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COMPARATIVE STUDY ON THE PERFORMANCE OF COBB 500 AND HUBBARD CLASSIC BROILER STRAINS UNDER FARM CONDITION

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ABSTRACT

The performance and profitability of two commercial broiler strains reared under farming system were investigated in this study. Day-old broiler chicks (n=60) of two different commercial strains (Hubbard classic and Cobb 500) were assigned into two treatment groups. The birds were reared from day one in 35 days of age with similar housing, feeding and management condition. Regarding to all parameters collected, live weight and body weight gain were significantly ($p<0.01$) higher in Cobb 500 than that of Hubbard Classic. Feed intake and FCR were higher ($p<0.01$) in Cobb 500 than Hubbard classic group, livability also higher in Hubbard classic strain than that of Cobb 500 broiler strain. Higher net profit (20.36 Tk kg^{-1} live bird) and lower production cost (109.64 Tk kg^{-1} live bird) were observed in Cobb 500 group than that of Hubbard classic strain, although the differences between the treatment groups were not statistically significant ($P>0.05$). In conclusion, Cobb 500 broiler strain is appeared to be the most economic to rear between the two broiler strains investigated here in response to their performance records.

Key words: Broiler performances, broiler strains, broiler management, benefit-cost ratio

INTRODUCTION

There is lack of sufficient animal protein in developing countries like Bangladesh due to population explosion. Poor people can hardly manage the standard daily requirement of protein (120g/day/head). To fulfill this shortage commercial broiler can play an important role. Still broiler is the cheapest meat source in Bangladesh and it contributes 30% to the total animal protein for human consumption (Huque 1996).

The price of poultry meat is beyond the buying capacity of the majority people of Bangladesh due to extreme shortage of supply. This growing demand can be met up quickly by rearing different strains of broiler on commercial basis because broilers can be grown more economically within the shortest period of time. The system of management practices of raising different strain of broiler are generally very poor in Bangladesh and feed cost is most important factor as it constitutes about 60-70% of the total cost of broiler meat production. Therefore, emphasis must be given to improve the standard of broiler management so efficiently that it can be grown very economically.

Many broiler strains are available in Bangladesh at present time. A few comparative studies had been under taken in the past to compare the performances of different strains in Bangladesh condition. Comparative performances on Cobb 500 and Hubbard Classic were not studied yet. So the finding of this research will conveniently help to evaluate the standard of these two strains of broiler under same management condition. This type of study secured worthwhile and also to commercial use for broiler production. With this idea, an experiment was conducted using Cobb 500 and Hubbard Classic with the following objectives:

i) To study the growth rate, feed efficiency, livability, and dressing percentage of two different broiler strains under same management condition and ii)To study for the selection of a suitable strain from Cobb 500 and Hubbard Classic for commercial broiler production.

MATERIALS AND METHODS

The experiment was conducted at the Bodeuzzaman Poultry Farm, Issorgonj, Mymensingh during 24 July to 29 August 2012 to study the performances of Cobb 500 and Hubbard Classic for a period of 35 days.

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Collection of experimental birds: Thirty Cobb 500 and thirty Hubbard Classic day-old broiler chicks were collected from Quality Hatchery Limited, Dhaka.

Layout of the experiment: Sixty day-old chicks of above mentioned strains were divided randomly into two treatment groups having 3 replications of 10 birds in each. The layout of the experiment is shown in Table 1.

Experimental ration: The ration was composed of locally available feed ingredients. The chemical composition of the feed ingredients used for the formulation of experimental diet is shown in Table 2 and Table 3.

Embavit B: The nutrient requirements were fulfilled according to the ISI (Indian Standard Institution, 1989). The formulated diet was fortified with the proper vitamin-mineral premix (Embavit-B) at an inclusion rate of 2.5 g kg^{-1} (Table 2).

Methods of feeding: The chicks of both treatment groups were supplied with feed and water on *ad libitum* basis throughout the experimental period (35 days). The feeds were supplied three times daily.

Management: Chicks were brooded with electric bulb providing with a temperature of 95°F at first week of age, decreasing gradually at the rate of 5°F per week for the adjustment to normal temperament of the house. Then chicks were randomly distributed in previously cleaned and disinfected equal sized six separate pens of a house where fresh and dried rice husk were used as litter of about 6cm depth. The birds were provided with a floor space of 900 cm^2/bird. Necessary care was taken uniformly to maintain comfortable condition for the experimental birds. The birds were kept separately in each pen under similar management condition. A 100 watt electric bulb (Fluorescent) was provided up to end of the study period for the convenient of the feeding and drinking.

Sufficient feeders and waterer were provided to ensure adequate feed and water intake of all birds. Proper hygienic and sanitary measures were taken during the experimental period. All the birds were vaccinated against Ranikhet Disease with Baby Chick Ranikhet Disease Vaccine (BCRDV) at the age of 5 day and booster dose at the 20th day. Gumboro Vaccine was administrated at the age of 14th day and booster dose was given at the age of 28th day against gumboro disease.

Data Collection

Body weight: The chicks of each replication were weighed at the beginning of the experiment and thereafter at the interval of one week until the termination of the experiment at 35 days of age. The birds were weighed prior to morning feeding. The weekly average live weight was recorded replication wise for each treatment group (Cobb 500 & Hubbard Classic).

Feed intake: The amount of feed consumed by the experimental birds of different replications of each treatment group (Cobb 500 & Hubbard Classic) was weighed at the end of each week and feed refusals were also recorded weekly.

Livability: The livability of broiler chicks was recorded daily. The differences of livability were also calculated for each treatment group (Cobb 500 & Hubbard Classic).

Feed cost: Feed cost per kg live broiler was calculated on the basis of market price of feed ingredients during the experimental period (35 days).

Statistical Analysis

All recorded and calculated data were analyzed using SPSS program & Student's-t-test. Analysis of variance (ANOVA) was performed and Least Significant Differences were calculated for significant differences to compare parameters between the strains.

RESULTS AND DISCUSSION

Body weight

The initial live weight of Cobb 500 broiler strain was higher (p>0.05) than that of Hubbard Classic. There were no significant differences (p>0.05) in body weight at day-old and 1st week of age between two different strains (Table 5). Cobb 500 birds were recorded heavier body weight compared

Table 1. Layout of the experiment

Strain	Age of birds	No. of birds in each Replication			Total No. of birds
		R_1	R_2	R_3	
Cobb 500	Day-old	10	10	10	30
Hubbard Classic	Day -old	10	10	10	30

amongst other factors might give rise to body weight variation between two individual birds. So it is assumed that more weight gain of Cobb- 500 broiler strain might arise from the genetic make-up during the embryonic stage, which can lead to having different growth potential, and it may be possible owing to the strain effect, and some other factors might be involved herewith.

Feed intake

Feed intake at 3rd, 4th and 5th weeks of age differed significantly ($p<0.01$), ($p<0.05$) & ($p<0.01$), respectively by the strains, except for 1st and 2nd weeks of age (Table 5). Feed intake at 1st and 2nd weeks of age was not significantly different ($p>0.05$) between the groups (Cobb 500 & Hubbard classic) of birds. Average feed consumption of Cobb 500 was found to be higher than that of Hubbard Classic (Table 5). Hossain *et al*. (2011) stated that feed intakes of Hubbard classic, Cobb-500 and MPK broiler strains were 2955.4g, 2855.4g and 2783.0g per bird, respectively at 35th day of age. On day 28th, significantly ($P<0.001$) the highest feed intake (1580.55g) was observed in Cobb-500 broiler strain followed by 1560.38g, 1475g in Hubbard classic and MPK broiler strains, respectively. At 35th day, bird of Hubbard group was the highest ($P<0.001$) in feed intake, while birds of MPK group being the lowest in feed consumption. The feed intake of Hubbard group was similar to the strain of Cobb-500, but differed significantly ($P<0.001$) from the other strain (MPK) during 35th day of age. Goliomytis *et al.* (2003) reported that feed intake was comparable between Cobb-500 and shaver Starbro strains through 154 days of age. They reported that feed intake of broilers increased until 84 days of age and then declined until 112 days of age. Our findings are in agreement with their results, as our experiment was ended at 35 days and there was also a continuous increase in feed intake. The higher feed consumption of the strains may be resulted from the heavier body weight and individual body requirements of the birds. In addition, the reason for higher feed intake may be explained by several other factors including breed or strain, feed quality, palatability of feed, age, sex, individual body requirement, stage of production, climatic effect and other environmental conditions. Smith *et al.* (1998) reported that strain and sex can affect feed intake and feed conversion ratio.

Feed conversion ratio (FCR)

Feed efficiency of 2nd, 3rd and 5th weeks of age was affected ($p<0.01$), ($p<0.05$) & ($p<0.01$), respectively by the strains, except for 1st and 4th weeks of age (Table 5). FCR, during the 1st and 4th weeks of age did not differ significantly ($p>0.05$), which showed no significant differences between the different group of birds. Significantly lowest ($p<0.01$) FCR value (1.56) was observed in Cobb 500 broiler strain 5th week of age. During the entire experimental period the FCR value differed significantly ($p>0.05$) between the group of birds. The lowest figure of FCR indicates that birds of this strain (Cobb 500) are supposed to be more efficient in converting feed to meat than Hubbard classic. This performance might be partly due to the capacity of this strain (Cobb 500) to consume greater quantities of feed, resulting in higher intakes and hence greater live weight, weight gain and improved FCR than in other broiler strains. Our findings are in agreement with the report of Hossain *et al.* (2011) and Abdullah *et al.* (2010). Hossain *et al.* (2011) reported that at 35th day of age, statistically similar but significantly higher FCR values (2.21; 2.18) were found in the birds of Hubbard classic and MPK broiler strains, while significantly lowest ($P<0.001$) FCR value (2.06) was observed in Cobb-500 broiler strains. Abdullah *et al.* (2010) found that the FCR value in Hubbard classic strain of broiler during the rearing period from 7-42 days of age was 2.21. Gonzales *et al.* (1998) also reported that FCR value may be differed due to the interaction of genotype amongst the strains, and found the highest FCR values in several strains including Hubbard classic strain of broilers.

Table 2. Composition of Embavit B (2.5 g kg^{-1})

Nutrient composition	Amount
Vitamin A	12500 lU
Vitamin D3	2500 lU
Vitamin E	20 lU
Vitamin K3	0.004 g
Vitamin B_1	0.0025 g
Vitamin B_2	0.005 g
Vitamin B_6	0.004 g
Nicotinic acid	0.04 g
Pantothenic acid	0.0125 g
Vitamin B_{12}	0.012 g
Folic acid	0.0008 g
Biotin	0.0001 g
Cobalt	0.0004 g
Copper	0.01 g
Iron	0.06 g
Iodine	0.0004 g
Manganese	0.08 g
Zinc	0.05 g
Selenium	0.00015 g

Source: Rhone Poulenc Bangladesh Ltd.

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Table 3. Chemical composition of the ingredients used for the formulation of experimental diet for Broiler Starter (0 to 21 days).

Ingredients	Fresh amount	ME (kcal/kg)	%CP	%CF	%EE	%Ca	%p	%Lysine	%Methionine	%Linolic acid	%Tryptophan
Wheat	0.5	1500	0.06	0.012	0.009	0.00025	0.00155	0.0015	0.0008	0.0045	0.0009
Rice polish	0.15	465	0.018	0.0075	0.018	0.00009	0.00195	0.0009	0.000375	0	
wheat bran	0.05	73	0.00775	0.005	0.002	0.000075	0.00006	0.000315	0.000115	0.00045	
Soya bean meal	0.1	233	0.046	0.005	0.0015	0.00025	0.00065	0.00289	0.00063	0.001	0.00072
Mastered oilcake	0.07	149.1	0.02275	0.00805	0.00595	0.000497	0.0007	0.001211	0.000441	0.00007	0.000476
Fishmeal	0.05	152	0.03275	0	0.005	0.002	0.00125	0.002525	0.00091	0.00005	0.0004
Blood meal	0.06	165	0.051	0	0.0006	0.00018	0.00015	0.004842	0.00057	0.00006	
Soya bean oil	0.01	88	0	0	0	0	0	0	0	0	
Limestone	0.005	0	0	0	0	0.0019	0	0	0	0	
Common salt	0.005										
Total	1 kg	2825.1	0.23825	0.03755	0.04205	0.005242	0.00631	0.014183	0.003841	0.00613	0.002496

Source: International Nutrient Standard for Poultry (INSP-1988, WPSA)

Table 4. Chemical composition of the ingredients used for the formulation of experimental diet for Broiler Finisher (21 upto sale).

Ingredients	Fresh amount	ME (kcal/kg)	%CP	%CF	%EE	%Ca	%p	%Lysine	%Methionine	%Linolic acid	%Tryptophan
Wheat	0.5	1500	0.06	0.012	0.009	0.00025	0.00155	0.0015	0.0008	0.0045	0.0009
Rice polish	0.15	465	0.018	0.0075	0.018	0.00009	0.00195	0.0009	0.000375	0	
wheat bran	0.05	73	0.00775	0.005	0.002	0.000075	0.00006	0.000315	0.000115	0.00045	
Soya bean meal	0.1	233	0.046	0.005	0.0015	0.00025	0.00065	0.00289	0.00063	0.001	0.00072
Mastered oil cake	0.02	42.6	0.0065	0.0023	0.0017	0.000142	0.0002	0.000346	0.000126	0.00002	0.000136
Fishmeal	0.03	91.2	0.01965	0	0.003	0.0012	0.00075	0.001515	0.000546	0.00003	0.00024
Soya bean oil	0.05	440	0	0	0	0	0	0	0	0	
Molasses	0.08	182.4	0.0032	0	0	0.00032	0.000064	0	0	0	
Limestone	0.015	0	0	0	0	0.0057	0	0	0	0	
Common salt	0.005										
Total	1 kg	3027.2	0.1611	0.0318	0.0352	0.008027	0.005224	0.007466	0.002592	0.006	0.001996

International Nutrient Standard for Poultry (INSP-1988, WPSA)

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Table 5. Average body weight, feed consumption, feed consumption ratio (FCR) and livability of Cobb 500 and Hubbard Classic broiler strains

Parameter	Age (wk)	Cobb 500 Mean±SE	Hubbard Classic Mean±SE	Level of significance
Average body weight (g/bird)	Int.wt	44.04±1.40	42.40±0.24	NS
	1st	182.5±8.97	156.35±9.65	NS
	2nd	444.2±40.13	411.26±11.50	**
	3rd	822.15±15.85	799.39±9.01	**
	4th	1252.31±40.36	1206.11±8.26	**
	5th	1775.31±95.02	1663.21±20.82	**
Average feed consumption (g/bird)	1st	120.46±20.59	129.24±26.96	NS
	2nd	412.16±106.72	494.66±49.57	NS
	3rd	1042.67±54.98	1120.97±72.04	**
	4th	1764.07±141.02	1792.76±85.03	*
	5th	2700.78±243.70	2642.60±159.65	**
Feed Conversion Ratio(FCR)	1st	0.87±0.10	1.13±0.15	NS
	2nd	1.03±0.18	1.34±0.10	**
	3rd	1.34±0.06	1.48±0.09	*
	4th	1.46±0.11	1.54±0.08	NS
	5th	1.56±0.07	1.63±0.09	**
Total FCR (Entire study period)		1.25±0.01	1.42±0.07	*
Livability (%)	1st	100±2.11	100±2.13	NS
	2nd	96.67±2.10	96.67±2.11	NS
	3rd	93.33±2.15	96.67±2.12	**
	4th	93.33±2.13	96.67±2.10	**
	5th	93.33±2.12	96.67±2.10	**

NS=Not Significant, *=p>0.05; **=, p<0.01

Livability

In the present study, the livability (%) of two broiler strains during the experimental period (35th day) were 96.66% and 93.33%, respectively (Table 5). Livability of the two strains throughout the entire rearing period (up to 35 days) showed significant (p<0.01) difference between the treatment groups. The livability (%) of the broiler strains was slightly affected by the treatment groups throughout the period (day 1-35). Birds of Hubbard classic strains grew poorly than the Cobb 500 birds. It indicates that strains affect the bird livability. The current findings are in agreement with that of Sarker *et al.* (2002) who demonstrated that strains had no adverse effect on livability of the birds. Despite this non-significant effect, numerically higher livability was observed in Cobb-500 strain group followed by Hubbard and MPK, respectively. Hossain *et al*. (2011) found that the livability (%)

Table 6. Cost of production and profit for per broiler per kg live broiler at 35 days of age

Parameter	Cobb 500 Mean±SE	Hubbard Classic Mean±SE	Level of Significance
Average Live Weight (g/broiler)	1775.31±95.02	1663.21±20.82	**
Livability (Number)	28±3.21	29±2.85	**
Feed Cost (Tk/broiler)	40×2.7=108±5.11	40×2.6=104±4.91	NS
Total Cost/ Production	197.35±11.25	186.74±11.25	NS
Market Price Live Broiler (Tk/Kg)	130±0.00	130±0.00	NS
Average Market Price of Live weight (Tk/Broiler)	234±12.85	221±10.58	**
Profit (Tk/Broiler)	36.65±2.14	30.26±1.94	**
Total Cost of Production (Tk/kg Live Broiler)	109.64±3.65	112.2±5.41	**
Profit (Tk/Kg Live Broiler)	20.36±1.14	17.8±1.02	**

NS=Not Significant, *=p>0.05; **=, p<0.01
Total cost of production includes feed cost, chick cost, litter cost, labor and medicine cost.

of three broiler strains during the experimental period (35th day) were 94.23%, 98.08% and 94.23% in Hubbard Classic, Cobb-500 and MPK broiler strains, respectively.

Cost benefit analysis

The data on cost of production of two broiler strains at 35 days of age are shown in Table 6. Higher (p<0.01) live weight was found in case of Cobb 500 group, while Hubbard Classic group of birds being the least. Numerically higher feed cost was found in Cobb 500 broiler strain than that of Hubbard classic broiler strain. Total cost of production (109.64 Tk/ kg live bird) was less for cobb 500 group and net profit (20.36 Tk/kg live bird) was found higher in this strain than that of Hubbard Classic. Higher net profit (20.36 Tk/kg live bird) and higher cost benefit ratio (0.186) were observed in the Cobb 500 broiler strain than the other strain (Hubbard Classic) and found significant difference (p<0.01) between the strains in case of total cost of production & profit per kg live broiler. The reason behind this is possibly due to attaining heavier body weight and lower total production cost. In addition, FCR of this strain (Cobb 500) might influence higher net profit than in other strains (Hubbard Classic). Higher profit margin was obtained by the farmers by selling these birds in the market on the live weight basis, as this strain (Cobb 500) attained heavier body weight than another strain in this study.

CONCLUSION

From the present study it may be concluded that under farming condition considering body weight, feed intake, feed conversion ratio, livability and cost benefit analysis cob 500 broiler strains was superior to that of Hubbard Classic broiler strain.

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