 m^2 /5 birds for a period of 33-37 weeks. Male birds were fed with a diet containing 150g CP, 11.3 MJME and 10g Ca per kg diet. The females were fed with a diet containing 180g CP, 11.3 MJME and 30g Ca per kg diet. The birds were exposed to 16 hours light per day. Male and female ratio of 1:10 was practiced for natural mating in the house. Eggs were collected 5 times a day; 8.00 AM, 10.00 AM, 12 PM, 2.00 PM and 4-30 PM, and hatching eggs were stored in cold room with a temperature of 18-20^{0}C and humidity of 75-80% for 3-5 days. A total of 151200 hatching eggs of Cobb-500, Ross and Hubbard-Hi-Yield strains were collected and set in James Way Electric incubator in 10 batches having 15120 eggs in each batch, and 5040 eggs in each strain. The eggs were collected from 33-37 weeks aged hens (B_1 and B_2 batches at 33 weeks, B_3 and B_4 batches at 34 weeks, B_5 and B_6 batches at 35 weeks, B_7 and B_8 batches at 36 weeks and B_9 and B_{10} batches at 37 weeks). The incubator temperature was maintained during incubation as per Table 1. The eggs were candled at 18½ days of incubation to assess the fertility and embryonic mortality, and removal of infertile eggs and eggs with dead embryos. The remaining eggs were transferred into Hatcher basket. On the 22nd day, the number of chicks hatched, normal and abnormal chicks were recorded.

The following data were recorded during the experimental period

1. Hen housed egg production (%)

2. Fertility (%) = $\frac{Total\ no\ of\ \ fertile\ eggs}{Total\ no\ of\ eggs\ set} \times 100$

3. Hatchability (%) on egg set = $\frac{Total\ no\ of\ chicks\ hatched}{Total\ no\ of\ eggs\ set} \times 100$

4. Hatchability (%) on fertile eggs = $\frac{Total\ no\ of\ \ chicks\ hatched}{Total\ no\ of\ \ fertile\ eggs} \times 100$

5. Normal chicks (%) = $\frac{Total\ no\ of\ normal\ chicks}{Total\ no\ of\ chicks\ hatched} \times 100$

6. Abnormal chicks (%) = $\frac{Total\ no\ of\ abnormal\ chicks}{Total\ no\ of\ chicks\ hatched} \times 100$

7. Egg and chick weight

The collected data were analysed in Completely Randomized Design (CRD) using computer package program MSTAT-C

Table 1. Temperatures maintained during incubation period.

Day	Temperature (^{0}C)	Incubator
1-10	37.8	
10-12	37.5	Setter
12-14	37.0	
14-18½	36.7	
18½ – 21 days	36.5	Hatcher

Stain to stain variation in among the strains for egg production was found to be significant. Significant differences were also observed among the strains for fertility, hatchability on fertile eggs, and egg set in incubator, abnormal chicks, hatching egg weight and chick weight ($P<0.01$) (Table 2). The highest egg production and fertility were found in strain Hubbard-Hi-Yield, intermediate in Ross and the lowest in Cobb-500. The highest hatchability (%) was also found in strain Hubbard-Hi-Yield (96.35%) followed by Cobb-500 and Ross, respectively. Normal chick (%) and chick weight as percentage of egg weight was almost similar among the strains and the difference was non-significant ($P>0.05$). The highest percentage of abnormal chick was found on Ross, intermediate in Cobb-500 and the lowest on Hubbard-Hi-Yield strain. The heaviest hatching egg and chick weight was observed in Cobb-500 followed by Hubbard-Hi-yield and Ross, respectively.

Egg production was the highest in Hubbard-Hi-Yield followed by Ross and Cobb-500, respectively. The results have indicated that lighter birds produced more eggs than the heavier ones. This result is consistent with the findings of Robinson and Wilson (1996) who concluded that excessive body weight in broiler breeder female was negatively correlated with hen-day egg production. The present finding is also supported by Spralt and Leeson (1987). Hubbard-Hi-Yield strain was the best performer in terms of fertility followed by Ross and Cobb-500, respectively, which is consistent with the results reported by Robinson and Wilson (1996), and Lilburn and Myers (1990). They stated that the heavier birds had lower fertility than the lighter birds. Because, the excess body weight hinders the ability of the bird to complete the successful mating. Over weight female had a diminished capacity for sperm storage since sperm storage gland are surrounded with and contracted by fat. The highest hatchability on fertile eggs and egg set was recorded on Hubbard-Hi-Yield strain followed by Cobb-500 and Ross, respectively. These results were partially supported by Islam (2001) who found significant difference among the strains for hatchability on egg set but found non significant difference among strains for hatchability of fertile eggs. There was no significant difference in normal chick production but significant difference was found for abnormal chick (%) production among the strains. Islam (2001) partially supported the present findings. The present findings, "body weight had no effect on egg weight" is supported by Sarker (2004) and Gous *et al.* (2000). They found the increased egg weight with the increase of age of the bird. Larger size chicks from the larger size eggs obtained in the present study is in agreement with those reported by Raju *et al.* (1997). They found that the chick weight increased with the increased in egg weight.

Table 2. Egg production, fertility and hatchability of Cobb-500, Ross and Hubbard-Hi-Yield broiler parent stock.

Traits	Strain			LSD value	Level of significance
	Cobb-500 (Mean±SE)	Ross (Mean±SE)	Hubbard-Hi-Yield (Mean±SE)		
Hen-housed egg production (%)	66.91±2.52	78.77±1.94	80.17±1.69	1.048	**
Fertility (%)	91.11±0.57	91.88±0.75	92.72±0.52	0.609	**
Hatchability on fertile eggs (%)	96.06±0.75	95.13±2.02	96.35±1.82	0.616	**
Hatchability on setting eggs (%)	87.63±0.87	87.50±1.76	89.81±1.15	0.676	**
Normal chick (%)	99.32±0.36	99.28±0.19	99.42±0.36	-	NS
Abnormal chick (%)	0.68±0.40	0.73±0.21	0.60±0.36	0.013	**
Hatching egg weight (g/egg)	61.26±1.58	58.83±1.11	60.07±1.60	0.601	**
Chick weight (g/chick)	40.78±0.93	39.07±0.42	39.79±0.85	0.495	**
Chick weight as % of egg weight	66.60±1.23	66.43±1.08	66.16±0.99	-	NS

*NS, P>0.05; **, P<0.01; SE = Standard error*

The present study reveals that Hubbard-Hi-Yield broiler strain was the best performer in terms of egg production, fertility, hatchability and normal chick production. Therefore, Hubbard-Hi-Yield parent as well as Grand Parent (GP) may be more profitable and suitable for broiler production in Bangladesh. However, more studies are needed involving more parent lines to confirm these findings.

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