

Abstract

The study was conducted at Jhawtala and Santirhat in Chittagong during August to October, 2015 to know live weight and weight gain of indigenous chicken under scavenging rearing system. The average mature age and live weight of indigenous hen was higher at Jhawtala (12.00 ± 7.106 month and 966.66 ± 346.410 g) than santirhat (12.9 ± 8.49 month, 943 ± 298 g). Again average age of sexual maturity of hen and hatchability percentage was higher at Jhawtala (170 to 180 days and 75.5) than santirhat (180 to 190 days and 70.5). Egg weight was also higher at Jhawtala (39.11 ± 6.37 g). Average live weight of chicks at 1st and 2nd week was higher in Jhawtala (36.3 ± 3.74 g, 48.2 ± 3.08 g) but chicks at 3rd and 4th week, was higher at Santirhat (62.00 ± 6.61 g, 79.71 ± 6.84 g). There was presence of significant ($P < 0.05$) positive correlation of egg weight with hatched weight and that was 0.708. However, the genetics of indigenous chicken was found inert under scavenging rearing system.

Key words: Chicken, rearing system, live weight, Correlation.

CHAPTER-I

INTRODUCTION

Bangladesh is a small and densely populated agro based country situated in South Asia. It is mainly a land of agriculture and about eighty percent of its people live in village. Most of the village people depend upon the agriculture for their economical support. Agriculture is an important sector in Bangladesh where poultry is one of the fastest growing segments of this sector (Faruque *et al.*, 2013). The production system for indigenous chickens is smallholder backyard scavenging in nature with each family keeping an average of 6-7 chickens to meet family requirements. Indigenous chickens are locally known as Deshi (*Gallus domesticus*) and it was reported that deshi chicken was derived from *Gallus gallus* (Dutta *et al.*, 2013).

Approximately there are 242.87 million chickens scattered throughout 68,000 villages in the country and mostly of them are indigenous non-descript type. The non-descript deshi chicken constitutes about 90% of the indigenous population. (DLS, 2013). Through the rural poultry are playing a vital role both in national economy and nutrition, they are poor meat and egg producers. It was reported that about 74 % households rear poultry domestically. The indigenous hens are small in size (average live wt. 1140 g) and produce eggs 45-60 per year (Hossen, 2010). Indigenous chicken is a low producer because of poor genetic makeup and inadequate nutrition and management (Bhuiyan *et al.*, 2005). Under intensive rearing system, indigenous hen live weight was 1228.6 ± 154.1 g and laid 100 - 110 eggs from starting to ten months (Faruque *et al.*, 2010).

Traditionally local chicken perform a variety of functions, e.g. laying eggs, hatching chicks, brooding and caring of them (Shahjahan *et al.*, 2011). The size of hens and number of eggs setting under each hen might influence the hatchability of eggs and subsequent successful rearing of chicks. Natural brooding system is less expensive but produces fewer chicks (Islam *et al.*, 2014).

There is a close correlation between egg weight and hatching weight, irrespective of the age of the hens. The high correlation between egg weight and chick weight decreased markedly during post-hatching growth (Pinchasov, 1991; Faruque *et al.*, 2010). In scavenging system of rearing the indigenous chicken cannot attain their full production due to exposure of risk which influences their survivability and productivity.

The indigenous chicken population of Bangladesh has been undergoing genetic erosion after the 1960, following the introduction of improved stock from developed countries as a result the performance of cross breed are higher than indigenous chicken. Now-a-days there is seeing that the adaptability of cross bred in rural condition has been increased. Therefore there is a possibility to mix up the genetic of exotic and non-descriptive deshi. If the result of the current study compared with earlier study there may be chance to know whether the non-descriptive deshi genetics is intact. Therefore the current study was designed with the objectives.

Objectives of the study

1. To study different productive traits (age, live weight, egg weight, hatched weight, clutch size) and reproductive traits (sexual maturity, hatchability) of indigenous chicken under scavenging rearing system.
2. To know the live weight and weight gain of indigenous chicken under scavenging rearing system.

CHAPTER-II

MATERIALS AND METHODS

2.1. Location and duration of study

The study was conducted at different households having indigenous chicken (local name deshi) of urban (Jhawtala) and rural (Santirhat) areas at Chittagong in Bangladesh from August 2015 to October 2015.

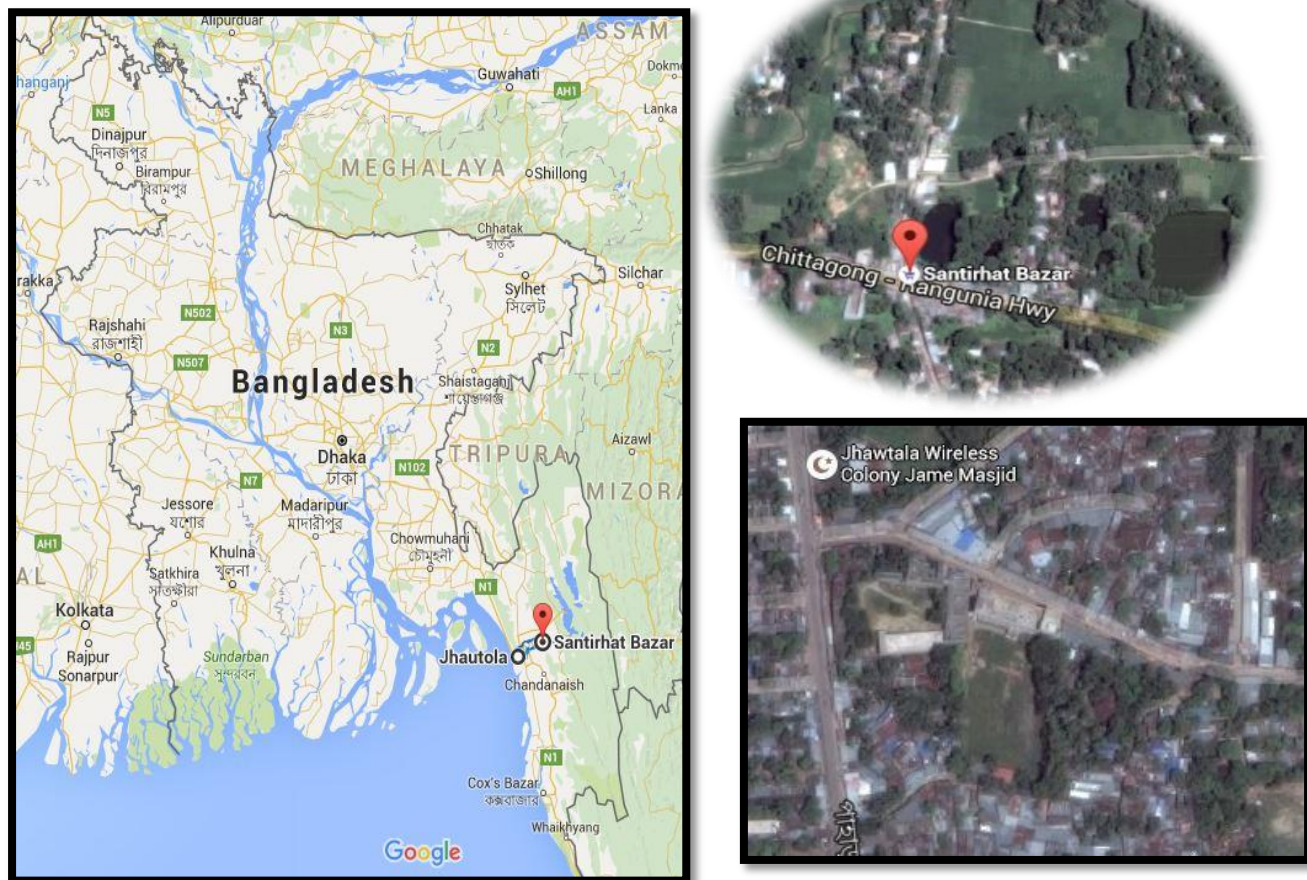


Fig 1 - Study area map.

2.2. Study population

Twenty indigenous chicken raising households from Santirhat ten households from Jhawtala were selected through stratified random sampling technique and constituted total 30 sample size for the study. Data was collected during 3 months period.

The owner of households would not keep any written record. So all the data was collected by using a pre-prepared questionnaire. The parameter of the questionnaire were total no poultry, total no of laying hen, age of sexual maturity, hatchability, clutch size, egg weight, hatched weight, finally 1st week to 4th week individual chicks weight.

2.3. Housing and management of indigenous chicken

The housing system of the indigenous chicken was mainly backyard farming system. Most of the chickens were scavenging in nature. The house was made of wood or bamboo or tin- shed or mud. As indigenous chickens were scavengers by nature so there were no practices of supplementary feeding. The birds scavenge for their own feed from morning to evening around houses and fields. They depend on field grains, insect's earthworms, green matters crop residues homestead pickings and kitchen wastes. In Jhawtala, boiled rice, broken rice, rice polish was given as a feed supplements. No commercial diets were given to them. At the age of 170-190 days sexual maturity was achieved. Indigenous chicken normally yield 50-70 egg in a year. The color of egg was white. The eggs were naturally incubated under broody hens. During brooding, wood shavings, rice hulls, chopped straw, sawdust were used as bedding materials. Every day at morning 6 am the door of the house was opened and at evening 6.30 pm the door of was closed. The vaccination and deworming schedule was not properly maintained.





Fig-3: Different types of housing in Indigenous chicken under scavenging rearing system.



Fig-4: Natural method of brooding by broody hen.

2.4. Method of data Collection

A total of thirty (30) individual households, rearing indigenous chicken from two different areas in Chittagong visited every week and look after the birds.

The data were collected from selected household owners by conducting personal interviews (total no poultry, age of poultry, age of sexual maturity, feed supplement, vaccination and deworming schedule). Some other parameters like body weight, egg weight, and hatched weight were also collected and recorded directly by research technique.

The individual laying hen and cock live weight, chicks hatched weight and their subsequent weekly live weight up to 4 week and egg weight was taken by using a top loading weighing balance. Indigenous chicken laying eggs clutch size was recorded in the questionnaire.

2.5. Statistical analysis:

All the data including different traits (age, body weight, age of sexual maturity, egg weight, clutch size, weight of chicks) were entered into MS Excel (Microsoft Office excel 2010) and means with standard deviation was analyzed by the PROC GLM of SAS (SAS, 2012) using the following statistical model.

$$Y_{ijk} = \mu + L_i + S_j + e_{ijk}$$

Where,

Y_{ijk} is the traits value;

μ is the overall mean;

L_i is the effects of locations;

S_j is the effect of sex; and

E_{ijk} is the effect of error distributed as $N(0, \sigma^2)$.

Significant mean differences were done using least significant difference (LSD) test (Steel *et al.*, 1997).



Fig 4- 1, 2- Data collection from owner. 3, 4- measuring egg weight
5, 6 - measuring chick weight.

CHAPTER- III

RESULT

3.1. Mature age and live weight

The mean with standard deviation of mature live weight and age of indigenous chickens under scavenging system is shown in Table 1. Table 1 showed that the average age of cocks was higher in Jhawtala than Santirhat and average mature age of hen was higher in Santirhat than Jhawtala, Chittagong. However, the average live weight of cock and hen was higher in Jhawtala than Santirhat.

Table1- Mean with standard deviation of different traits of indigenous chicken under scavenging rearing system.

Traits	Location	Jhawtala		Santirhat	
		Cock	Hen	Cock	Hen
Age (month)		17 ± 8.58	12 ± 7.11	11.6 ± 8.12	12.9 ± 8.49
Live weight (g)		1589 ± 615.3	967 ± 346.4	1198 ± 551	943 ± 298

3.2. Egg and Chicks weight

Mean with Standard deviation of different productive traits of in indigenous hen under scavenging system is shown in table 2.

Table-2: Mean with Standard deviation of different productive traits of indigenous hen under scavenging rearing system.

Traits	Location	Jhawtala	Santirhat
Egg weight (g)		39.1 ± 6.38	38.3 ± 6.00
Hatched weight (g)		26 ± 4.01	23.80 ± 3.88
Wt at 1 st week (g)		36.3 ± 3.74	33.90 ± 4.05
Wt at 2 nd week (g)		48.2 ± 3.08	46.42 ± 4.89
Wt at 3 rd week (g)		61.4 ± 3.32	62.00 ± 6.61
Wt at 4 th week (g)		76.7 ± 3.04	79.71 ± 6.84
Clutch size		10.8 ± 2.22	10.9 ± 1.2

The average eggs weight, hatched weight, 1st and 2nd week chick's weight were higher in Jhawtala than Santirhat (Table 2). On the other hand weight of chicks at 3rd and 4th week was higher in Santirhat than Jhawtala. Clutch size of the hen was More or less similar (Table 2).

3.3. Body weight and weight gain

The live weight and weight gain of indigenous chickens under scavenging system, shown in figure 5.

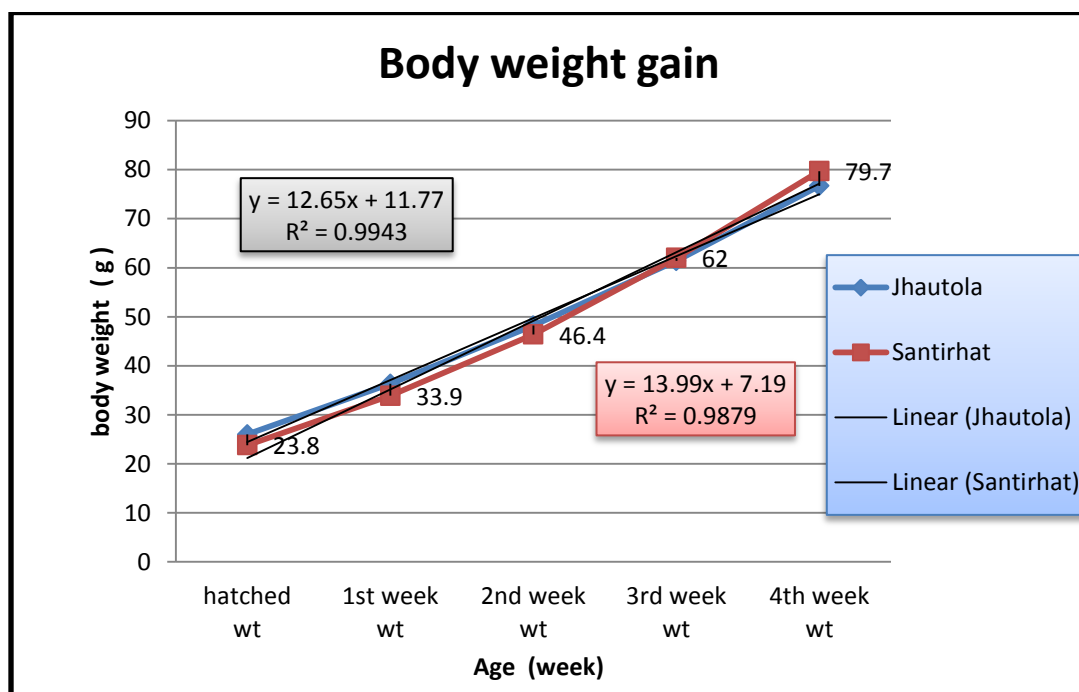


Fig 5- Patterns of growth of indigenous chicks (hatched to 4th week) over the time.

Figure 5 showed that intercept (a), slope (b) and determinant of coefficient (R^2), the values of body weight of chicks in two different areas (Jhawtala, Santirhat). Here the intercept value 11.77 and 7.19 indicated the average hatch weight of chicks is higher in Jhawtala than Santirhat. Whereas, slope value 12.65 and 13.99 indicated that average increase of body weight per week is higher in Santirhat than Jhawtala. Determinant of coefficient (R^2) value 0.99 and 0.98 indicated the degree of agreement between age and birth weight was higher.

3.4. Age of sexual maturity and hatchability (%)

The age at sexual maturity and hatchability of indigenous hen was shown in Table 3. It seemed that the indigenous hen of Jhawtala showed early maturity than Santirhat and similar results for hatchability percentage was also observed.

Table 3 Different reproductive traits of indigenous hen under scavenging rearing system.

Traits	Location	Jhawtala	Santirhat
Age of sexual Maturity (days)		170-180	180-190
Hatchability (%)		75.5	70.5

3.5. Correlation:

The Pearson correlations of different traits are presented in table 4. The result showed that, there was a significant ($P < 0.05$) positive association between egg weight and hatched weight. Highly significant positive relation was also found between total bird and total hen and there also significant relationship present with hatched egg. On the other hand no significant ($P > 0.05$) relationship was present among egg weight and hatched weight with total hen.

Table 4 Correlation of different traits of indigenous hen under scavenging system.

Traits	Total bird	Total hen	Hatched weight (g)	Egg weight (g)
Total bird	1	0.52 (0.001)	0.29 (0.023)	0.20 (0.27)
Total hen		1	0.08 (0.55)	0.03 (0.88)
Hatched weight (g)			1	0.71 (0.01)
Egg weight (g)				1

CHAPTER-IV

DISCUSSION

The average live weight of indigenous hen was higher in Jhawtala than Santirhat and it might be due to additional practice of providing feed supplements (Broken rice, boiled rice, rice polish) to their hen. Similar findings also found under scavenging system that supplementary feed increase live weight of hen (Zaman *et al.*, 2004) .

Average egg weight, clutch size, hatched weight and 1st and 2nd week chicks weight were higher in Jhawtala than Santirhat, it might be due to providing of extra feed, the findings was supported with (Zaman *et al.*, 2004). Again average weight of 3rd and 4th week chicks were higher in Santirhat than Jhawtala due to during that time the extra supplementary feed (Rice polish, broken rice, wheat) was provided. Similar findings were also reported previously by (Sazzad, 1986; Bhuiyan *et al.*, 2005).

Early sexual maturity of hens was observed in Jhawtala than Santirhat. It might be influenced by environmental factors, nutrition. This findings of sexual maturity was an agreement with the findings (Sazzad, 1992; Zaman *et al.*, 2004). Age at sexual maturity was reduced with increased amount of supplementary feed. Poor nutrition and management delay the start of production. Sexual maturity depends on the physiological age of the organism. If this process is postponed (lack of food) it will be reflected in a later start of laying. Hatchability (%) of the eggs was found higher in Jhawtala. This might be occurred due to in natural brooding (broody hen) the humidity was not properly maintained. The report was supported by (Bhuiyan *et al.*, 2005). The hatchability of eggs ranged from 78.33 to 90.79 overall percentages of 85.99% which was much higher than the present findings (Khatun *et al.*, 2005),

The Study also revealed that There was a significant ($P < 0.05$) positive correlation between egg weight and hatched weight means that increased egg weight will result in increased hatching weight. Hatched weight was determined by egg weight, normally being 62-78% of egg weight which is supported with (Hartmann *et al.*, 2003; Malago and Baitilwake, 2009; Faruque *et al.*, 2010).

CHAPTER-V

CONCLUSION

From the study it may be concluded that the live weight of indigenous hen is higher in Jhawtala under scavenging rearing system. Age of sexual maturity of hen came early in Jhawtala. Moreover clutch size and eggs weight, chicks weight are lower in Santirhat. There is also seen higher hatchability percentage of eggs in indigenous chicken in Jhawtala. The average body weight of chicks (1st and 2nd) is lower in Santirhat, as there was no practice of supplementary feeding. The study helps the people to know about productive, reproductive traits and live weight and weight gain of indigenous chicken under scavenging system. There will also chance to know whether the non-descriptive deshi genetics is inert or not. Due to short duration of the study period sample size of current study was very small. if the sample size is large, the more significant result will come.

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Annex

Questionnaire

Farm Owner name:

Address: Age: sex:

Mobile no:

- ❖ Total no of poultry:
- ❖ Total no of laying Hen:
- ❖ Age of laying hen:
- ❖ Weight of laying hen:
- ❖ Clutch size:

Weight of egg: (g)

1	2	3	4	5	6	7	8	9	10	11	12

- Color of Egg: white/ brown , Other:.....
- Total no of Cock:
- Age of Cock:
- Weight of Cock:

Weight of Chicks: (g)

1.	Hatched	1 st week	2 nd week	3 rd week	4 th week
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

- ❖ **Hatchability:**
- ❖
- ❖ **Age of sexual Maturity:**
- ❖ **Rearing system :** Scavenging / semi scavenging
- ❖ **Feed supply in semi scavenging system :**
- ❖ **Feed ingredients supply:**
- ❖ **Space allocated for each poultry :**
- ❖ **Time of poultry house door open :**Am &
close:.....Pm
- ❖ **Vaccination:** yes/ No
- ❖ **Deworming :** yes/ No

Data Collector Name: Mohammad Mahbub Hasan

Intern ID No: B13

Date:

BIOGRAPHY



Name	Mohammad Mahbub Hasan
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No of publication	None.
Research interest	Research related work.

