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Performance of Hybrid Layers and Native Hens under Farmers' Management in a Selected Area of Bangladesh

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Abstract: An experiment was conducted in Jessore district of Bangladesh during the period from January 2003 to December 2004 to investigate the performance of Brown Shelled Hybrid Layer, White Shelled Hybrid Layer and Native Hen measured during only laying period (57 weeks). 8 Brown Shelled Hybrid Layer farms, 8 White Shelled Hybrid Layer farms and 10 Native Hen farms were reared intensive, intensive and scavenging systems respectively. Result revealed that the egg production, egg weight, final body weight, feed consumption, shell weight, age at first laying, feed cost, management cost, and net profit varied significantly due to different birds and different management system. Under intensive system Hybrid Layer rearing were better than Native Hen showed moderate performance in terms of higher egg production, higher weight of egg, higher body weight and lower mortality. Feed conversion efficiency, production number of eggs, egg mass, net profit and survivability was higher in White Shelled Hybrid Layers than Brown Shelled Hybrid Layers under intensive system. Under scavenging system NH was better also for the rural area of Bangladesh, because of lower production cost, higher market price of eggs, live bird price and good profit. Rural poultry plays a vital role in the existing farming systems of Bangladesh. It can be recommended here that the Native Hen farming under scavenging system without any investment and White Shelled Hybrid Layer or Brown Shelled Hybrid Layer i.e. any one under intensive system farming are obvious for efficient and profitable egg production in Bangladesh.

Key words: Farmers' management, productivity, net profit, hybrid layer, native hen

Introduction

In 2001, the total world's poultry meat production amounts to almost 70 Million MT, and the greatest part (more than 50%) was produced in Asia and North America. In total, more than 56 Million MT eggs were produced worldwide, and again the greatest production came from Asia (Faostat, 2002). In rural Bangladesh, poultry rearing is a comparatively better source of employment to earn cash on homestead (Paul *et al*., 1990). Alam *et al*. (1998) observed in Bangladesh, Production of eggs per layer was 43.88 in traditional, 141.11 in semi-intensive and 230.15 in intensive farms. The traditional farms reared indigenous birds only and their productivity was very low. Intensive farms, On the other hand, reared exotic birds and their productivity was relatively high. Family poultry production systems are financially economic because even if the productivity of birds is low, some poultry meat and some eggs constitute almost a net profit for poultry keepers (Rauen *et al*., 1989; Spradbrow, 1993/94; Sonaiya, 1996; Alam, 1997; Mallia, 1999; Fattah, 2000; Paul *et al*., 2000; Kumtakar, 2000; Buza and Mwamuhehe, 2001). Consequently, a number of poultry farms have been established on commercial basis in and around the cities and towns and are operated intensive management.

The birds reared in these farms belong to high yielding strains and are raised exclusively on poultry ration. In addition, there are small scale poultry farms in rural areas which are being operated by very small and landless farmers. (Alam *et al*., 1998). Poultry is plying an important role for human nutrition, national income, employment and income generation. Poultry is by far the largest livestock group and has been estimated to be about 14000 million consisting of chickens, ducks and turkeys (FAO, 1999). Almost every family of rural Bangladesh is habituated in backyard poultry keeping and every household has maintained about 6-12 chickens (Huque, 1999). Breed, stain, reproductive efficiency, management systems are the major factors in the profitability of a layer farm through its effects on the annual egg production, egg size and price of the flock and the cost of flock depreciation. Proper management system in respect to good housing, balanced feeding, proper nursing, vaccination and planned breeding must be improved to achieve the desired egg production. The present study, therefore, aimed to evaluate some of the productivity thereby profitability of poultry farming under different management system of hybrid layer, and native hen.

The Specific objective of the study were:

1 Determine the productivity, cost and return aspects of different types of layers, poultry farms under different management.

2. To evaluate the efficiency of hybrid layers as compared to native hens.
3. Under intensive care to identify difference between Brown shelled layer and White shelled layer.
4. To know which one profitable business among them.

Materials and Methods

A survey was carried out on 8 intensive Brown shelled egg layer (BSL) farms (ISA brown, Hisex brown, Bovans nera, Brown nick), 8 intensive White shelled egg layer (WSL) farms (BV-300, Hisex white, Bovans white, Nick chick) and 10 scavenging Native hen(NH) farms. Farms were selected randomly from Jessore district of Bangladesh. Data on number of eggs production, egg's weight, age at first laying, average feed intake, management cost (vaccine, medicine, litter, lighting cost, etc), sale value of eggs and pullets, cost of production and returns of these poultry farms were collected for the year January 2003 to December 2004 by quarterly visits, information relating to marketing of eggs, it's shell weight were also collected separately. Data were collected by using a predesigned survey schedule .The study was conducted among the farmers during only for the production period (57 weeks) of birds. Collected data were analyzed by SPSS (SPSS, 1999) computer program.

Results and Discussion

Body weight, age at first laying and market price: Body weight (kg) at 75th, 76th and 80th week for BSL, WSL and NH were found 2.106, 1,775 and 1.300 respectively (Table 1), which was statistically significant ($p<0.001$). Adult body weight of NH was the lowest but the market price of a live NH (TK. 110.50) was higher than a live WSL (Tk. 88.75) (Table 2). Prices of poultry products largely depend on body weight (or, indirectly, age) and poultry species (Guèye, 2001), other factors that may effect prices of poultry are sex, feather colour, disease outbreak, patience and experience or knowledge of buyer, the offer of poultry in markets compared with the demand and geographic location (e.g. prices tend to be higher in urban areas, compared with rural areas (Guèye, 2002).Goalanda Hatcheries Ltd. (1991) reported adult body weight, age at first laying, total number of egg production (19-75 weeks) of Brown nick and Nick chick were 2.200 kg and 1.775 kg, 133 days and 133 days and 322.8 and 326.7 respectably. NH (175d) showed significantly ($p<0.001$), late sexual maturity than hybrid BSL (133d) and WSL (140d), (Table 1).

Egg production, egg weight, egg mass, shell weight and it's market price: Production of eggs per layer per year was 230.15, 141.11 and 43.88 in intensive, semi-intensive and traditional farms, respectively. The traditional farms reared indigenous birds only and their productivity was very low .The intensive farms reared exotic birds and their productivity was found relatively high (Alam *et al.*, 1998). In Bangladesh rural farmers have been traditionally keeping their native birds under scavenging system of rearing. The native chicken which constitutes about 98% of total poultry population are genetically poor and lay about 42 and 64 eggs per year respectively under scavenging and intensive system of rearing (Sazzad, 1986; Huque and Haque, 1990; Bulbul, 1983 and Ahmed and Islam, 1985). Poultry production in Bangladesh is dominated by scavenging indigenous chicken. They are dual purpose birds providing both meat and eggs to the farmers. The scavenging birds are raised with little or no inputs and their productivity is very low and irregular (Huque and Stem, 1993). Annual (57 weeks) egg production number of BSL, WSL and NH were found 298.13, 311.40 and 44, egg production percentage were 76.05, 79.44 and 11.22, weight per egg were found 57.32g, 55.44g and 36.27g respectively in the field level and the differences were significant ($p<0.001$) and hybrid layers have produced heavier eggs (Table 1). Amin and Bhuiyan (1995) noted in Bangladesh under scavenging system mature live weight, egg production/hen/year and egg weight of indigenous chicken were 1141.48 g, 35-45 and 35-39g respectively. Egg production performance of WSL was the highest (Table 1) and NH was the lowest. The lowest result is partial agreement with Anonymous (1991). Market price of NH egg was the highest (Tk. 3.20) and it was Tk. 3.00 in BSL and Tk. 2.80 in WSL per egg, which differed significantly ($p<0.001$) (Table 2). BLRI (1999) reported, adult live weight (kg), age at 1st laying (days), and annual egg production number of non descript of native chicken were 1.0-2.0, 155-195, and 83 respectively. USA Poultry Ltd. (1986), Bangladesh, stated that the age at first laying, total number of egg production (18-74 weeks), mortality (18-74 weeks), average egg weight and average body weight of Bovans nera (Brown Shelled Egg Layer) and Bovans white (White Shelled Egg Layer) were 18 weeks and 18 weeks, 307.6 and 320.7, 5.7% and 5.7%, 60.58g and 59.48g and 2.170 kg and 1.669 kg respectively. An external (shell weight) characteristics (Table 1) of eggs showed significant difference ($p<0.001$). Egg shell percentage of NH was highest (10.09%) and the difference were significant ($p<0.001$). Joardar (2003) reported, of the total egg weight, shell forms about 10%, albumen 60% and yolk 30%.

Feed intake, feed conversion ratio (FCR) and feed cost: Under intensive system the average feed consumption of BSL and WSL was 46.00Kg and 42.48 Kg had a significant difference ($p<0.01$). No significant difference ($p>0.05$) was observed for FCR and FCR of BSL and WSL was 2.69 and 2.46 for the 57 weeks respectively

Table 1: Production performance of different types of layers

Parameters	B.S.L	W.S.L	N.H	F-value	Level of significance
Experimental Period (Weeks)	19-75	20-76	24-80	_	_
Rearing system	Intensive	Intensive	Scavenging	_	_
Feed intake (kg bird^{-1})	46.00±0.73	42.48±0.40	_	9.77	**
Egg production (No. bird^{-1})	298.13^{b}±2.72	311.40^{a}±1.93	44.00^{c}±1.79	5317.23	***
Egg Weight (gm egg^{-1})	57.32^{a}±0.85	55.44^{b}±0.73	36.27^{c}±0.37	293.26	***
Egg mass production (Kg/layer/57 weeks)	17.10^{a}±0.43	17.26^{a}±0.42	1.59^{b}±0.07	730.88	***
F C R (Feed conversion ratio)	2.69±0.08	2.46±0.06	_	4.01	NS
Egg production (%)	76.05^{b}±0.69	79.44 ^{a}±0.49	11.22^{c}±0.46	5289.17	***
Shell Weight (gm egg^{-1})	5.62^{a}±0.12	5.28^{b}±0.10	3.66^{c}±0.10	160.34	***
Shell (%)	9.80^{b}±0.02	9.52^{c}±0.04	10.09^{a}±0.12	10.39	***
Live weight (kg bird^{-1})	2.106^{a}±0.48	1.775^{b}±0.24	1.300^{c}±0.60	54.16	***
Age at first eggs (days)	133.00^{c}±1.25	140.00^{b}±0.84	175.00 ^{a}±2.02	230.57	***
Mortality (%)	7.0^{b}±0.65	5.6^{c}±1.07	14.5 ^{a}±1.16	29.11	***

^{abc}Mean with uuncommon superscripts each parameter differ significantly, NS=Non significance, *P<0.05, **p<0.01, ***p<0.001. 1US$ = 61 Taka. BSL-Brown Shelled Layer, WSL-White Shelled Layer, NH-Native Hen. Brown Shelled Layer stain were ISA Brown, Hisex brown, Bovans nera, Brown nick. White Shelled Layer stain were BV-300, Hisex white, Bovans white, Nick chick.

Table 2: An economic study on the basis of different types of layer and table eggs

Parameters	B.S.L	W.S.L	N.H	F-value	Level of significance
Experimental Period (57 Weeks)	19-75	20-76	24-80	_	_
Rearing system	Intensive	Intensive	Scavenging	_	_
Feed cost (Tk. layer^{-1})	575.00±11.23	520.23±5.35	_	70.64	***
Cost of pullet (Tk. pullet^{-1})	124.50±0.90	115.00±0.73	_	32.00	***
Management cost (Tk. layer^{-1}/57 weeks)	23.50^{a} ±1.60	18.80^{b}±0.83	9.50^{c}±0.67	47.34	***
Production cost (Tk. layer^{-1}/57 weeks)	723.00^{a}±11.43	654.04^{b}±5.20	9.50^{c}±0.67	3696.6	***
Market price (Tk. egg^{-1})	3.00^{b}±0.03	2.80^{c}±0.02	3.20^{a}±0.03	24.69	***
Market price of eggs (Tk. layer^{-1})	894.38^{a}±8.15	871.92^{b}±5.40	140.80^{c}±5.72	4755.46	***
Market price (Tk. live weight layer^{-1})	115.83^{a}±2.67	88.75^{c}±0.98	110.50^{b}±3.19	50.01	***
Net income (Tk. layer^{-1}/57 weeks)	1010.22^{a}±7.25	960.62^{b}±5.26	251.30^{c}±7.94	3883.80	***
Net profit(Tk. layer^{-1}/57 weeks)	287.22^{b}±14.17	306.58^{a}±7.91	241.80^{c}±18.28	14.66	***

^{abc}Mean with uncommon superscripts each parameter differ significantly, NS=Non significance,*P<0.05, **p<0.01, ***p<0.001. 1US$ = 61 Taka. BSL-Brown Shelled Layer, WSL-White Shelled Layer, NH-Native Hen. Brown Shelled Layer stain were ISA brown, Hisex brown, Bovans nera, Brown nick. White Shelled Layer stain were BV-300, Hisex white, Bovans white, Nick chick. Feed cost for BSL Tk. 12.50 Kg^{-1}, Feed cost for WSL Tk. 12.25 Kg^{-1}, BSL market price TK. 55 Kg^{-1} live weight, WSL market price TK. 50 Kg^{-1} live weight, NH market price TK. 85Kg^{-1} live weight.

(Table 1). Most family poultry-keeping farmers adopt the free-range, backyard and semi-intensive husbandry systems but without feeding (Guèye, 2002), so their feed costs were zero. Mukherjee (1987) and Sazzad *et al.* (1988) reported that a little or no attention is given on the nutritional status of scavenging poultry. Nutrition has much more effect on production than that of the genetic influence for the improvement of poultry in scavenging. Feed cost for each bird of BSL and WSL are shown in Table 2 and feed cost per bird were found Tk. 575.00 and Tk. 520.23 in BSL and WSL respectively category of birds had a significant (p<0.001) effect on feed cost. USA Poultry Ltd. (1986) Bangladesh, stated that total feed intake and FCR for 18-74 weeks of Bovans nera (Brown Shelled Egg Layer) and Bovans white (White Shelled Egg Layer) were 43.9Kg and 38.4kg and 2.33 and 1.99 respectively. Cost of feeding constitutes more than 75% of total expenditure in the poultry entrepreneurship, therefore, any endeavor to reduce the feeding cost reflects greatly on the profitability (Sapkota, 2001).

Pullet market price: Market price of BSL pullet and WSL pullet was Tk. 124.50 and Tk. 115.00 respectively, which differed significantly (p<0.001). Native birds were reared without any investment (some farmers used only medicine and vaccine). So it was a cause of farther profit (Table 2).

Mortality: Flock mortality (Table 1) rate of all categories varied from 5.6% (WSL) to 14.5% (NH) and the difference were significant (p<0.001). The native layer mortality percentage was much more higher incase of unskilled farmers. Hussain *et al.* (1998) observed in Bangladesh about 14 Per cent of farmers reported that their ducks were attacked by diseases, while 56 per cent of farmers in the case of poultry diseases. They spent on an average Tk. 1.14 for duck treatment and on in average, the farmers spent Tk. 2.39 for poultry treatment. In 1983, Amin reported that in Bangladesh 40-60% cocks and hens die due to only New Castle disease.

Management cost and production cost (57 weeks): Management costs per bird for three different categories of layers are shown in Table 2. The effect of layers category was found significant (p<0.001) on this

Table 3: Employment and income through rural family poultry rearing for underprivileged groups in Bangladesh

Technology	Yearly average income (US$)§
1. Key poultry rearers: they rear 10-13 hens of improved breed in a scavenging or semi-scavenging system with little additional feed supply	60
2. Model rearers: They rear 25-30 hens and 3-4 cocks in a semi- scavenging with addition of some feed.	160
3. Mini poultry farmers: They rear 50 hens in confinement with balanced feed	160

Source: Fatth (2000)1US$ = 61 Taka

§ Gross National Products (GNP) per person in Bangladesh estimated to be US$ 450 in the year 2000.

parameter. Management cost included labour cost, fuel cost, litter cost, transport cost, vaccination and medicine cost. Guèye (2000) showed that birds are often maintained with low level imputes (i.e. land, labour and capital), and can therefore be raised by even the poorest social strata of the rural population. Total production cost (Table 2) per hybrid layer were (57 Weeks) higher in BSL (Tk. 723.00) and in WSL (Tk. 654.04), on the other hand, lowest in NH (Tk. 9.50). Different types of layer had a significant effect ($p<0.001$) on the total production cost.

Net profit (57 weeks): Yearly (57 weeks) net profit from per layer of BSL, WSL and NH was Tk. 287.22 (Tk. 2159.55/100 layer/month), TK. 306.58 (Tk. 2305.11/100 layer/month) and Tk. 241.80 (Tk. 1818.05/100 layer/month) respectively (Table 2) and the differences were significant ($p<0.001$). WSL had a higher profit. The difference of the net profit between hybrid layer and native hen was about Tk. 45.00 to Tk. 65.00. In Bangladesh, Jahan *et al*. (2003) reported farm owner obtained Tk. 0.72 (Sale value Tk. 2.77 egg^{-1}) as profit from selling a brown egg, which was 8% higher (TK. 0.67) than that received from a white egg (Sale value Tk. 2.52 egg^{-1}) Under scavenging system NH was good also, because of lower production cost, higher rate of egg and live bird and good profit. Rural poultry plays a vital role in the existing farming systems of Bangladesh. Village poultry is an asset for resource poor farmers and one of the main nutrition sources of the rich (Haque, 1989). In rural Bangladesh, poultry rearing is a comparatively better source of employment to earn cash on homestead (Paul *et al*., 1990). The average net income from the model raising of 200 (hybrid) layer has been found Tk. 41996/ year i.e. Tk.3416/month, which clearly confirm that rearing of about 200 birds meet the need of a 6 member's rural family in Bangladesh (Yamamoto *et al*., 2003). So Bangladesh must continue small-scale poultry farming by native bird and hybrid also. To boost up production, these farms need to be scientifically managed. Guèye (2004) reported that small-scale family poultry production is vary important in low-income food-deficit countries. In developing countries these birds usually make up more than 80% of the national poultry flock. They provide income to resource-poor small farmers, especially women, to supply the population with high quality protein. A sector not to be ignored.

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