

Article

Management and production performance of Cobb-500 broiler parent stock under open housing system

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Abstract: The study was conducted to observe the management practice and production performance of Cobb-500 broiler parent strain under open housing system. Seventy thousand Cobb-500 parent stock broiler breeder was observed for a period of 30 days. Observation was focused on farm management including housing, feeding, watering, lighting, litter management, debeaking, deworming, vaccination, daily routine work of the farm, record keeping, bio-security and diseases control measures of Cobb-500 bird under open house system. Results showed that the average of the body weight of Cobb-500 male birds were 378.67g, 1599.17g, 2728g, and 4337g at starter (0 to 6 weeks), grower (7 to 18 weeks), pre-breeder (19 to 23 weeks) and breeder (24 to 65 weeks) stage respectively. Similarly the average of the body weight of Cobb-500 female birds were at starter (0 to 5 weeks), grower (6 to 18 weeks), pre-breeder (19 to 23 weeks) and breeder (24 to 65 weeks) stage 438.5g, 1540.46g, 2247.2g, and 3479.65g respectively. The egg production at 25 weeks of age was 16.02% and peak production was 85.12 % at 35 weeks of age. The average egg production from 25 to 68 weeks of age was 60.78 %. The maximum hatchability was recorded 91.58% at 38 weeks of age. The average hatchability from 25 to 68 weeks of age was 83.93%. The above findings prove that Cobb-500 performs well under open housing system.

Keywords: Cobb-500; broiler parent; open house system; starter; grower; breeder; production; hatchability

1. Introduction

Bangladesh is an agriculture-based tropical country where over 80% of the country's 150 million people live in rural areas and are highly dependent on agriculture. Livestock contributes 6.5% to GDP based on value added through their production of egg, milk, meat, hides and skins. The growth rate at 7.23 % in GDP IN 2004-2005 for livestock was the highest of any sub-sector comparing with 0.15% for arable crops and 3.65% fisheries (Bangladesh Economic Review, 2006). Poultry is in the top position of the livestock sector, contribution where as the livestock sub-sector contributed 12-14% to total Agricultural GDP in 1998-1999 at current prices. (Khan and Roy, 2003). The poultry industry is one of the fastest growing and most promising industries in Bangladesh. Since 1995, a significant annual average growth rate in the commercial poultry is achieved, and the growth rate in backward poultry farming is not high but country's commercial poultry sector gained 15-20% annual average growth rate during this period (Alam, 2002). Its steady growth result attaining country's economic growth which also contributes to improve the nutritional status. But still there is a gap between supply and demand of poultry meat and eggs. Broiler production has become a specialized speedy business at present time for the people of the country. The growth of the meat production of beef and chevon remained stagnant .The International Food Policy Research Institute has estimated that by year 2015 poultry will account for 40% of all animal protein. (IFPRI, 2000). At present chicken contributes 51% of total meat production of the country

though the share of broiler is not separated. Per capita annual consumption of meat in the country is 5.95 kg whence is only 7.38% of the universal standard. (MOFL, 2006). Before the emergence of Bangladesh in 1968-69, the Department of Poultry Science of Bangladesh Agricultural University (BAU), Mymensingh brought day old chicks from Pakistan International Airlines and started producing broiler experimentally in the university poultry farm. During late 1980s the Department of Livestock Service (DLS), Bangladesh imported 'Arbor Acres' broiler parent stock. At the same time BIMAN, Bangladesh Airlines started a commercial poultry farm called Biman Poultry Complex with a contractual agreement with Shaver Poultry Breeding Farm of Canada. The farm supplied DOC of broiler and layer to small farmers (Raha, 2007). Commercial poultry production has started around 1980 in Bangladesh and this agro-based industry has involved US \$ 1.00 – 5.00 billion investment and employed about 5 million peoples (Kabir, 2005). The number of Parent Stock (PS) and day-old chicks (DOC) is increasing day by day. There are 130 hatcheries (109 in operation) in the country at the present time (Saleque, 2007) which was only 14 in 1990 (Sarker, 2003). Commercial poultry production is basically based parent stock and broiler grand parent chick. In the country, there are 5 breeder farms that have started rearing grand parent (GP) (Raha S K, 2007). Although the production of day old chicks per year is not sufficient to meet the domestic demand but the member of broiler parent stock and day old chicks are increasing. Table 1 shows the growth of poultry industry in Bangladesh and shows projected production in 2001-2015. The number of broiler parent stock 4175.5 thousand in 2001 having a growth rate 20.15 %, which was 1062 thousand in 2001 and the estimated number in 2014-2015 will be 15,500 thousand .In addition to parent stock, the number of broiler DOC in 2001 is 325650 thousand and the growth rate is 19.69% which was 100359 thousand in 2001 and the estimated number in 2014-2015 will be 1,24,0000. The rapid growth rate of broiler parent stock and DOC are due to establishment of new breeder farms and hatcheries in the country (Khaleduzzaman *et al.*, 2009). The study was undertaken to investigate the performance in terms of body weight, body weight gain, feed intake, survivability and productive performance in terms of age at first lay, egg production resulting from quantitative feed restriction reared in open sided housing system under Bangladesh condition. Thus the present study has been undertaken with the following objectives:

- a) To observe the management practices of Cobb-500 strains in terms of housing, litter management, lighting management, feeding breeding and disease control.
- b) To observe the production performance of Cobb-500 broiler strain.

2. Materials and Methods

2.1. The study area

The population was taken from renowned poultry farm of Bangladesh named Sanowara Poultry and Hatchery Ltd. which is situated in the Chandanaish, Chittagong.

2.2. Observed population

The observation was conducted upon the management and performance of the brooding, growing and laying stages from the age of 0 to 68 weeks of rearing. The experiment birds were the parent stock breeder of the broiler type strain Cobb₅₀₀.

2.3. Source of data

All data were collected from record file kept in the Sanowara Poultry and Hatchery Ltd.

2.4. Data analysis

All recorded data was tabulated and analyzed using descriptive statistical methods in Microsoft excel 2007, Microsoft corporation, USA.

3. Results and Discussion

3.1. Housing

3.1.1. House type

There were 38 sheds in the study farm where 2 of them were control house that is they rely on the floor airflow of air through the house for ventilation and 36 are open sided. The width and length of the houses are 35 ft and 500 ft.

3.1.2. Shape of roof and roof exhaust

The roofs of all sheds are monitor type, which was proved a large amount of air space, hard to keep warm and removal of ammonia. House equipped with a covered area at the peak of the roof to allow excess heat to escape.

3.1.3. Building materials and construction

The foundation of the building made of concrete, concrete blocks & bricks.

3.1.4. Curtains, slats, cooling of the open sided house

Jute curtains were installed down the length of the building and hung so that the entire curtain may be rolled up or down by cables. The curtains were changed after removal of flock. Among 36 sheds: Three of them were 2/3rd slat and 1/3rd floor, 33 of them were fully floor system.

3.2. Biosecurity

3.2.1. Cleaning and disinfection

Bleaching powder and lime are used for disinfecting floor and slat, which were spread over the floor and slat for twenty four hours and then washed with water. This procedure was repeated three times. For the disinfection walls and other equipments 10% formalin were used, which was also performed thrice. It is to be noted that traditional fumigation was not in practice there.

3.2.2. Insect control

In the farm organophosphorus- type insecticide (Ectodip Forte) was used immediately after the old breeders removed. The insecticide (Ecotope Forte) was sprayed over the pits, the litter and the lower part of the walls up to 1 meter high. Leave the insecticide to work for 24 hours. Water tank, pipes and nipples were carefully cleaned with an alkaline detergent (DSC 1000) and then double rinsed with clean water. The entire ventilation system (air inlets and outlets, fans) and brooders were brushed and vacuum cleaned.

3.3. Management practice

3.3.1. Preparation of brooder and brooder guard

The brooder guard was made of plain metal sheet. The hover was set approximately 3 feet above the chick level. The slat was covered with sheet of bamboo. Rice husk was used at rate of 3" heights over it. At last sheet of paper was placed over it. In the farm only light brooder was used but gas brooder also used at late night in extreme cool condition.

3.3.2. Temperature

In day old chicks 95°F temperature was maintained which reduced over time to 80°F at day 22 (Table 1).

Table 1. Temperature schedule of the farm.

Age (In days)	Temperature (under brooder)	
	°F	°C
01-07	95	35
08 -14	90	32
15-21	85	29
22-28	80	27

3.3.3. Feeder space

For different age groups, feeder space varies from 2.5 cm to 10 cm per bird (Table 2).

Table 2. Feeder space provided per bird.

Sl. No.	Age(Wks)	Feeder space/ bird(cm)
1	0-2	2.5
2	3-6	4.0
3	7-12	7.5
4	13 and above	10.0

3.3.4. Water intake

Water intake for birds of different age groups ranges from 2.8 L to 48 L per 100 birds (Table 3).

Table 3. Amount of water required and watering for bird space.

Age(Wks)	Water space/ chick(inch)	Amount of water\100 bird (litters)
0-4	1/4 (0.6cm)	2.8-4
5-8	½ (1.2cm)	12-14
9-12	4 (10 cm)	20-25
13-16	5 (12.5cm)	35-40
16 and above	6 (15cm)	45-48

3.3.5. Litter management

In the farm, rice husk was used as litter material. Litter was disinfected by using lime. It was scratched twice in a week. The culled litter was dried in sun and sold.

3.3.6. Lighting management

In control shed, fluorescent lights were used here as light source locating about 8-9 ft height and 1 watt light used for 5 sq. ft. area. The light source were used somewhat more because some light absorbed by walls and other equipment (Table 4).

Table 4. The lighting schedule for study poultry population.

Days	Age		Duration of light (hrs) in house
	Days	Weeks	
1	-	-	24
2	-	-	23
3	-	-	20
4	-	-	19
5	-	-	18
6	-	-	17
7	-	-	16
8	-	-	15
9	-	-	14
10	-	-	13
11	-	-	12
12	-	-	12
13	-	-	12
14	-	-	12
15-21	3	-	10
22-140	4-20	-	8
141-147	21	-	11
148-154	22	-	13
155-161	23	-	14
162-476	24-68	-	15

3.3.7. Nesting, ventilation, and debeaking

Each laying nest contains 9 holes and one hole for laying 4 birds. The hole was of about 33 cm. in length, width and height. For ventilation, electric extractor fans used that are capable of removing 40,000 cu. ft. air per hour. Chicken debeaked in the farm at 6th to 10th days of old age. Second debeaking was done only for female at 10 to 12 weeks of age.

3.4. Male bird management

In the farm, they reared males in a different house using separate standard (Table 5). At 4 weeks, a detailed evaluation of the state of the flock was made to isolate less developed birds in a separate pen. After 15 weeks, weekly weight gain (+145-150g/wk) was maintained strictly in order to ensure proper testicle development. After 23 wks, they supplied germinated Bengal grams (5gms per bird per day). After 40wks, they also supplied piece of onion (5gms per bird for 3 days in every 2 wks).

Table 5. Equipment standards: the equipment space required for breeder male.

	Rearing house	Production house
Density	4 males/m ²	
Number of males for 100 females		9 to 10 at 24 wks
Brooders	1 for 500 males	
Feeders: Trough	20 cm access/male (10m length, for 100 males)	20 cm access / male (10m length, for 100 males)
Drinkers: Rounds	1 for 80 males	1 for 70 males
- Nipples	1 for 10 males	1 for 8 males

Around 17 weeks, they made a second detailed evaluation of the flock to separate birds that were development insufficiently in a special pen and readjust the lighting programmed. Transfer was usually made between 20 to 22 weeks of age. Those males in bad condition were eliminated and replaced by younger mature males aged about 25 wks.

3.5. Feeding

Four types of feed were given to birds. Starter (for male & female upto 3 wks. ad libitum and in 4-6 wks. for male 45, 48.5, 52.5 grams while 42, 44, 47 grams for female feeding respectively). Grower (for male 7-18 wks feed supplied from 53 gms in 7 wks to 111 gms in 18 wks with adding 5gms more for every week increase respectively. And for female 7-18 wks feed supplied from 47 gms in 7 wks to 88 gms in 18 wks as per adding 5gms more for increasing every week). Pre-breeder (for male 19-23 wks feed supplied from 112 gms in 19 wks to 140 gms in 23 wks as per adding 5gms more for increasing every week while feed supplied from 89 gms in 19 wks to 120 gms in 23 wks as per adding 5gms more for increasing every week for female). Breeder (For male 24-68 wks. feed supplied from 140-160 gms while 120-125 gms for female).

3.5. Production performance of the flock

3.5.1. Body weight

The average achieved and target body weight of Cob 500 male birds at 1st, 5th, 10th, 15th, 20th, 25th, 30th, 40th, 50th, & 65th weeks were 164g, 714 g, 1295g, 1888 g, 2586g, 3300g, 3835g, 4410g, 4538g, 4634g and 185g, 740g, 1340g, 1990g, 2550g, 3580g, 4150g, 4460g, 4560g, 4660g respectively. The average achieved and target body weight of Cob 500 female birds at 1st, 5th, 10th, 15th, 20th, 25th, 30th, 40th, 50th, & 65th weeks were 108g, 678 g, 1172 g, 1558 g, 2124 g, 2646 g, 3188 g, 3616 g, 3700 g, 3845 g and 159g, 658 g, 1157 g, 1565 g, 2168 g, 2668 g, 3185g, 3610 g, 3710 g, 3840 g respectively.

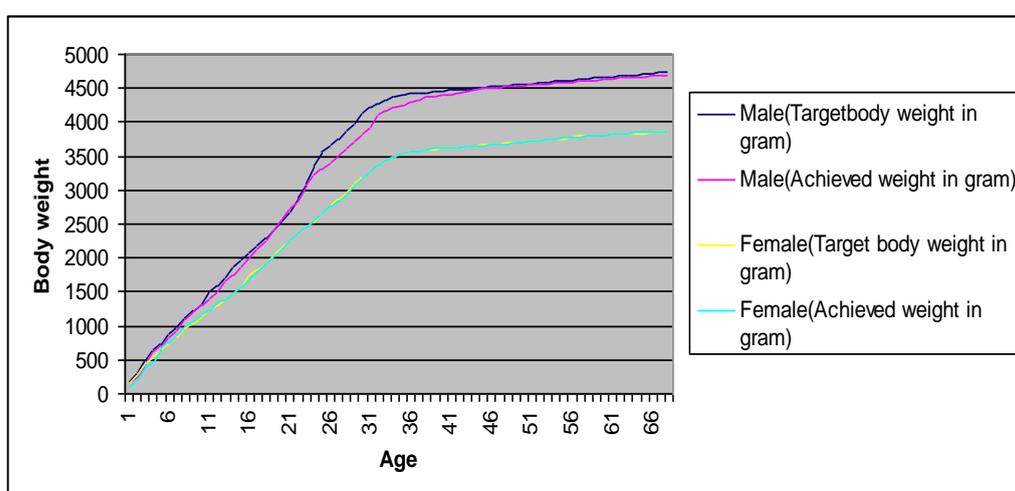


Figure 1. Body weight of male and female bird.

According to Figure 1, the observed body weight of Cobb-500 parent stock female bird was increased sharply from day old to 33 weeks of age like standard weight. After 33 weeks it also increased slowly up to the 68 weeks of age parallel to that of the standard one.

3.6. Egg production

The egg production achieved at 25 weeks of age was 16.02% and peak production was 85.12% achieved at 35 weeks of age (Figure 2). The average egg production was 60.78%. It was near about close to the standard egg production percentage of that strain.

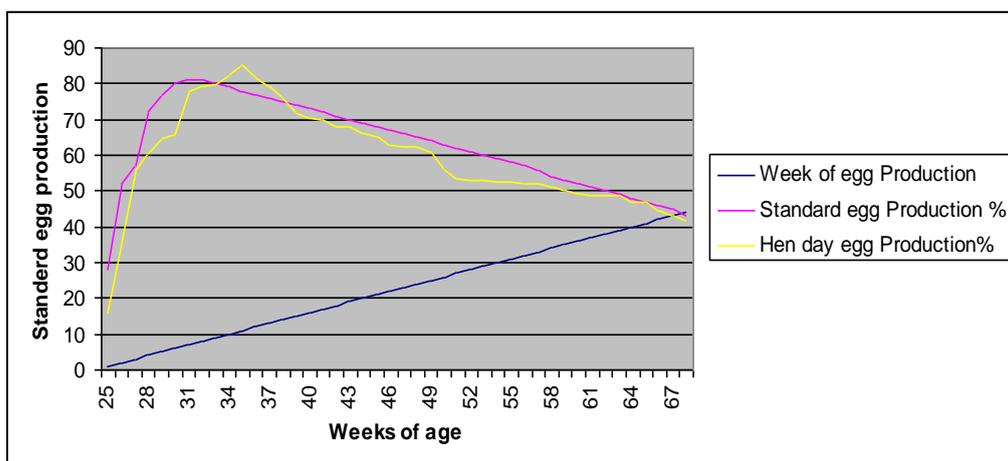


Figure 2. Performance egg production from 25th to 68th weeks.

According to graph, at initial age the egg production was lower and at 35 wks age the production was higher. In this investigation observed that, at initial stage of laying period (25/26 weeks), egg production are comparatively low. It's due to lower body weight than target body weight, undeveloped reproductive tract, delayed sexual maturity, disease condition etc. The result of this study coincided with the findings of Reden a.i. Marple (1986) who reported hen day egg production was lowest in lower body weight hens and delayed sexual maturity. In this study, peak production observed at 35 weeks of age and then decrease with age. It occurs due to uncontrolled mature body weight, excessive accumulation of fat reserve, disease problem etc.

3.7. Hatchability

Average hatchability percentage of Cobb 500 was 83.93%. Peak hatchability percentage was 91.58% at 38 weeks age bird.

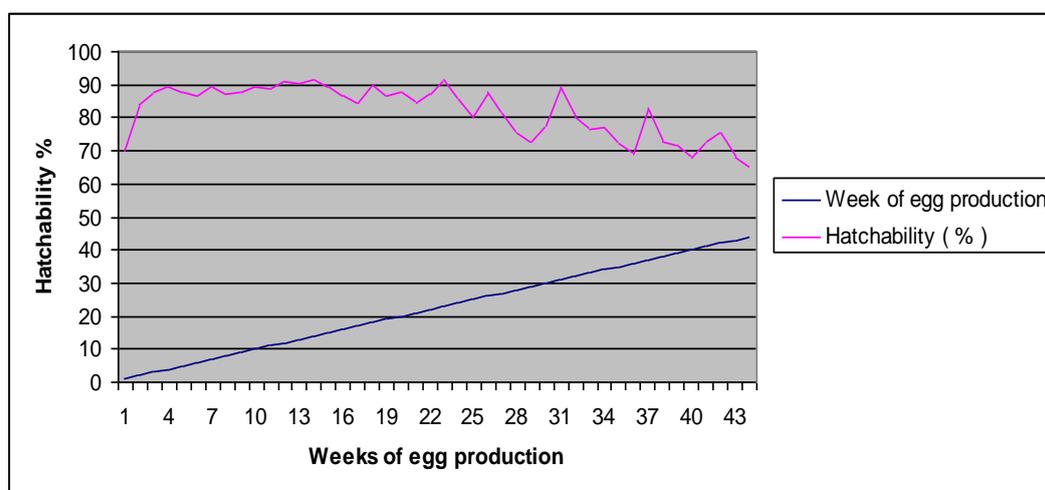


Figure 3. Performance of hatchability in present from 25th to 68th weeks.

According to graph, peak hatchability at 37 weeks of age (Figure 3). The average hatchability from 24 to 68 weeks was 83.74%. It was near to about close to the standard of hatchability percentage of that strain. Hatchability percentage was lower initially, because eggs of immature female, weak male in the flock and managerial problem. Overall results of the study almost similar to results of study of Khan and Ahmed (2010).

4. Conclusions

From the current study it may be concluded that it is possible to achieve target body weight of broiler parent stock, which is close to the breeder standard. Uniformity may be either acceptable or close to the acceptable value in most of weeks of rearing period although it may be varying between sexes. The production pattern found in this study were also satisfactory and the feed prepared in own farm also good quality and the stresses on the productivity and hatchability were minimized.

Conflict of interest

None to declare.

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