

CHAPTER 1: INTRODUCTION

Bangladesh is a large and densely populated developing country in south Asia having tropical climate bordering Burma, India, Nepal and Bhutan. The total population of her is about 16 crores. The Population per square kilometer is 953 which is the highest in the world (BBS, 2008). Livestock constitute an important part of the wealth of a country, it provides manure, meat, milk and egg to the vast majority of the people. There are about 22.90 million cattle, 1.26 million buffalo, 21.56 million goat, 2.78 million sheep, 212.47 million chicken and 39.84 million duck present in Bangladesh (DLS, 2009). Like other developing countries the economy of Bangladesh depends mainly on her agriculture sector where livestock is an important subsector providing egg, milk, meat, leather, drought power & considered to be the backbone of agriculture.

The breeds of poultry available in Bangladesh are as follows: (i) non-descript indigenous type - Asseel, Chittagong Fowl, and Naked Neck; (ii) Exotic: White Leghorn, Rhode Island Red (RIR), Fayomi, Australop, several commercial broiler and layer breeds; (iii) Crossbreed: Indigenous exotic. Local breeds of poultry are small in size and poor in egg production.

The government has established many poultry and duck farms in many places of the country. In the mid-eighties Backyard Poultry Programme were introduced with the financial assistance of UNICEF. Seven poultry units have been established with the assistance of the Netherlands Government. Two cross breed poultry farms, 'Rupali' (White leg horn \times Faomi) and 'Sonali' (RIR \times Faomi) have successfully evolved hybrids under Bangladesh village conditions. Many commercial poultry breeds have successfully been established in recent years in Bangladesh and are being profitably utilized by different entrepreneurs. Because of the extension programmes undertaken by the government and poultry entrepreneurs, the number of poultry farms in the country are increasing steadily. During 1997-98 total poultry farms were about 60,670.

Apart from the farms in the public and private sectors, there are a few military farms, which cater partially to the needs of armed forces personnel. The number of chicken

were 228.04 million (BBS, 2010), but the national share of commercial and family poultry in terms of egg production is probably almost equal and that of meat production is 60:40 (Bhuiyan, 2011). Bangladesh reported that traditionally local chicken perform a variety of functions, e.g. laying eggs, hatching chicks, brooding and caring of them, (Shahjahan *et al.*, 2011) However, chicken types (full feathered, naked neck and cap headed indigenous chicken) have no significant effect ($P>0.05$) on eggs per clutch (Shahjahan, 2010).

Identification and characterization of the chicken genetic resources generally requires information on their population, adaptation to a specific environment, possession of traits of current or future value and sociocultural importance, which are crucial inputs to decisions on conservation and utilization (Weigend and Romanov, 2001). Genetic variations in chickens can be described, among other approaches, using monogenic traits based on pigmentation differences and comb types. Pigmentation differences, which are attributable to melanin, produce a variety of plumage colors in the chickens. The presence and level of melanin pigments such as trichochrome is related to feather colour and is considered to be indicative of genetic differences among certain plumage colors (Smyth, 1990). Similarly, the presence or absence of the carotenoid pigments, primarily xanthophylls, in the feed is responsible for the diversity in skin color of chicken. The genetic basis of this variation was described by Eriksson *et al.*, (2007).

Indigenous chicken of the tropics are important reservoirs of useful genes and possess a number of additive traits (Horst, 1989). High demand of indigenous (Deshi) cockerel for their tenderness and special taste was observed (Ahmed and Ali, 2007) and indigenous chickens were popular to rural, peri-urban and urban people (Chowdhury, 2012). There are a number of breeds/types of indigenous chickens such as: Non-descript Deshi, Aseel, Naked Neck, Hilly and Dwarf in Bangladesh and these are undergoing genetic erosion due to continuous indiscriminate crossing with exotic stock but no attempts have been made to improve and conserve these valued genetic resources (Bhuiyan *et al.*, 2005). For this aspect, the phenotypic characterization of different chicken is important. Therefore, the current study was conducted with the phenotypic characterization of different

chicken breed available in Chittagong. Moreover, this study is helpful to know the overall productive and reproductive performance of chicken. It can also be helpful in selecting best individual for improvement of the economic traits. The current study was designed with the following objectives:

1. To determine the characterization of phenotypic variation of chicken in Chittagong.
2. To know the overall productive and reproductive performance of chicken in Chittagong.

CHAPTER 2: MATERIALS AND METHODS

The study was conducted for two months in Banskhali and Lohagara Upazila of Chittagong during internship programme from 5th February to 5th April, 2016.

2.1 Study area

This observational study was conducted at different semi intensive rearing system at Banskhali and Lohagara Upazila in Chittagong. In this area were selected three types of chickens such as Deshi, RIR (Rhode Island Red) and Sonali.



Figure 1: Study areas indicating in the map of Bangladesh

2.2 Study population

The observational study population comprised of 100 originating from different semi intensive rearing system. A total of 100 data were collected at Banskhali (75) and Lohagara (25) Upazila in Chittagong.

2.3 Data collection

Data collection was done regarding different points such as live weight, egg weight, clutch size, skin color, comp type, shank color, color of earlobe of chicken by using questionnaire (Appendix-1). Feeding system, housing system, vaccination schedule and deworming schedule were also recorded.

2.4 Data analysis

Data analysis was performed in Microsoft Excel 2013 by standard deviation method.

CHAPTER 3: RESULTS

During the study of total 100 laying chicken, productive & reproductive performance like live weight, egg weight, clutch size, skin color, comp type, shank color and color of earlobe were identified in semi intensive rearing system. The phenotypic variation of breed chicken in Banskhali, Lohagara Upazila and Chittagong was presented in Table 1, Table 2 and Table 3 respectively.

3.1 Live weight

In this study the mean body weight of overall chicken was 7860 ± 632 gm in Chittagong where Deshi, RIR and Sonali were (1390 ± 63) gm, (1220 ± 86) gm and (1460 ± 108) gm respectively in Banskhali Upazila (Table 2). In case of Lohagara Upazila, the body weight of Deshi, RIR and Sonali are (1310 ± 92) gm, (1080 ± 73) gm and (1400 ± 210) gm respectively (Table 3).

3.2 Egg weight

The mean of egg weight of overall chicken under study was 225.76 ± 31.79 gm. The egg weight of Deshi, RIR and Sonali were (36.61 ± 16.6) gm, (38.76 ± 2.08) gm and (35.93 ± 2.26) gm respectively in Banskhali Upazila (Table 2). In case of Lohagara Upazila, (38.0 ± 2.55) gm, (35.13 ± 3.10) gm and (41.33 ± 5.20) gm were the egg weight of Deshi, RIR and Sonali respectively (Table 3)

3.3 Clutch size

In this study the mean of clutch size of overall chicken under study was 79.66 ± 7.36 where Deshi, RIR and Sonali were 12.63 ± 0.71 , 14.0 ± 0.93 and 12.56 ± 0.92 respectively in Banskhali Upazila (Table 2). In case of Lohagara Upazila, the clutch size of Deshi, RIR and Sonali were 13.14 ± 1.07 , 12 ± 1.40 and 15.33 ± 2.33 respectively (Table 3).

3.4 Skin color

Yellow color (51%) was prominent compare to Red (31%), White (14%) and Black (4%) in Chittagong District (Table 1).

3.5 Shank color

Yellow shank color was more dominant (90%) in Chittagong District (Table 1).

3.6 Earlobe color

Red was prominent (92%) than White in Chittagong District (Table 1).

3.7 Comb type

All chicken were single comb type in both Upazila without some RIR chicken breed. 14.67% RIR in Banskhalı Upazila (Table 2) and 16% RIR in Lohagara Upazila was rose comb type breed (Table 3).

Table 1: Phenotypic variation of chicken in Chittagong

Breed	Live wt (gm)	Egg wt (gm)	Clutch size	Skin color				Shank color		Earlobe color		Comb type	
				Yellow	Red	White	Black	Yellow	Black	Red	White	Single	Rose
Deshi	2700 ^a ±155 (52)	74.61 ±19.15	25.77±1.78	17%	21%	12%	2%	46%	6%	44%	8%	52%	
RIR	2300 ^b ±15 9 (29)	73.89 ±4.18	26±2.33	25%	4%			29%		29%		14%	15%
Sonali	2860 ^{ab} ±31 8 (19)	77.26 ±7.46	27.89±3.25	9%	6%	2%	2%	15%	4%	19%		19%	
Total	7860±632 (100)	225.76 ±31.79	79.66±7.36	51%	31%	14%	4%	90%	10%	92%	8%	85%	15%

a, b superscripts means with different superscripts in the same column differ significantly

Table 2: Phenotypic variation of chicken in Banskhali Upazila

Breed	Live wt (gm)	Egg wt (gm)	Clutch size	Skin color				Shank color		Earlobe color		Comb type	
				Yellow	Red	White	Black	Yellow	Black	Red	White	Single	Rose
Deshi	1390 ^a ±6 3(38)	36.61± 16.6	12.63 ±0.71	18.67% (14/75)	17.33% (13/75)	12% (9/75)	2.67% (2/75)	46.67% (35/75)	4% (3/75)	41.34% (31/75)	9.34% (7/75)	50.67% (38/75)	
RIR	1220 ^b ±8 6(21)	38.76± 2.08	14.0± 0.93	22.67% (17/75)	5.34% (4/75)			28% (21/75)		28% (21/75)		13.34% (10/75)	14.67% (11/75)
Sonali	1460 ^{ba} ± 108(16)	35.93± 2.26	12.56 ±0.92	8% (6/75)	8% (6/75)	2.67% (2/75)	2.67% (2/75)	16% (12/75)	6% (4/75)	21.34% (16/75)		21.34% (16/75)	
Total	4070±25 7 (75)	111.3± 20.94	39.19 ±2.56	49.34% (37)	30.67% (23)	14.67% (11)	6% (4)	90.67% (68)	9.34% (7)	90.67% (68)	9.34% (7)	85.34% (64)	14.67% (11)

a, b superscripts means with different superscripts in the same column differ significantly

Table 3: Phenotypic variation chicken in Lohagara Upazila

Breed	Live wt (gm)	Egg wt (gm)	Clutch size	Skin color			Shank color		Earlobe color		Comb type	
				Yellow	Red	White	Yellow	Black	Red	White	Single	Rose
Deshi	1310 ^a ±92 (14)	38.0±2.5 5	13.14±1. 07	12% (3/25)	32% (8/25)	12% (3/25)	44% (11/25)	12% (3/25)	52% (13/25)	4% (1/25)	56% (14/25)	
RIR	1080 ^b ±73 (8)	35.13±3. 10	12±1.40	32% (8/25)			32% (8/25)		32% (8/25)		16% (4/25)	16% (4/25)
Sonali	1400 ^{ab} ±21 0 (3)	41.33±5. 20	15.33±2. 33		12% (3/25)		12% (3/25)		12% (3/25)		12% (3/25)	
Total	3790±375 (25)	114.46± 10.85	40.47±4. 8	44% (11)	44% (11)	12% (3)	88% (22)	12% (3)	96% (24)	4% (1)	84% (21)	16% (4)

a, b superscripts means with different superscripts in the same column differ significantly

CHAPTER 4: DISCUSSION

The Deshi chicken was highest (52%), compared to RIR (Rhode Island Red) (29%) and Sonali (19%) among three types of chicken in Chittagong. The mean body weight of Deshi (2710 ± 155 gm), RIR (2300 ± 159 gm) and Sonali (2860 ± 318 gm) were observed. The mean body weight of overall chicken under study was 7860 ± 632 gm which was very close to the findings of Islam *et al.*, (2012) but lower than Semakula *et al.*, (2011), Ssewanyana *et al.*, (2003) and Kyarisiima *et al.*, (2004). The observed variation of skin color of chicken in this region, where Yellow (51%) are prominent than Red (31%), White (14%) and Black (4%) and this finding was supported by Bhuiyan *et al.*, (2005) in Bangladesh and Dana *et al.*, (2010) in Ethiopia. Most of the chicken were Yellow shank color (90%) but there were chickens with Black (10%) and this finding was supported by Faruque *et al.* (2010) in Bangladesh. Similarly, Youssao *et al.*, (2010) reported the most predominant shank colors were white in forest ecotypes than that of Savannah though there were birds with grey, black & yellow colored shanks but dissimilarity with the finding Daikwo *et al.*, (2011) that he found yellow colored shanks dominant over black, yellow, black and white in chickens of Dekina. Complete absences of black pigments in dermis and yellow pigments in epidermis of shanks, results the colors was white (Bell, 2002). Red (92%) earlobe colored chickens were prominent over White (8%) in chicken while Biswas (2005) observed the red earlobe color (58 %) was prominent over white (45.8%) but Ahmed and Ali (2007) found 80.55% white earlobe color of Deshi chicken. Comb size was associated with gonadal development and intensity of light but comb type is the consequence of gene interaction (Bell, 2002). However, at present study of single comb (85%) and rose comb (15%) were found and similarly reported by Bhuiyan *et al.*, (2005) in Bangladesh (97% single comb), Apunoet *et al.*, (2011) in Nigeria (96.45% single comb and 0.44% pea comb) and Badubi *et al.*, (2006) in Botswana (90% single comb and 1% pea comb).

CHAPTER 5: LIMITATION

The major limitation of this study were smaller population size, time period (only two months of internship period), poor record keeping system of the owners in Chittagong.

CHAPTER 6: CONCLUSION

From the present study, it may be concluded that the Deshi chicken was highest (52%), compared to RIR (29%) and Sonali (19%) in Chittagong. The overall mean body weight (7860 ± 632), egg weight (225.76 ± 31.79) and clutch (79.66 ± 7.36) of Deshi, RIR and Sonali were found in this study. The prominent colors of skin, shank, ear lobe and comb type were yellow (51%), yellow (90%), red (92%), and single (85%) respectively. The owners of different chicken breeds under the studied area followed semi intensive rearing system. The highest productive and reproductive performance of chicken was found in this area having good management practice, modern rearing system, supply of proper nutrition. I got clear idea about the existing resource in that study area. Finally this study will be helpful to identify the best chicken breed on the basis of their productive and reproductive performance.

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ACKNOWLEDGEMENTS

The author express his deep sense of gratitude, regard and sincere thanks to **DR. Tahmina Bilkis, Assistant Professor, Department of Genetics and Animal Breeding, Chittagong Veterinary and Animal Sciences University (CVASU)**, for her magnanimous guidance and valuable counsel in execution and completion of the study and immense help during the preparation of the report, without which it would have been simply impossible to carry out the study.

The author express his deep sense of gratitude, regard and sincere thanks to **DR. Md. Moksedul Momin, Lecturer, Department of Genetics and Animal Breeding, Chittagong Veterinary and Animal Sciences University (CVASU)** for this valuable advice and co-operation

The author express his deep sense of great, gratitude and indebtedness to **Professor Dr. Md. Ahsanul Haque, Dean, Faculty of veterinary Medicine, Chittagong Veterinary and Animal Sciences University (CVASU)**.

BIOGRAPHY

I am Md Sadeque Abdullah, son of Mr. A.K.M Zakaria and Mrs. Shaheda Begum. I am native to Chittagong. I have completed my secondary (2008) and higher secondary (2010) education from Chittagong successfully. Then I got myself admitted in Doctor of Veterinary Medicine Course under Chittagong Veterinary and Animal Sciences University. During my internship programme I got a short time research on phenotypic characterization of different chicken breeds in Chittagong. I believe all these will be helpful in progress of my career in future.

Author

Appendix-1

Tag No:

Date:

Name of Farm	
Name of Owner	
Occupation	

Address:

House No	
Road No	
Village/Ward	
Upazilla/Thana	
District	
Mobile No	

Animal Information Data:

Physiological Status: Pullet/Hen.

Species : Poultry

Breed : Deshi/Chittagong/sonali/RIR/ Cross (_ _ _ _ x _ _ _ _)/Others

Age	Sex	Weight	Skin colour	Comb type	Colour of shank	Colour of earlobe

Stage of laying	Egg weight	Clutch size	Pause	No.of egg per year

Source of Population:

Source of Animal: Farm/ Family (1-2 No.)

Type of Farm		Housing System	Extensive
Size of Farm			Intensive
Deworming	Yes/No		Semi-intensive
Day since of Deworming		Feeding system	Extensive
Any Recent Illness			Intensive
Time of Recent Illness			Semi-intensive
Vaccination	Yes/No	Day since Vaccination	