Phenotypic characteristics of three indigenous chicken genotypes in Bangladesh

K.N. Monira[1]* and S.S. Hussain[2]

[1]Bangladesh Livestock Research Institute, Savar, Dhaka- 1341, Bangladesh. [2] Department of Animal Breeding and Genetics, Bangladesh Agricultural University, Mymensing-2202, Bangladesh

Abstract

Poultry contributes the largest parts of animal-source foods. The International Food Policy Research Institute (IFPRI) has estimated that by year 2015, poultry will account for 40% of all animal protein. Indigenous chicken have a capacity to resist disease, able to utilize low quality feeds and their products are preferred by consumers. There views were collected to indigenous chicken production scenarios and their characteristics and to synthesize the information for gathering knowledge. The review areas were all over Bangladesh but our studied areas were Baraigram, Natore; Sarail, Brahmonbaria and Bandarban Hill tract and genotypes were Indigenous, Aseel and Hilly chicken. The production or management system was backyard scavenging and semi-scavenging type for Indigenous, Hilly and Aseel female chicken but for Aseel male it is used intensive system for breeding program; which was characterized by small flock size.The average number of chicken per house-hold was almost same in Baigram and Sarail (7.93±4.46 and 7.69± 2.75); but lower in Bandarban Hill district (5.11± 1.78). Indigenous, Aseel and Hilly chickens have a large morphological variation. The percent of plumage color of Indigenous chicken was 35% black brownish, 30% brown with black strip, completely black 30% and golden red 5%; in Aseel chicken was as 45% golden red, 30% black brownish, completely black 25% and in Hilly chickens have 50% black brownish, 45% brown with black strip and 5% black plumage color. 90% of indigenous chicken have yellow shank while 10% black shank. All the Aseel chickens have yellow shank. The shank color of Hilly chicken was as 50% yellow, 39% white and 11% black. The study revealed that indigenous chicken and Hilly chicken laid mainly white colored eggs and Aseel chickens laid mainly light brown egg. Feeds were not usually supplemented in all three genotypes reared under scavenging system. Chickens pick up grains such as rice, vegetables, green grass, insect, earthworm etc. from the yard, as chickens have reared under scavenging system. Different types of housing were used for chickens in the selected sites. Approximately 30%, 40% and 60% of farmers kept chickens in their living houses in cases of Indigenous chickens, Aseel and Hilly chicken, respectively. No farmer used artificial lighting for the chickens. So, the study was performed to review indigenous chicken production scenarios may serve as an important base of Ph.D research and may help to take proper planned to conserve of these three genotypes.

(**Key words:** Review, Phenotype Characterization, Indigenous, Chicken Genotypes.)

Introduction

Bangladesh has a rich heritage of indigenous poultry germplasm, which strongly supported decisive measures for conserving indigenous genetic resources. The indigenous chicken may be classified into three major groups: Aseel breed, Hilly and Indigenous (Deshi) (Okada *et al*., 1987; Faruque *et al.,* 2010). Aseel is the only breed of chicken in Bangladesh (Faruque *et al.,* 2010, Okada *et al.,* 1988). It is the heaviest chicken among the existing breeds and varieties of indigenous chicken in Bangladesh, the highest weight

*Corresponding author: monirablri@yahoo.com

being 6 kg (Bhuiyan *et al*., 2005; Yamamoto, 2010). Aseel chicken is predominantly reared in the home stead area of Sarail upazilla of Brahmanbaria district. Aseel has been bred there as a game bird for many centuries, specifically for its aggressive behavior. It is a very powerful bird having large bone, with broad shoulders, an upright stance, heavily muscled hips and square shanks, strong and curved neck and short beak. Indigenous chicken mostly of non-descript in nature. They are widely distributed throughout the country and also called Deshi chickens (Okada *et al*., 1987). Deshi chickens are more genetically diverse, well adapted and more resistant to diseases. Deshi chickens are easy to establish for low income families. Hilly chicken observed in Chottogram Hill Tract. Hilly chickens are very prominent in muscularity and vigourisity and reared for local consumption and its egg and meat have a unique taste, is regarded as a delicacy also popular among consumers.

The indigenous chicken population of Bangladesh has been undergoing genetic erosion since the 1960s following the introduction of improved stock from developed countries. Efforts to sustain commercial hybrid broiler and layer chicken farming under intensive and semi-intensive production models have been tested but efficiency of systematic characterization screening breed improvement and conservation programs with the indigenous Deshi chickens at the smallholder village levels (in-situ) of Bangladesh are yet to be tested. This in turn may help to sustain village chicken production system in Bangladesh and could be a useful micro-economic strategy in the on-going poverty alleviation process in the country (Bhuiyan *et al.*, 2005). Indigenous chickens constitute nearly 80% of the total chicken population of the country. About 89% of the rural livestock-holders rear chickens and the average number per household are 6.8 numbers. The production system for indigenous chickens is small holder backyard scavenging in nature with each family keeping an average of 6-7 chickens to meet family requirements. A cash income is derived from them when necessary. Indigenous chickens produce about 75% of the eggs and 78% of the meat consumed domestically (Bhuiyan *et al.*, 2005 and Faruque *et al.*, 2010).

The poultry industry is one of the faster growing and most promising industries in the agricultural sector of Bangladesh. Annual average growth rate in the commercial chicken is satisfactory. On the other hand, the growth rate of indigenous chickens is not satisfactory as evident from the supply of egg and meat in the market. Though poultry industry has evidenced faster growth in the livestock sector, still there is a huge gap between supply and demand of poultry meat and eggs. For example, per head annual consumption of eggs in the country is 95 against the minimum requirement of 104 eggs.

Morphological characteristics and production performance variations of some Bangladeshi chickens have been reported by Islam *et al*. (2011). Attempt has been taken to make for genetic improvement ex situ in institutional flock under intensive management system but information on the production potential of these flocks in situ i.e. in their home tract is not enough. Maximum survey data were collected by interview method and proper recording was not done in situ. However, for real genetic progress, it is essential to use the actual data. Therefore, the present study was

performed to review indigenous chicken production scenarios and may help to take proper plan to conserve of these three genotypes in Bangladesh. Reviewed data of morphological and production parameters of Indigenous, Aseel and Hilly chicken are shown in Table 1, 2 and 3 respectively.

Table 1. Traits values of Indigenous chickens at different conditions

Rearing system	Traits		Source
	Morphological	Production	
Backyard scavenging system	Plumage colour- black (75%), red (25%) Skin colour-white (82%), yellow (17%) Shank color- black (39%), yellow (32%), White (29%); Egg shell colour- Light brown (67%) white (27%) Comb type-single	Age of 1st egg: 175d Mature body wt.1-1.3 kg Egg prod/hen/year-45-50 no.	Bhuiyan *et al.*, 2005
Scavenging and Semi-intensive system	Plumage colour- male/female – colored/white Skin color-white/yellow Shank color-Male/female-yellow/white Comb type-single	Age of 1st egg: 156 d Mature body wt. male – 1.8 kg, female- 1.4 kg Egg prod/hen/year-36 no. Egg production% 24-36 wk. 50 no.; Average egg wt.- 43 g Cluster per year-3-4	Faruque *et al.*, 2010
Locations: 10 districts Semi-intensive system	Plumage colour- male/female – colored/white Skin colour-white/yellow Shank color-Male/female-yellow/white Comb type-single	Gene frequencies of B^A, B^C and B^7 were seen in low frequency though the B^M was comparatively high frequency in all populations.	Yamamoto *et al.,* 2010
Locations: 8 districts Semi-intensive system	The comb shape and the colors of earlobe, feather and shank was studied. The pea (P), rose (R), and crest (Cr) loci controlling the comb shape, the barring (B), extension of black (E), inhibitor (I) and silver (S) loci controlling the feather color, and the Id locus for shank color were investigated.	The comb shape (the P, R and Cr loci), earlobe color, feather color (the B, E, I and S loci) and the shank color (the Id locus). Gene frequencies were estimated at these 8 loci and at four blood group loci (The Ea-A, Ea-B, Ea-D and Ea-E loci).	Okada *et al.*,1987
Semi-intensive system	Comb shape - 99% single plumage color- (24%) white with red colored (1%). shank color- white (52%) black (36%) yellow (10%). skin color- white (47%).	The indigenous chicken laid 48.5% white colored eggs, 20% red brown and 1% red. The average adult body weight was measured 961.50g.	Tabassum *et al.*, 2012
Locations: 2 districts. Extensive system.	Production- Not mention	Age at 1st laying 203.4d Days/clutch-18.07 Egg/clutch-15.64 Clutch/year-3.38 Male mature wt.-1.28 kg Female mature wt.-1.08 kg	Shahjahan *et al.*, 2010

d, day; no - Number, WK - weeks, g-gram, Kg- Kilogram

Locations: 4 districts. Scavenging system.	plumage pattern- black -25.49%, grayish- 22.30% red-16.40% the rest showed white, multi colored, black with white tips, reddish brown and white with red stripes. Plain heads, yellow shanks and pea comb were observed 51.18%, 64.42% and 50.72% respectively. Shank feathering-About 97.52% no feathers on their legs.	Production- Not mention	Islam *et al.*, 2011
Locations: 2 districts Scavenging system.	Comb color - bright red (79.4%), the eye color- brown (70.1%) and red (24.3%). Neck hackle- black (32.7%) and orange (29%, plumage color- black (33%) gold (31%) and white (20%), earlobe color- red (58%) white (45.8%), skin color- white (98.1%), shank color- whitish (56.1%) and black (30.8%), comb pattern- mostly single type (86%).	Production: not mention	Biswas *et al.*, 2005
Location: BLRI farm Intensive management system	Plumage color- black brownish (33.33%) followed by white with black tips (28.33%) and red brownish (18.33%). Shank color-whitish 35% yellowish 31.38%; black 11.66% and others 21.67%. egg color- light brown (62.42%) to cream or off white (30.28%)	Male: Shank Length (cm)- 10.35,Wattle length (cm)- 4.98, Body weight (Kg) - 2.48 Female: Number of eggs/hen from starting to ten months of laying - 108, egg weight 42.94 fertility (%) 89.65, hatchability (%), 88.63,	Faruque *et al.,* 2010
Locations: 12 districts Extensive system	plumage color, black-34.50, red-18.17, brown-36.33, white-11.00%, Type of comb, simple-98.67, rose-0.50, pea-0.17, walnut-0.67%, body feathering, normal-99.83, frizzled-0.17%, Color of beak, white-5.00, blackisk-54.17, yellow-33.17, bworn-7.67%, color of earlobes, red-85.83, white-13.33, blackisk-0.67, yellow-0.17, color of skin, white-85.83, pink-5.50, yellow-5.33, brown-3.33	Production: not mention	Islam *et al.,* 2004
Location: BLRI farm Intensive system	Morphology: not mention	Age at 1st egg-160d Egg production (no.)- 60.04 (24-40 wks) Egg weight- 42.26 g	Faruque *et al.,* 2013
Locations: Joypurhat district Semi-scavenging system	Morphology: not mention	57.2% farm household had-20 chicken, 28.8% farm households had 20-50 chicken and 2.0% household had 70-90 chickens. 79% respondents reared native chicken in combined house and 10% prepared separate house	Sarker *et al.,* 2005

Scavenging system	Morphology: not mention	A family having 15 organic chickens earns Tk. 1770/year, 70-80% routing management performed by women.	Paul *et al.*, 2003
Location: BLRI farm Intensive system	Plumage color was reddish black (33.13%) , shank colors- white (39.87%), yellow (37.22%), black (20.04%) and mixed (2.87%), earlobes - reddish white (44.79%) white (29.24%) and red (25.97%), skin color - white (92.22%) single comb (96.12%)	Plumage color- BW Red Black - 1459.60g, Black Red – 1388.32g, Red – 1211.60g, Black – 1285.37g White Black – 1409.72g Red White – 1315.33g and Black – 1208.54g	Sarker *et al.*, 2014
Location: Rajshahi District Extensive system	Morphology- not mention	Age at 1st lay-20wk Marketable wt.-750 g Av. Egg production-2.92 month	Dutta *et al.*, 2013
Location:Noakhali district Extensive system	Morphology: not mention	Final body wt-366g Body wt. gain-301 FCR-3.05 Mortality-3.77	Sarker *et al.,* 2013
Location: Noakhali district scavenging system	Morphology: not mention	Clutch/hen/year-4 Egg/clutch-17 Clutch length-19 Egg prod./hen/year-68 Value of eggs & chicken consumed/month (BTD)-363 Income both in cash & consumption - 433 Tk.	Sarker*et al.*, 207
Locations: 2 districts scavenging system	Morphology: not mention	Their livelihoods providing The maximum number of chicken egg production per year was 1026 and the highest sale from chicken eggs was taka 3591, so poultry have the potential to assist resource poor farmers to improve both social and economic benefits	Hussain *et al.,* 2007
Location: Jessore district scavenging system	Morphology: not mention	Egg production (no. bird)-44 Egg weight-36.27g Egg production %-11.22 Live weight (kg bird)-1.3 Age at 1st eggs (days)-175 Mortality % - 14.5	Ershad, 2005
Location: 2 districts Semi-scavenging system	Morphology: not mention	Live wt.-female- 966.1, male - 1010, Clutch size (d)-15.18 Egg production (e/h/y)-70.65 Egg wt.(g/egg)-44.17 Hatchability % at set egg-87.40	Ahmed *et al.,* 2012

e/h/y - Egg/hen/year

Location: Gaibandha district, scavenging system	Morphology: not mention	Average populations of chickens were 8.4, 64% of the farmers were low producer and only 6% higher producers. In case of consumption, 74% consumed by low producers	Billah *et al.,* 2013
Location: Aftab Bahu mukhi Farm ltd. Intensive system	Morphology: not mention	Quality chicks, feed, technical support, vaccines, medicines and health monitoring are provided by the ABFL, their net profit per month Tk.2000-4000.	Aziz *et al.,* 2003

Table 2. Traits values of Aseel chickens at different conditions

Rearing system	Traits		Source
	Morphological	Production	
Location: Brahmanbaria district backyard scavenging system	Plumage colour- Deep purple Skin colour-white/yellow Shanks- Featherless Egg shell colour- Brownish	Age of 1st egg: 240-300d Mature body wt.1.07-4.50kg Egg prod/hen/year-33 no.	Bhuiyan *et al.,* 2005
Location: Brahmanbaria district Scavenging and Semi - intensive system	Plumage colour- male/female Silver/Gold Skin colour-white/yellow Shank color-Male/female-yellow/white Egg shell colour- Brownish	Age of 1st egg: not mention Mature body wt. (male)– 4.5 kg, female- 3.5 kg Egg prod/hen/year-15 no. Average egg wt.- not mention	Faruque *et al.*, 2010
Locations: 10 districts Semi-intensive system	Plumage colour- male/female Silver/Gold Skin colour-white/yellow Shank color-Male/female-yellow/white Comb type- pea/rose	Production parameter-not mention Worked on - gene frequencies of B^A, B^C and B^7 were seen in low frequency though the B^M was comparatively high frequency in all populations.	Yamamoto *et al.,* 2010
Locations: 8 districts Semi-intensive system	The comb shape and the colors of earlobe, feather and shank. The pea (P), rose (R), and crest (Cr) loci controlling the comb shape, the barring (B), extension of black (E), inhibitor (I) and silver (S) loci controlling the feather color, and the Id locus for shank color were investigated	Production parameter-not mention The comb shape (the P, R and Cr loci), earlobe color, feather color (the B, E, I and S loci) and the shank color (the Id locus). Gene frequencies were estimated at these 8 loci and at four blood group loci (The Ea-A, Ea-B, Ea-D and Ea-E loci).	Okada *et al.*, 1987

Locations: 2 districts Semi-intensive system	Feathercolor: neck/hackles-red in both males (56.14%) and females (54.06%). Sickle feather color- black in both males (71.93%) and females (54.17%). saddle feather color-red (40.35%) in male and pale brown (58.33%) in female. Breast feather color- black (64.91%) in male and pale brown (50%) in female. primary feather color- black in both male and female	Shank length- male 12.79 ± 0.13 female- 10.21 ± 0.25 cm Ulna/Radius length, male- 11.04 ± 0.07 cm female- 8.96 ± 0.23 cm, Keel bone length- male, 14.39 ± 0.19 cm female -10.79 ± 0.23 cm. Adult live weight male- 3749.12 ± 83.44g female - 2062.50 ± 105.26 g. Egg prod. 24-48 numbers of clutch/hen/year.	Sarker *et al.,* 2011
Location: Brahmanbaria district Semi – intensive sys.	Plumage color in wing region: cock - reddish, black, red and blackish. Hen-red, brown, black, white, blackish, gray Plumage color in breast region: cock- red, black, blackish, white, gray Hen-reddish, black, blackish	Body wt. Male-3.32 kg (1-2yr) Female-2.43 kg (1-2yr.) Total egg:21 (min) 74 (max) Egg wt. 38g (min), 56g (max)	Huque *et al.*, 2013

Table 3. Traits values of Hillychickens at different conditions

Rearing system	Traits		Source
	Morphological	Production	
Location: Chittagong district backyard scavenging system	Plumage colour- grey or reddish Skin colour-yellow Shanks- Featherless Egg shell colour- Brownish	Production: not mention	Bhuiyan *et al.,* 2005
Location: Chittagong district Scavenging and Semi-intensive system	Plumage colour- male/female – white/black Skin colour-white/yellow Shank color-Male/female-black/yellow Comb type-single	Age of 1st egg: 154 d Mature body wt. male – 3.5 kg, female- 2.2 kg Egg prod/hen/year-32 no. Egg production% 24-36 wk. 49 no.Average egg wt.- 42 g	Faruque *et al.,*2010
Locations: 10 districts Semi-intensive management system	Plumage colour- male/female – colored/white Skin colour-white/yellow Shank color-Male/female-yellow/white Comb type-single	Production parameter-not mention Worked on - gene frequencies of B^A, B^C and B^7 were seen in low frequency though the B^M was comparatively high frequency in all populations.	Yamomoto *et al.,* 2010
Locations: 8 districts Semi-intensive system	The comb shape and the colors of earlobe, feather and shank was studied. The pea (P), rose (R), and crest (Cr) loci controlling the comb shape, the barring (B), extension of black (E), inhibitor (I) and silver (S) loci controlling the feather color, and the Id locus for shank color were investigated.	Production parameter-not mention The comb shape (the P, R and Cr loci), earlobe color, feather color (the B, E, I and S loci) and the shank color (the Id locus). Gene frequencies were estimated at these 8 loci and at four blood group loci (The Ea-A, Ea-B, Ea-D and Ea-E loci).	Okada *et al.,*1987

Location: BLRI farm Intensive system	Plumage color- black brownish (33.33%) followed by white with black tips (28.33%) and red brownish (18.33%). Shank color-whitish 35% yellowish, 31.38%; black 11.66% and others 21.67%. egg color- light brown (62.42%) to cream or off white (30.28%)	Male: Shank Length (cm)-11.09,Wattle length (cm)-4.09, Body weight (kg)-2.60 Number of eggs/hen from starting to ten months of laying - 104, egg weight 40.32 fertility (%) 91.55, hatchability (%), 79.23	Faruque *et al.,* 2010
Location: BLRI farm Intensive system	Morphology- not mention	Body weight at 38 weeks of age - 1429g, egg weight 40.94g, egg production 27.23%	Islam *et al.,* 2004
Location: BLRI farm Intensive system	Morphology- not mention	The live weight of the birds fed PHPE diet was significantly higher (699±18) than that of MLPE diet (492±10) at 8 weeks of age. Feed conversion ratio (FCR) was better in PHPE diet (2.89±0.03) than in MLPE diet (3.22±0.09)	Rahman *et al.,* 2013
Location: Chittagong Hill tract Semi-scavenging system	Morphology-not mention	EW-Hx, Fayoumi - 42.35g Egg shell thickness-0.35 mm Shape index-0.72	Khan *et al.,* 2004

EW - Egg Weight

Population dynamics of three genotypes

An In-depth survey was conducted in one hundred fifteen (115) households (HH) at Bandarban Sadar Upazila, Sarail Upazila and Baraigram Upazila where chickens were reared in situ. Information regarding the number of chickens per household, age and sex group (chick, pullet, cockerel, hen or cock), morphology of adult chickens (comb type, ear lobe color, shank color, plumage pattern), housing pattern, length of lighting practiced for laying hens, available feeds and feeding system, disease prevention measures and treatment practiced by the farmers were investigated.

The chickens were categorized in cock (male chicken>8 months), hen (female chicken>8 months), cockerels (male chick 2-8 months), pullet (female chick 2-8 months) and chicks (unsexed chick <2 months of age). The average number of chicken according to age and sex group is presented in Table 4. The average number of chicken per house-hold was almost same in Baraigram, Pabna and Sarail, Brahmanbaria (7.93±4.46 and 7.69± 2.75); but was lower in Bandarban Hill district (5.11± 1.78). This variation was also observed in age and sex group of chicken in three localities as presented in Table 4.

Table 4. Population dynamics of three genotypes

Parameter	Location		
	Natore	Brahmanbaria	Bandarban
Genotypes	Indigenous	Aseel	Hilly
Chicken/house-hold	7.23+4.46	7.69 + 2.75	5.11 + 1.78
Cock/house-hold	0.57± 0.14	1.69 ± 0.31	2.00±0.13
Hen/house-hold	2.27± 0.25	3.31± 0.27	0.16± 0.10
Cockerel /house-hold	1.33 ± 0.19	00.00	0.07± 0.04
Pullet /house-hold	0.53± 0.26	0.08 ± 0.04	1.96± 0.06
Chick/house-hold	3.23 ± 0.54	2.62 ± 0.65	0.95± 0.65

Morphological characteristics of Indigenous, Aseel and Hilly chicken as shown in Table 5.

Table 5: Phenotypic characteristics of Indigenous, Aseel and Hilly chicken

Parameter / Genotype		Mean (%)		
		Indigenous	Aseel	Hilly
Plumage color	Black brownish	35	30	50
	brown black strip	30	-	45
	Completely black	30	25	5
	Golden red	5	45	-
Shank color	white	90	-	39
	black	10	-	11
	yellow	-	100	50
Comb color	red	99	100	100
	pale red	1	-	-
Comb type	single	99	-	88.9
	rose	-	25	-
	pea	-	75	-
	others	1	-	11.1
Ear lobe color	red	53.33	100	83.3
	white	46.66	-	16.9
Skin color	white	99	100	100
	yellow	1	-	-
Egg shell color	white	93.33	20	83.3
	light brown	6.66	80	11.7

Indigenous chicken have variation in plumage color. Black brownish 35%, brown with black strip 30%, completely black 30% and golden red 5%. Aseel chickens have 45% golden red, 30% black brownish, completely black 25% but Hilly chickens have 50% black brownish, 45% brown with black strip and 5% black plumage color. In case of shank color, 3 shank color were observed. The 90% of indigenous chicken had white shank and 10 % had black shank. All the Aseel chicken had yellow shank. In case of Hilly and Aseel chicken, 100% comb color was red color comb while 99% of Indigenous chicken had red color comb and the rest had pale red color comb. 99% of Indigenous chicken had single comb. 75% of Aseel had pea comb and 25% had rose comb. 88.9% of Hilly had single comb and 11.1% had buttercup comb. 53.33% Indigenous chicken had red color

earlobe and the rest had white earlobe; 100% Aseel had red earlobe; for Hilly chicken, 83.3% had red earlobe and the rest had white earlobe. Aseel hens laid 80% light brown and 20% white color eggs; Hilly hens laid 83.3% white and 11.7% light brown eggs. Indigenous hens laid mainly white colored eggs.

Hilly chickens are covered with plumage of white with black tips 85% followed by multicolor 15%. According to Tabassum (2012) described indigenous chickens were multiple colored were 24% and white & red colored 1%. The result of present study is more explanatory than the previous ones. In case of shank color 3 shank colored chickens were found in studied villages. The shank of indigenous chicken was 90% white and 10% black. While the shank color of Aseel chicken was observed 100% yellow. The shank color of Hilly chicken was 50% yellow, 39% white and 11% was black. Tabassum (2012) described 4 shank colored; 52% white, 2% white & red, 36% black and 10% yellow in indigenous chickens. Daikwo *et al*. (2011) recorded 8.5% white, 13.75% black, 37.25% black/yellow and 40.5% yellow. Sarker *et al*. (2014), reported the most predominant shank color was white in forest ecotype but grey, black & yellow colored shanks were also found and all the chickens had yellowish shank color in Aseel chicken in Bangladesh. The results are not consistent with the observations of others except Sarker *et al*. (2010). In case of Hilly and Aseel chicken 100% comb color was red but for Indigenous 99% was red and rest was pale red color. The comb type of Indigenous was 99% single and 1% others; Aseel was 75% pea and 25% rose comb; Hilly was 88.9% single and 11.1% others. The single comb was the commonest (96.45%), followed by rose (3.10%) while pea was the least (0.44%) reported by Apuno *et al*. (2011). Badubi *et al*. (2006) reported that the Indigenous chickens were mostly single combed as was also observed by (Bhuiyan *et al*., 2005) in Asia among the Indigenous chickens of Bangladesh. Thus the results of present study and published reports from others research works suggested that the single comb is dominant over any type of combs elsewhere. The earlobe color of Indigenous was 53.33% red and 46.66% was white; for Aseel 100% was red and for Hilly 83.3% was red and 16.9% was white which are similar to the findings of Biswas (2005) reported that the red earlobe color of Indigenous chicken was predominantly red (58%) followed by white earlobe (45.8%) but Ahmed and Ali (2007) however found 80.55% white earlobe color of indigenous chicken. In case of skin color, the result shows that 99% was white in Indigenous chicken and 1% was yellow but in case of Hilly and Aseel 100% was white. Tabassum (2012) described white (89.9%) skin colored was prominent and yellow skin colored chicken also available. The result shows that Aseel chickens laid 80% light brown & 20% white color eggs; Hilly chickens 83.3% white & 11.7% light brown eggs. Indigenous chicken mainly laid white (93.33%) colored eggs and light brown (6.66%); which is similar findings of Tabassum (2012). Biswas (2005) reported that the indigenous chickens laid light brown (62.42%) to cream of off white (30.28%) colored eggs.

Table 6: Management practices for Indigenous, Aseel and Hilly chicken

Parameter		Genotype		
		Indigenous	Aseel	Hilly
Management system on the basis of input supply		Semi-intensive	Semi-intensive *	Semi-intensive
Feeding system	Only scavenging (%)	60	60	80
	Scavenging + one time supplement (%)	35	35	20
	Scavenging + two times supplement (%)	5	5	-
Feed used as supplement	Cooked rice (%)	50	20	60
	Rice granule (%)	40	80	40
	Paddy (%)		10	-
	Rice bran	10	-	-
Lighting system	Artificial lighting (%)	-	-	-
	Natural lighting (%)	100	100	100
House	Readymade small house (%)	30	30	-
	Homemade earthen house (%)	30	-	-
	Wooden house (%)	10	35	-
	Bamboo house (%)	-	25	40
	Kept in case in night time in bed room/store room/kitchen (%)	30	40	60
Housing materials	Mud	40	-	-
	Wood	20	40	10
	Tin	20		
	Bamboo	-	60	90
Treatment	Regular vaccination (%)	26.34	26.34	-
	Partial vaccination (%)	20.00	20.00	-
	No vaccination (%)	53.66	53.66	100
	Regular de-worming (%)	26.34	26.34	-
	Partial de-worming (%)	20.00	20.00	
	No de-worming (%)	53.66	53.66	
	Treatment done by Veterinary expert (%)	20	20	-
	Non- veterinary expert (%)	80	80	-

*Breeding male and fighter males were kept in confined for 24 hours and fed in confinement

Management system

Majority of indigenous chickens in Bangladesh are reared in the scavenging production systems. Different authors reported that the most common system was scavenging type being characterized as small flock sizes, beside this semi-intensive production system also used. Most of the caretaking practices of local chicken husbandry and being undertaken by women and children of household in Bangladesh. A shelter used by the majority of the farmers for indigenous chicken productions is sharing the house with the family at night. There is no planned feeding system for

chickens and almost the only source of diets is scavenging feed resource. Moreover, there is no planned breeding also. Perpetuation of the indigenous chicken is by natural incubation process. A broody hen is engaged in hatching and rearing the chicks. Most of producers rear their indigenous chickens to generate incomes by selling eggs and marketable chickens.

Generally, chickens picked up grains such as rice, vegetables, green grass, insect, earthworm etc. from the yard, as chickens were reared under semi-intensive system. Farmers supplied feed 2 times daily and maximum supplied only a carbohydrate source: that is broken rice, wheat, rice polish etc. Chickens in the study area mostly depended on scavenging feed that were insufficient for their requirement and contained low nutrient. Huque *et al*. (1992) reported that native chickens consumed 9-27 g/bird/day scavenge able feedstuffs, which is lower than standard requirement and contained low nutrients, and may be one of the important factors that cause low productivity of local chickens (Das *et al*., 2008).

The survey and the findings of different writers revealed that management was semi-intensive system for all the chickens except breeding and fighting cocks of Aseel in Sarail. Breeding and fighting cocks of Aseel in Sarail were kept in confinement for 24 hours, and management system was intensive. Feeds were not usually supplemented in all three genotypes reared under scavenging system. Chickens picked up grains such as rice, vegetables, green grass, insect, earthworm etc. from the yard, as chickens were reared under scavenging system. Different types of housing were used for chickens in the selected sites. Approximately 30%, 40% and 60% of farmers kept chickens in their living houses in cases of Indigenous chickens, Aseel and Hilly chicken, respectively. No farmer used artificial lighting for the chickens. 53.66% of the farmers did not vaccinate their chickens, whereas the rest vaccinated their chickens once or twice per year. The vaccination programs were provided by mainly non-veterinary expert.

100% management system was semi-intensive. Approximately 30% of farmers kept chickens in their living houses. 50% houses is made in earthen, 37% in wooden houses and 13% houses was made by tin for indigenous chickens. In case of Aseel 50% houses was made by bamboo and 50% made by wooden. 100% of farmers did not use lighting and ventilation system. 73.33% of the farmers in selected areas did not vaccinate their chickens, whereas the remainder vaccinated once or twice per year. The vaccination programs are mainly provided by local livestock personnel and other experts. All of farmers were selling their chickens by indirect marketing systems.

Conclusion

The present findings reveal that all Indigenous chickens may have production potentialities. Aseel is significantly different from others indigenous chickens in all phenotypic parameters. It seems that the situation for indigenous poultry production is still remain problematic, so that some sorts of technological intervention are required. Rural poultry production should be improved by proper nutritional inputs. Conservation of indigenous germplasm by proper planning is important and development of a local breed or variety by using these indigenous

chickens is necessary. Veterinary services should be also strengthened for the diagnosis of diseases.

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