Performance of BLRI developed native duck under farmer's condition with supplementary feeding

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Abstract

A total of 198 straight run day old ducklings of Bangladesh Livestock Research Institute (BLRI) developed native duck (named as Rupali and Nageswary) and local native duck genotypes were distributed among nine farmers of low laying areas of Kalihati Upazilla of Tangail district. Rupali and Nageswary ducklings were obtained from existing stock of BLRI and local native ducklings were collected from local farmers of the study area. After 12 weeks of age each farmers retained 10 female and 2 male ducks and sold away remaining ducklings. Farmers' were instructed to supply 50g of balanced feed to their ducks in the morning and evening. Ducks were allowed to scavenge in the *beel* throughout the day. Data on: growth, feed intake, age at onset of lay, egg production rate, egg weight, mortality rate were recorded and cost-benefit was calculated. There found no significant difference on growth parameters, live weight gain, age at first laying or age at peak egg production among the duck genotypes. In the study highest live weight gain was found in Nageswary (1090 g) followed by Rupali (1058 g) and local native (912 g) duck at 8 weeks of age. Egg production rate of local native ducks (37.21%) was found significantly lower ($P<0.001$) compared to Rupali (50.67 %) and Nageswary (55.40 %). The mortality rate in local duck was significantly higher ($P<0.05$) compared to Rupali and Nageswary ducks. Rupali ducks produced heavier eggs (66.86g) followed by local native (62.20g) and Nageswary (57.22g) which differed significantly ($P<0.05$). Rupali ducks laid eggs of thicker shell (0.61mm) compared to other duck genotypes under study which was also varied statistically ($P<0.05$). Cost benefit analysis shows that earning both from Nageswary and Rupali was much higher than local native ducks. Higher egg production rate of Nageswary and Rupali duck has contributed for higher return. It is concluded that rearing Rupali or Nageswary ducks in the low laying rural areas with scavenging and supplementary feeding facility is more profitable than rearing local native ducks.

(Key words: Native duck, performance, supplementary feeding, rural area)

Introduction

Duck farming appears to be a profitable business for low laying river basin areas of Bangladesh. The climate and environmental condition of Bangladesh are suitable for duck habitation. Duck rearing is one of the options of livelihood available to the landless, because of the fact that duck can exploit common feed resources from natural water bodies like wet and marshy lands, *beels, haors*, rivers, cannels etc. They are more productive and resistant to the harsh climatic condition than chicken (Islam et al. 2003a). Ducks are not only more resistant to common diseases compared to chickens but also lay more eggs and produce more meat than indigenous chicken at least in the low laying area of the country (Rahman et al. 2007). Poultry birds are generally maintained by rural woman and children that generate cash income as secondary business of the family in addition to supply adequate eggs and meat to family's diet as the cheapest source of animal protein. Ahmed (1986) found that indigenous ducks, though small in size, are well adapt to management in rural conditions of Bangladesh and their meat has been reported to be excellent quality. Improved feeding increases the egg production of ducks but not cost effective in comparison of feed cost (Huque et al. 1993). Potentiality of breed is one of the most important factors for successful duck rearing, particularly that for egg production (Ismoyowati et al. 2011).

A few researches were conducted on duck production. A project entitled "Selection and Improvement of native duck" was in operation during 1998 to 2002 at BLRI (Huque et al. 2001) with the intention

to compare the production performance and potentiality of native ducks with exotic duck breeds. During the project period native and exotic ducks were collected from different region of the country and syncronized for feather colour for three generations. Based on the performance of collected ducks (Huque et al. 2001) the study was continued. Results of that study revealed that, in terms of production native duck is comparable with exotic ducks (Islam et al. 2003a). Since than, BLRI is conducting a breeding program on native ducks within a limited facility. Family mating system was followed to select and reproduce the ducks of better productive ability for the next generation (Huque and hossain, 1991: Huque et al. 2001: Islam et al. 2003b) of BLRI developed native ducks and named as Rupali and Nageswary. Several studies were conducted to evaluate productive, reproductive and phenotypic characteristics of Rupali and Nageswary duck. All those studies were conducted on station under intensive management system. Presumptuous that both Rupali and Nageswary ducks will perform better under scavenging system of rearing in rural condition, a field trial was conducted to validate the production ability of Rupali and Nageswary ducks compared to locally rear native ducks under farmer's condition.

Materials and methods

Location and duration of experiment

The experiment was conducted in a low laying area of Kalihati Upazilla of Tangail district in Bangladesh from April 2011 to June 2012.

Source of bird

A total of 198 straight run day old ducklings of Rupali, Nageswary and local native duck genotypes were distributed among 9 farmers.

Experimental design

The experiment had 3 treatments and each treatment group have 3 replications. Each replication consisted of 22 ducklings either of Rupali, Nageswary and local native duck respectively. Local native duck group was considered as the control group. All birds received supplementary feed in addition to scavenging feed. The experimental designed was completely randomize design (CRD) and data were analyzed using one way ANOVA in SPSS computer program.

Feeding and management

Farmers were brooded their ducklings according to their own practice up to 28 days of age keeping in confinement and fed on balanced duck starter feed containing 20% crude protein and 2800 kcal energy/kg diet along with home grown feed like rice polish and kitchen waste. Before distribution of ducklings farmers were trained on improved feeding management and hygienic techniques. Ducklings were vaccinated against Duck plague and Duck cholera at 28 days and 60 days of age, respectively and booster of both the vaccine were administered one week later of initial dose. After 28 days of age the experimental birds were allowed to scavenge freely in the natural water body from 8.30 A.M to 4.30 P.M. At the end of 12 weeks of age male and female ducks were separated by the farmers. Each farmer retained two drakes and 10 ducks and, sold away remaining birds. Up to 28 days of age ducklings were fed *ad libitum* on duck starter and home grown feed and in the next 4 weeks the continued on starter feed along with scavenging feed resource in the water bodies. Thereafter only 50g of balanced duck feed (grower feed up to 20 weeks of age and then layer feed) were supplemented along with scavenging. Earlier report of Rahman et al.1997) shows that native ducks can support 30-40% of their nutritional requirement from scavenging feed resource base. Based on that information it was assumed that supplying 50g of balanced feed (about 33%of daily requirement) and allowing the ducks to scavenge in a water body may support production of ducks under study. Supplementary feed

was supplied from BLRI, which was prepared as per nutritional recommendation of Ferrell and Stapleton (1985). Supplementary feed was divided in to two equal portions and was given twice daily at morning and evening. Feed was supplied in the plastic bowl and the bowls were cleaned properly before each feeding.

Record keeping

Data were recorded on growth, feed intake, age at onset of lay, egg production, egg weight, mortality and economic return of ducks. A research assistant performed record keeping with the help of collaborator farmers**.**

Results and discussion

Growth performance of different duck genotypes under the study are shown in table 1. It is evident from table 1 that there was no significant difference in the performance of live weight gain, age at first laying or age at peak egg production among the duck varieties. In the study highest live weight gain was found in Nageswary (1090 g) followed by Rupali (1058 g) and local native (912 g) duck at 8 weeks of age. Similar trend in live weight gain was also observed at first laying age but local native ducks covered about 200 gm in live weight gain if compared between live weight of 8 weeks of age and age at first laying. Perhaps slower growth rate at early age and physiological age advancement in growing period acted for this dissimilar live weight gain at early and later growing period among duck genotypes. Huque et al. (1998) found body weight at sexual maturity and age at onset of lay for desi x Jinding cross breed. The present findings for the body weight at first egg production in local duck are in agreement with the findings of Huque et al. (1998). Average egg production rate of local native ducks up to 52 weeks of age (37.21%) was found significantly lower ($P<0.01$) compared to Rupali (50.67 %) and Nageswary (55.40 %). Das and Hoq (2000) obtained 48% duck-day egg production in Jinding ducks which is comparable with BLRI developed ducks. The mortality rate in local duck was significantly higher ($P<0.05$), which is in agreement with the findings of Huque and Hossain (1991) Local native ducklings were collected from unknown origin with poor vigor and comparatively lower body weight. Perhaps their general health condition might be responsible for higher mortality. Larger ducklings, which are presumably in better condition, enjoy higher survival than smaller ducklings (John M. Coluccy, and Kurt A. Anderson, 2012).

Table 1: Comparative performance of Rupali, Nageswary and local ducks

Parameter	Duck (mean ± SE)			Level of sig.
	Rupali	Nageswary	Local	
Live weight at 8 weeks of age (g)	1058.85±224.32	1090.06±122.84	912.85±278	NS
Age at first egg production (days)	154±2.31	147±3.64	161±4.22	NS
Age at peak production (days)	231±5.21	228.62±4.46	199.5±6.34	NS
Live weight at first egg laying (g)	1437±25.35	1455±41.23	1435±52.34	NS
Egg production rate (%) up to 52 weeks of age	50.67±1.50	55.40±2.36	37.21±1.91	**
Mortality (%) up to 52 weeks of age	6.06±1.00	9.10±1.52	12.12±3.5	*

*=P<0.05, **=P<0.01, NS= Non-significant

Table 2 shows that Rupali ducks produced heavier eggs (66.86g) followed by local native (62.2g) and Nageswary (57.22g) which differed significantly ($P<0.05$). This result comply with the findings of Khatun et al. (2007) and Arafa et al. (1982) who reported that egg weight of ducks vary between strains. Rupali ducks laid eggs of thicker shell (0.61mm) compared to Nageswary duck (0.41mm) and

local duck (0.41mm) and differ statistically (P<0.05). The differences observed in shell thickness among genotypes are in agreement with Khatun et al. (2007) and Padhi et al. (2009) who reported that native ducks have better egg shell quality. They also reported lower egg shell thickness in Khaki campbell ducks. Membrane thickness was significantly higher in Nageswary duck. Breaking strength was highest in Nageswary (412 g/cm), intermediate in local (376 g/cm) and lowest in Rupali duck (359 g/cm) egg. In Rupali duck shell thickness was high but breaking strength was poor, which might be due to high porosity in the shell of eggs of Rupali ducks.

Table 2: Egg quality of different duck varieties

Parameter	Duck (mean ± SE)			Level of sig.
	Rupali	Nageswary	Local	
Egg weight (g)	66.86±1.18	57.22±1.89	62.20±2.06	**
Breaking strength (g/cm)	359±0.33	412±0.27	376±0.33	NS
Yolk color (Colour matching fan)	12±0.53	9.11±0.93	11.33±1.05	NS
Shell thickness (mm)	0.61±0.078	0.41±0.011	0.41±0.008	**
Membrane thickness (µm)	0.092±0.012	0.134±0.005	0.118±0.006	**

*=P<0.05, **=P<0.01, NS= Non-significant

A total of 22 ducklings of experimental varieties were provided to each farmer. At 12 weeks of age male and female birds were separated. After separation farmers kept only 2 male and 10 female birds for laying purpose. Rest of the ducks was sold away for revenue earning (Table 3). It is evident from table 3 that the highest rearing cost was observed in Nageswary group (TK. 6512.67) and lowest in local group (TK. 6484.00). There was a big variation in total income from sale of eggs and drakes of different genotypes of ducks. Profit from egg production was lowest in local ducks (Tk.5258.00), intermediate in Rupali (Tk.7749.00) and highest in Nageswary duck (Tk. 8415.00).

Table 3: Cost and profit of rearing 22 ducklings up to 52 weeks of age (Taka)

Parameter	**Duck genotypes**		
Cost	**Rapali**	**Nagesway**	**Local**
Cost of per duckling; Rupali and Nageswary 15/- and local native duck 12/-	330.00	330.00	264.00
Ducklings purchase (22 duckling in each group)			
Feed cost up to 12 weeks	1072.00	1072.00	1072.00
Feed cost from 12 weeks to laying	1096.20	1218.00	1339.80
Feed cost during laying	3775.80	3654.00	3532.20
Vaccine	66.67	66.67	66.67
Medicine	155.00	172.00	210.00
Total	6495.67	6512.67	6484.00
Income			
Sale of eggs (@ Tk.7 /piece)	7748.50	8415.30	5257.70
Sale of drakes (@ Tk. 133/kg live weight)	1733.33	1520.00	1566.67
Total income	9491.83	9993.30	6828.40
Net profit	2969.16	3440.00	340.00

Conclusion

The study revealed that rearing of Rupali or Nageswary ducks in the low laying rural areas with scavenging and supplementary feeding facility is more profitable than rearing the local native ducks.

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