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Breeding practices of chicken and duck at the Villages in Dinajpur District of Bangladesh

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Abstract

Chicken and ducks are two most important income generating tools for village women and poor peoples in Bangladesh and around the globe. These two species of livestock are supplying complete protein and contributing in nutrition security for human being in the world. To add new knowledge to increase production of these two species will help lot more in the rural economy. So, to explore information about chicken and duck breeding practices, data like rearing system, mating system, breeding male bird keeping practices and best performing birds' selection for future stock formation etc. were collected, through door to door visit using a pre-structured questionnaire, during June to July 2016. Collected data were analyzed using SPSS software. Most of the farmers were class eight to SSC pass (52.80%). Average numbers of male and female chicken were 6.55±0.34 and 18.26±0.81 per household, respectively. While, mean numbers of male and female duck were 4.69±0.32 and 14.23±1.00, per household respectively. Yearly egg production of indigenous chicken, crossbred duck and Khaki Campbell ducks were 54.78 ± 0.58, 136.60±2.12 and 232.64±3.84 per head, respectively. All enumerated farmers used free range rearing system for chicken and duck production. Most of the chicken and duck travelled about 60.96 meters distance from their home yard. Uncontrolled natural mating systems were practiced for both chicken and duck. Most of the farmers kept same cock and drake in the flock years after years.

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Introduction

To meet the daily animal protein requirements for human consumption, livestock and poultry sub sector has enormous contribution, though contribution in GDP was 2.5% in fiscal year 2011-12 in Bangladesh (MoFL, 2013).Available chicken varieties and breeds in Bangladesh are non-descript indigenous, Aseel, Chittagong Fowl, and Naked Neck, White Leghorn, Rhode Island Red, Fayomi, Australorp, several commercial broiler and layer breeds and Crossbreed of Indigenous and Exotic chicken and available duck breeds and varieties are Muscovy, Khaki Cambell, Indian Runner, Jinding, Cherry Valley, Non-descript indigenous, Sylhet Mete, Nageswari, and Crossbreed of indigenous and exotic duck (Banglpedia, 2015). According to (MoFL, 2013) chicken and duck population in Bangladesh were 249.01 and 47.25million respectively.Average egg production per clutch in duck and chicken identified 17.50 and 13.47 eggs, respectively, with 69.61% and 76.78 hatchability (Shahjahan and Bhuiyan, 2016). Per capita availability of meat (livestock and poultry all together), milk and eggs, were 65.03 gm/head/day, 91.03 ml/head/day and 50.00 nos/head/year but, FAO recommended 120 gm meat /head/day, 250 ml milk/head/day and 104.00 nos of eggs/head/year, respectively (MoFL 2013). Indigenous duck and chicken of free range provide 86.05% meat and 75.06% eggs (Huque *et al.,* 1999). Ducks do not interfere with chicken scavenging areas and need comparatively less care during brooding and rearing than chicken (Ferdus, 1999). Knowledge gap of rural farmers in quality feed management, disease prevention and control techniques were the constrains in scavenging poultry production (Billah *et al.,* 2013). Rural household supplied 20.8% of the country's total egg and 37.3% of meat and the average number of birds per household were 6.8 and 89% of rural household reared poultry (BBS-2009) but Bhuiyan (2011) reported that the national share of family poultry and commercial poultry in terms of egg production probably almost equal and that of meat production was 40:60.To increase eggs per clutch, clutches per year, hatchability and to decrease age at sexual maturity of female birds in progressive generations, use of superior indigenous mature cocks alone and exercising cock rotation program would be effective in rural low input production system for indigenous scavenging chickens *in situ* (Islam, 2017). Some provided supplementary feed (40%) for their ducks but most of the farmers depended on natural feed sources (60%).

The duck habitats were mainly surrounded by marshy lands (67%). About 27% of the farmers used rice polish as a supplementary feed and17% used a mixture of rice polish and boil rice for the same (Ghosh *et al.*, 2012).In coastal areas of Bangladesh, farmers used free range scavenging system for indigenous (*desi)* ducks production and about 91.5% farmers reared the same and there were great potentials for an improvement of native duck population through nutritional and management engineering (Pervin *et al.,* 2013). Annual egg production of local duck was 60-91 eggs/duck (Salam and Bulbul, 1983; Huque and Ukil, 1994 and Fouzder *et al.,* 1999). Many research works have been carried on indigenous chicken and duck breeding system in Bangladesh. But research works with specific question of how long the indigenous chicken, crossbred and Khaki Campbell duck travelled in free range production system and how long a male kept in a household for breeding purpose at the villages of Dinajpur district in Bangladesh is absent or scanty. So this research work was designed and conducted with following objectives:

First, to explore knowledge about the movement of indigenous chicken, crossbred and Khaki Campbell duck from their home yard under free range production system and Second, to explore information in breeding male keeping practices under natural uncontrolled mating system of indigenous chicken, crossbred and Khaki Campbell duck.

Materials and methods

Experimental sites

A total of 300 farmers at 95 villages under 13 upazilas (sub-district) like Dinajpur Sadar, Biral, Bochaganj, Birganj, Kaharole, Khanshama, Birampur,

Chirirbandar, Parbatipur, Nawabganj, Fulbari, Ghoraghat and Hakimpur of Dinajpur district in Bangladesh during June to July 2016, were enumerated.

Experimental design `

The design of the study was unbalanced factorial in nature, as observation numbers of different traits were unequal.

Data collection

An in-depth survey form was formulated and tested to collect data. Data like level of education of farmers, flock size, rearing system, movement of birds, mating systems practiced, breeding male keeping practices and best performers' selection process on Indigenous chicken, Crossbred and Khaki Campbell duck were collected.

Data analyses

Data were analyzed for having frequency, percentages and mean value using descriptive statistics menu under the Statistical Package for the Social Sciences version 14.0 (SPSS, 2005).

Results and discussion

Educational qualification of farmers

Interestingly it was observed that, most of the farmers (Table 1) were class eight to SSC pass (52.80%). But, Shahjahan and Bhuiyan (2016), found the illiterate rate of chicken farmers were about 67% where farmers mainly got primary (17%) and secondary (14%) level of schooling. On the other hand, Asaduzzaman *et al.* (2009), observed 46.70% farmers were literate in Gouripur sub-district of Mymensingh, but according to BBS (2009) average national literate rate was 66%. However, in a survey on rural farmers in Sylhet, Mymensingh and Noakhali districts of Bangladesh Uddin *et al.* (2010) reported 55% literacy.

Moreover, higher educated (BA and MA pass) peoples were also engaged in chicken and duck farming in the enumerated zone (Table 1) and similar, observation was also reported in case of cattle farmers by Islam *et al.* (2016), who found 19.60% farmers were BA to MA pass.

Table 1. Educational qualification of chicken and duck farmers in the villages of Dinajpur district.

Level of education	Number of farmers
Signature	6 (2.00%)
Five	58 (19.33%)
Eight	91 (30.33%)
SSC	68 (22.67%)
HSC	39 (13.00%)
BA/BSc	32 (10.67)
MA/MSc	6 (2.00%)

The above findings might be indicative that, secondary level educated peoples were dominating the chicken and duck farming in the villages of Dinajpur district.

Flock size of chicken

A total of 300 farmers (Table 2) were enumerated and chicken were available at 287 households. Average numbers of male and female chicken were 6.55±0.34 and 18.26±0.81 per household, respectively. Mean number (24.73±1.07) of chicken were higher than Islam *et al.* (2012), Chowdhury (2012) and Shahjahan and Bhuiyan (2016) who found the average number of chickens per household 9.5, 5-20 (including ducks and pigeons) and 5.62, respectively. On the contrary, similar flock size of chicken (24.31 ± 1.21) per household was found and the flock was comprised of chicks (3.70 ± 0.42), hens (13.29 ± 1.01), pullets (4.84 ± 0.50), cocks (1.72 ± 0.10) and cockerels (0.46 ± 0.08) (Gebremariam *et al.*, 2017).

Flock size of duck

On the other hand same (300 farmers) households were enumerated (Table 2) to document the numbers

of male and female ducks on test day. However, male duck were found at 255 households, while female duck found at 262 households. Mean numbers of male and female duck (Table 2) were 4.69±0.32 and 14.23±1.00, per household respectively. Duck number per household at present study were observed 18.18±1.28 per household, which were higher than Ghosh *et al.* (2012) who found average number of duck per household 6 and Shahjahan and Bhuiyan (2016) who observed per household duck number was 3.81.

Table 2. Number of chicken and duck recorded on test day per households at the villages of Dinajpur district in Bangladesh.

Species	Sex	Mean ±SE
Chicken	Male	6.55±0.34 (287)
	Female	18.26±0.81 (287)
	Total	24.73±1.07 (287)
Duck	Male	4.69±0.32 (255)
	Female	14.23±1.00 (262)
	Total	18.18±1.28 (262)

Note: Number in the parentheses denotes the number of households.

Chicken rearing system and movement of chicken

All enumerated farmers used to free range chicken rearing system (Table 3). Similarly, Gebremariam *et al.* (2017) found backyard scavenging (100%) rearing system of indigenous chicken with seasonal supplementation of feed (100%). However, Shahjahan *et al.* (2011) found fully extensive or scavenging system of indigenous chicken both in Bhaluka under the district of Mymensingh and Jhenaigati upazila under the district of Sherpur in Bangladesh. Respondents reported that their chicken travelled 30.48 to 60.96 meters distance from the farm house. Most of the farmers (50.40%) reported that their chicken travelled 200 feet distance from farm yard.

Table 3. Chicken rearing and mating system practices at the villages of Dinjapur district in Bangladesh.

Parameter		Farmers opinion
Chicken rearing system	Free range	300 (100.00%)
Chicken breed kept	Indigenous Chicken	300 (100.00%)
Distance travelled by the chicken from house	100 feet	49 (16.30%)
	150 feet	100 (33.30%)
	200 feet	151(50.40%)
Keep cock for breeding	Yes	252 (84.00)
	No	48 (16.00%)
Keep the best cock or anyone?	Best	173 (57.67%)
	Anyone	127 (42.33%)
Keep the best hen or anyone?	Yes	170 (56.70%)
	No	130 (43.30%)
Same cock keeping duration in flock	1 year	26 (10.30%)
	2 year	124 (49.20%)
	3 year	68 (27.00%)
	4 year	20 (7.90%)
	Till death	14 (5.60%)

Mating system of chicken and breeding male keeping practices

Most of the farmers (84.00%) kept breeding cocks (Table 3). But very interestingly many of them (57.67%) selected the best performing breeding cocks to use for breeding purpose. On the other hand 56.70% farmers kept best performing hens for future breeding purpose. However, Gebremariam *et al.* (2017), found on the basis of body weight, body conformation, plumage color and comb type, farmers ranked their chicken for selection. Very unfortunately farmers used same cocks (Table 3) for two (49.20%),

three (27.00%), four years (7.90%), even some of them kept the same cock till the death (5.60%). That means the cocks were getting chances to mate with their full sibs, half sibs, dams and daughters easily. Similar mating system were reported by Shahjahan *et al.* (2011), who found for indigenous chicken farmers used natural and uncontrolled mating systems. However, for all indigenous livestock, natural and uncontrolled breeding system was also observed by Shahjahan and Bhuiyan (2016). This uncontrolled natural mating system might influences the inbreeding opportunity and which could reduce the fertility and could enhance to arise some others problems associated with inbreeding deficiency.

Table 4. Duck breeding practices at the villages of Dinjapur district in Bangladesh.

Parameter		Farmers opinion
Duck rearing system	Free range	262 (100.00%)
Duck breed kept	Crossbred duck	209 (79.77%)
	Khaki Campbell duck	53 (20.23%)
Distance travelled by the duck from house	100 feet	44 (16.80%)
	150 feet	31(11.80%)
	200 feet	114 (43.50%)
	1 km	42 (16.00%)
	2 km	9 (3.40%)
	Did not care	22 (8.40%)
Keep drake for breeding	Yes	221 (84.40)
	No	41 (15.60%)
Keep the best duck or anyone?	Best	172 (65.60%)
	Anyone	90 (34.40%)
Same drake keeping duration in flock	1 year	61(23.30%)
	2 year	145 (55.30%)
	3 year	12 (4.60%)
	4 year	9(3.40%)
	5 years	1 (0.40%)
	Till death	34 (13.00%)

Duck rearing system

All enumerated farmers used to free range duck rearing system (Table 4). Gajendran and Karthickeyan (2011), observed that duck husbandry practices were traditional, nomadic and sometimes primitive because, duck farming had not undergone any process of industrialization. However, Ghosh *et al.* (2012), performed a study to assess the status of household scavenging ducks and factors affects the productivity in Companiganj upazila under Noakhali district of Bangladesh. Most of the farmers (43.50%) reported that their duck travelled 60.96 meters distance from farm yard but few farmers found their duck travelled even up to 2 kilo meter from their homeyard.

Mating system of duck and breeding male keeping practices

Most of the farmers (84.40 %) kept breeding drakes (Table 4). But very interestingly many of them (65.60 %) selected the best performing breeding ducks to use for breeding purpose.

Very unfortunately farmers used same drakes (Table 4) for two (55.30%), three (4.60%), four years (3.40%), even some of them kept the same drakes till the death (13.00%). That means the drakes were getting chances to mate with their full sibs, half sibs, dams and daughters easily. Similarly, Shahjahan and Bhuiyan (2016), observed that farmers were using

natural and uncontrolled mating system for indigenous duck. However, broody hens were found to be widely used for hatching duck eggs, thereby making the hens as live incubators and artificial incubation was not practised (Gajendran and Karthickeyan 2011). This uncontrolled natural mating system might influences the inbreeding opportunity and which could reduce the fertility and could enhance to arise some others problems associated with inbreeding deficiency.

Table 5. Egg production performances of chicken and duck per year per head.

Parameter	Mean ±SE
Indigenous chicken	54.78 ± 0.58(300)
Crossbred duck	136.60±2.12 (209)
Khaki Campbell duck	232.64±3.84 (53)

Note: Number in parentheses denotes the number of responding farmers.

Egg production of indigenous chicken

Egg production of indigenous chicken was 54.78 ± 0.58 per year per hen (Table 5), but egg production performances of indigenous chicken could be increased to 67.81 per year per hen at the villages using only superior indigenous cocks and exercising cock rotation program in traditional low input production system (Islam, 2017). Like present findings Shahjahan *et al.* (2011), found annual egg production of indigenous chicken was 53.25 per hen. On the other hand some research scholars (Faruque and Salah Uddin, 2009; Khan, 1983 and Chowdhury *et al.,* 2006) observed that indigenous chicken egg production could be increased to 100-110 per hen (under intensive rearing system), 135 eggs per year per hen (using proper selection program) and doubled with improved diets and management conditions.

Egg production of crossbred and Khaki Campbell duck

Yearly egg production (Table 5) of Crossbred duck (136.60±2.12 eggs per duck) were higher than the mean egg production per duck per year (90.00 ±21.50, 105.00 ± 13.20 and 112.00 ± 15.80 for Deshi white, Deshi black and Deshi mix colored duck (Ghosh *et al.*, 2012). On the other hand, yearly egg production (Table 5) of Khaki Campbell duck (232.64±3.84 eggs per duck) were also higher than Ghosh *et al.* (2012), who found 150.00 ± 8.90 eggs per year per duck for Jinding duck. However, lower number of yearly eggs production for Deshi duck than present findings were also documented by Pervin *et al.* (2013), Salam and Bulbul (1983), Huque and Ukil (1994) and Fouzder *et al. (*1999).

Conclusion

Most of the farmers were class eight to SSC pass, but higher educated (BA and MA pass) peoples were also engaged in chicken and duck farming in the enumerated zone. Mean number of chicken and ducks per household were 24.73±1.07 and 18.18±1.28, respectively. Egg production of indigenous chicken was 54.78 ± 0.58 per year per hen. Yearly egg productions of Crossbred duck were lower than that of Khaki Campbell duck produced. All enumerated farmers used free range rearing system for chicken and duck production. Most of the chicken and duck travelled about 60.96 meters distance from their home yard. Uncontrolled natural mating systems were practiced for both chicken and duck. Same male was used to keep for breeding purpose in household level years after years.

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