

Effect of Cropping Patterns on Egg Production of HYV Hens in a Semi-Scavenging Poultry Model in Bangladesh

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Abstract

A study was made with 1272 pullets of 6 months age under semi scavenging conditions to compare the egg production in three agro-ecological zones with different cropping patterns. The cropping patterns were grain dominant in low lying 201% cropping intensity (Manikgonj), grain / fibre (Jute) in medium high land 207% cropping intensity (Jessore) and Sugarcane / grain in high land 159% cropping intensity (Rajshahi). Cropping pattern significantly influenced age of first egg and total egg production. Average age at first egg was 31, 34, 34 weeks in the grain, grain/fibre and sugarcane/grain cropping patterns respectively. The average egg production/hen/year were 157, 154 and 103 respectively and the results varied significantly. It was interesting to observe that the highest egg production and early egg laying were associated with the lowest level of supplementation by the farmers in the grain dominant cropping patterns (130Kcal and 6.4g protein/bird/day). The results indicated that HYV hens can be an efficient utilizer of grain based crop residues as scavenging feed resources and the egg productivity seems to be much higher than the existing non descriptive native chicken under same nature of management.

Introduction

The native chicken in the existing traditional scavenging system of Bangladesh produces 45 eggs per hen per year (Ahmed and Hasnath, 1983) and constitutes about 80% of country's chicken population. Some experiments have been conducted concerning introduction of exotic breeds of hen (HYV) and their crosses to determine potentials and limitations in the scavenging and semi scavenging system (Ahmed *et al.*, undated; Quader *et al.*, 1989; Hossain *et al.*, 1992; Sazzad, 1992; and Rahman *et al.*, 1995).

The Directorate of Livestock Services (DLS) and the NGO Bangladesh Rural Advance Committee (BRAC) have developed a unique semi scavenging system (BRAC, 1994) in which exotic chicken are reared in confinement during the first 8 weeks age after which the birds scavenge part time for some days and gradually shifted to the semi scavenging system of rearing.

The feed resources for small flock of birds in traditional scavenging system are agricultural crop residues in and around homestead /or after harvest near by crop fields, kitchen and dinning wastes, grazing of green grass /small plants, earthworms, insects and small amount of supplemented feed ingredient(s) offered by the flock owner. The agricultural cropping patterns of Bangladesh which varied from one region to another are said to contribute as major feed resources for scavenging chicken. This study was undertaken; 1) to know the egg production of HYV hens under semi scavenging system of rearing in three agro ecological zones with different cropping patterns, and 2) to estimate the energy and protein content of feed ingredient(s) supplemented to the birds by flock owner.

Methodology

A total of 1272 selected HYV pullets from 4 batches of 11 weeks interval were at the age of six months placed by 297 rural women farmer (key rearer - beneficiaries of BRAC) kept for a period of one year. Number of pullets per key rearer ranged from 3 to 6. The distributions of pullets/key rearer were 375/98 for grain dominant (Manikgonj), 408/98 for grain/fibre (Jessore) and 489/101 sugarcane/grain (Rajshahi) cropping areas. The experimental locations with cropping patterns are shown in table 1.

Table 1. Cropping patterns of sites during experimental period

Particulars	Grain dominant (Manikgonj)	Grain/fibre (Jessore)	Sugarcane/grain (Rajshahi)
Agro-ecological zone	Low Ganges	Medium high river flood plain	High Ganges flood plain
Seasonal flood	Yes	No	No
Cropping intensity	200.6 %	207 %	159 %
Major cropping patterns	1.Rice(B.Aman +B.Aus)-Onion (T.Aman) 2.Rice(B.Aman +B.Aus)-Mustard 3.Mustard-Rice (Boro) 4.Rice(Boro) -Rice(Local) -B.Aman (transplanted) 5.Rice(B.Aus+B.Aman)/Jute -Khesari 6.Rice(B.Aus+B.Aman)-Wheat/Potato/Mustard 7.Rice(B.Aman) -Ground Nut 8.Rice(B.Aman) -Sesame	1.Rice(B.Aus) /Jute-Rice 2.Rice(B.Aus) /Jute-Rice (T.Aman)-Wheat/Pulse/Oil seed 3.Rice(B.Aus) -Rice(T.Aman) -Rice(Boro) 4.Rice(B.Aus) /Jute-Wheat/ Pulse-Oilseed/ vegetables	1.Sugarcane -Lentil 2.Sugarcane -Onion/Garlic 3.Rice(B.Aus)-Wheat 4.Rice(B.Aus)-Lentil/Mustard 5.Rice(B.Aus)-Potato 6.Rice(Boro) 7.Rice(T.Aman) -Wheat 8.Rice(T.Aman) -Vegetables

The key rearers were offered a short training on HYV chicken management before started. Birds were allowed to scavenge in and around homestead and adjacent crop fields during day time and kept in shelter at night and during unfavorable weather conditions. Feed ingredients, like wheat, wheat bran, paddy, broken rice, cooked rice, balanced diets for laying hens etc. were supplemented as single or a mixture of 2 or 3 ingredients to the birds by farmers. Birds were housed in a bamboo shelter when offered supplemented feed. There was continuous supply of drinking water in the bamboo enclosure and birds had easy access during scavenging period of the day. Laying nest was placed in night shelter areas. Birds were dewormed every two months and vaccinated against Newcastle and Fowl pox diseases according to a program. Data regarding egg production, mortality and supplemented feed were recorded twice a week. The protein and energy content of the supplemented feed were calculated on the basis of book values. Data were analyzed by the least square principle using the SAS programming package, SAS (1988).

Results and Discussions

The performance data of the hens up to 18 months of age are presented in table 2. Birds from grain dominant Manikgonj area started early egg production (31 weeks) compared to other locations (34 weeks) and the difference was significant.

The average hen day egg production / hen was highest in grain dominant area (157) followed by grain/fibre (154) and significantly lower in sugarcane/grain (103) cropping patterns. Mortality was observed very high in all the locations and the most suspected reason was bacterial diseases against under nutrition condition of the birds. The seasonal flood in grain dominant Manikgonj area and water logging condition in grain/fibre Jessore area could be the other reasons for higher significant mortality than sugarcane/grain based cropping patterns of Rajshahi. Mortality due to predator (wild animals) loss were found significantly higher in the sugarcane/grain cropping area compared to other locations and the reason was that wild animals hunt experimental birds from their sugarcane fields hideout adjacent to scavenging areas.

The energy content of supplemented feed was observed lowest in grain dominant cropping area and found significantly lower than grain/fibre area.

Table 2. Performance of experimental birds reared under semi scavenging conditions at three locations

PARAMETERS	PERFORMANCE (Least square mean)		
	Grain (Manikgonj)	Grain/fibre (Jessore)	Sugarcane/grain (Rajshahi)
Age of first egg (wk)	31a	34b	34b
Eggs/hen (hen day)*	157a	154a	103b
Mortality % (excluding predator loss)	43.9b	12.3a	19.8a
Mortality % due to predator loss	0a	0.3a	6.3b
Supplemented energy Kcal/bird/day	130a	146b	134a
Supplemented protein (g)/bird/day	6.4b	8.3c	5.6a

Figures with same letter in a row are not significantly different ($P < 0.05$)

* Corrected for 12 months production period from first egg production

The amount of supplemented protein were found lowest in sugarcane/ grain area followed by grain dominant and grain/fibre areas and differed significantly. However, irrespective of locations the amount of supplemented protein and energy seems to be around 30 and 40% of daily requirement of commercial hens in captivity.

In grain dominant cropping pattern (201% cropping intensity) area, it was observed the highest egg production and early egg laying while the birds received the lowest amount of energy and protein supplementation. On the other hand, the egg productivity of birds in grain/fibre cropping area (207% cropping intensity) receiving higher amount of energy and protein supplementation might not come up like in the grain dominant area because of the presence of the fibre crop in the cropping patterns.

The results indicated that the HYV hens used to manage good amount of feed by scavenging various resources, especially the grain based crop residues widely scattered in and around homestead or nearby after the harvest in the crop fields. The amount of scavenged feed seems to be 60 - 70% of total feed consumed by a scavenging bird which has

practically no cost involvement. The higher egg productivity over native chicken indicated that HYV hen could be an efficient utilizer of various scavenging feed resources including the grain based crop waste of Bangladesh.

References

- Ahmed, A. and M. A. Hasnath, 1983. A study on the heritability estimates of body weights of indigenous chickens. *Bangladesh Vet. J.* 17: 19-24.
- Ahmed, N.U., R. Amin, N. P. Magor, N.I. Miah, N. Islam, A. Saha , A. H. Khan and H. Ali, nd. Livestock related FSR activities of the Bangladesh Rice Research Institute, Rice Farming Research Division, Bangladesh Rice Research Institute, Gazipur, Bangladesh. pp 171.
- BRAC, 1994. Poultry programme. RDP annual report. Mohakhali, Dhaka, Bangladesh. pp. 21 - 24.
- Quader, M. A., M.M. Rahman, M.G. Moula and M.R. Khan, 1989. A comparative study on adaptability of different exotic and local breeds of poultry under two management systems of rearing. Research Report (Rabi 1988-89). On-farm Research Division, Region II , Bangladesh Agricultural Research Institute, Jamalpur, Bangladesh.
- Rahman, M.M., M. N. Islam, and N. R. Sarker, 1995. An adaptability study of three improved types of layer chicken under rural conditions at Naikhongchari FSR site. *Bangladesh Journal of Livestock Research*. Paper accepted for publication.
- Sazzad, M.H., 1992. Comparative study on egg production and feed efficiency of different breeds of poultry under intensive and rural conditions in Bangladesh. *Livestock Research for Rural Development*, Vol.4 no.3: 65-69.