CONTENT

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Author

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ABSTRACTS

The present study was conducted in Pipulbaria village at Sirajganj district to know the production performance of indigenous chicken with seasonal effect and predict the values by fitting the exponential model. The average live weight of chicken was (912.73±31.02g) higher in winter than summer (888.27±20.377g).The average egg weight was higher (40.23.5±0.441g) in summer than winter (39.76±0.536 g).The average egg production per clutch higher in summer (12.2±0.536g) than in winter (10.53±0.376g).The Actual value of the traits (Live weight and clutch size) in Summer (888.27±20.377g, 12.2 ±0.536g) higher than predicted value (885.82 ±5.122g, 11.72±0.06g). The Actual value of the traits (Live weight and Egg weight) in winter (912.73±31.021g, 39.76±0.536g) higher than predicted value (906.17±1.848g, 39.01±0.143g). The R^2 was used to compare the model performance and actual and predicted values.

Key word: Deshi chicken, productive traits, genetic potentialities, predicted value.

INTRODUCTION

Agriculture is an important sector in Bangladesh where poultry is one of the fastest growing segments of this sector (Faruque *et al.*, 2013). The production system for indigenous chickens is smallholder backyard scavenging in nature with each family keeping an average of 6-7 chickens to meet family requirements. Indigenous chickens are locally known as Deshi (*Gallus domesticus*) and it was reported that deshi chicken was derived from *Gallus gallus* (Dutta *et al*., 2013). Approximately there are 337.99 million chickens (DLS 2018) scattered throughout 68,000 villages in the country and most of them are indigenous non-descript. The non-descript deshi chicken constitutes about 90% of the indigenous population (Hossen, 2010).Through the rural poultry are playing a vital role both` in national economy and nutrition, they are poor meat and egg producers. It was reported that about 74% households rear poultry domestically. The session and feed supplement play a vital role in chicken productivity. In scavenging system of rearing the indigenous chicken cannot attain their full production due to exposure of risk which influences their survivability and productivity. The indigenous chicken population of Bangladesh has been undergoing genetic erosion, following the introduction of improved stock from developed countries as a result the performance of crossbreed are higher than indigenous chicken (Bekele et al., 2010). Recording and assessable productivity of a chicken is relatively long term and expensive. Simulation modeling can assist in better understanding of a farming system by estimating the productivity. Modelling integrates knowledge of the components of a farm system with their interactions and can be used to identify differences in efficiency of production by varying inputs and out puts (Olney and Kirk, 1989). Modelling assists researcher, policy maker and farmer in making decision to improve sustainability and farm profitability. Various types of models for the egg production of chicken have been found in literature: a simple 3 parametric model (Wood model) for individual weekly egg production; a logistic model, which including the both increasing and decreasing phase (Yang et al., 1989; Grossman and Koops, 2001); and a stochastic simulation model of egg production (Alvarez and Hocking, 2007). The applicability of models on egg production in indigenous chickens is limited. Therefore there is a necessity of maintain the average performance of indigenous chicken. Therefore the current study was designed with the objectives.

Objectives of study:

1. To study different productive traits (live weight, egg weight, clutch size) of indigenous chicken under scavenging rearing system in two different seasons.
2. To fit the linear regression model and estimate the predicted values of different traits using the model parameters.

METHODS AND MATERIALS

Study area

The study was conducted at different households having indigenous chicken (local name deshi) of area at Pipulbaria, Sirajganj in Bangladesh.

Study population

Fifteen hens with different age were selected through random sampling technique. Total 40 chickens was considered in this study.

The owner of households would not keep any written record of their chickens. So all the data was collected using a pre-prepared questionnaire by the researcher. The parameter of the questionnaire were total no poultry, total no of laying hen, clutch size, egg weight.

Housing and management of indigenous chicken

The housing system of the indigenous chicken was mainly backyard farming system. The house was made of wood or bamboo or tin- shed or mud. As indigenous chickens were scavengers by nature so there were no practices of supplementary feeding. The birds scavenge for their own feed from morning to evening around houses and fields. They depend on field grains, insect's earthworms, green matters crop residues homestead pickings and kitchen wastes. In study area, boiled rice, broken rice, rice polish was given as a feed supplements to the chickens. No commercial diets were given to them. At the age of 170-190 days sexual maturity was achieved. Indigenous chicken normally yield 50-70 egg in a year (Noor et al. 2020). The color of egg was brown. The eggs were naturally incubated under the broody hens. Every day at morning 7 am the door of the house was opened and at evening 6.30 pm the door of was closed.

Method of data collection

A total of 40 individual households, rearing indigenous chicken from Pipulbaria area in Sirajganj were selected for the study and the data were collected from selected household owners by conducting personal interviews (total no poultry, age of poultry, age of sexual maturity, feed supplement, diseases, vaccination and deworming schedule). Some other parameters like body weight and egg weight were also collected and recorded directly by

the researcher. The individual laying hens live weight, egg weight was taken by a top loading weighing balance. Indigenous chicken laying eggs clutch size was also recorded.

Modeling the performances

The exponential model equation (Y = a + bx), where, Y is the value of the traits, x is the ages of hens, and a and b are the parameters that define the shape of the curve) was fitted using PROC MIXED of SAS to estimate their parameters (a, and b). The goodness-of-fit of predicted values to actual records, and model performance were compared by the fit statistics: coefficient of determination (R^2). The values of R^2 was obtained by fitting each predicted value for each week from linear regression as a dependent variable with model parameters (a and b) and weekly production as independent variables with the PROC MIXED procedure of SAS.

Statistical analysis

All the data including different traits (body weight, egg weight, clutch size) were entered into MS Excel (Microsoft Office excel 2010) and means with standard deviation was analyzed by the PROC GLM of SAS (SAS, 2008) using the following statistical model.

$Y_{ij} = \mu + S_i + e_{ij}$

Where,

Y_{ij} is the traits value

μ is the overall mean

S_i is the effect of season

and e_{ijk} is the effect of error distributed as N $(0,\sigma^2)$.

The mean differences were compared using least significant difference (lsd) (Steel et al., 1997) at 5% level of significance.

Activities during data collection:

Fig: Balancing of live weight of hen

Fig: Balancing of live weight of hen

Fig: Balancing Egg weight

Fig: Housing of indigenous chicken

RESULTS

The mean and standard deviation of different productive traits of indigenous hen under scavenging rearing system is presented in Table 1. There was no significant differences found for live weight of mature indigenous chickens, clutch size and egg weight (Table 1). However, numerically highest average live weight in winter (912.73±31.02) than summer season. Again highest egg production per clutch was in summer (12.2±0.536) than winter season and highest egg weight was also observed in summer (40.23±0.441) season than winter season.

Table 1: comparative performance of indigenous chicken between season

Traits	**Summer season**	**Winter season**	**SEM**
Live weight (gm)	888.27±20.377	912.73±31.02	12.231
Clutch size (number)	12.2±0.536	10.53±0.376	0.835
Egg weight (gm)	40.23±0.441	39.76±0.536	0.235

The model parameters (intercept (a) and regression co-efficient (b)) with fit statistic (R^2) of linear regression and the actual and predicted mean ± standard error values of different traits are shown in Table 2. The intercept value and regression co-efficient values of different trait was similar in two seasons but comparatively higher R^2 was found in summer for clutch size than winter season. There was no significant differences found between actual and predicted values of all traits in two season.

Table 2: Model parameters and actual and predicted values of the traits

season	Traits	Model parameter		R square	Actual traits value	Predicted traits value
		Intercept (a)	Co-efficient (b)			
Summer	Live weight	846.43	0.0031	0.07	888.27±20.377	885.82±5.122
	Clutch size	12.24	-0.003	0.2	12.2±0.536	11.72±0.064
	Egg weight	41.45	-0.002	0.004	40.23±0.441	40.26±0.148
Winter	Live weight	891.71	0.0011	0.004	912.73±31.021	906.17±1.848
	Clutch size	10.82	-0.0004	0.02	10.53±0.376	10.76±0.008
	Egg weight	40.16	-0.002	0.02	39.76±0.536	39.01±0.143

DISCUSSION

The average live weight of hen in winter (912.73±31.02) was higher than summer (888.27±20.377) and the average clutch size was also highest in summer (12.2) than winter (10.53). The variation of clutch size and live weight of this study might be due to differences between seasons and feeding of chickens. Similar factors were described by other researchers elsewhere (Grobbelaar *et al.,* 2010; Khan *et al.,* 2017: Sarma *et al.,* 2018).

The highest egg weight was observed of indigenous chickens in summer than winter. Similar values of egg weight of indigenous chicken were reported by several researchers (for example, Khan *et al*., 2017; Sarma *et al.,* 2018). The variation in egg weight might be due to the differences in genetics, feeding and management and season of the year of the chicken and these factors was also reported by other researchers (Khan *et al.*, 2004; 2017).

The model co-efficient of the traits (live weight) was positive both summer and winter. It indicated that there was positive relationship between actual and predicted live weight value. The co-efficient of other traits (clutch size, egg weight) in both summer and winter negative. It indicated that there were negative relationship between actual and predicted value. The model co-efficient value was lower than the Khan and Ahmed (2010).

The R^2 value of live weight higher in summer (0.07) than winter (0.004). It indicated that in summer the actual values and predicted values of live weight was similar than winter. Lower R^2 value of live weight indicated the difference between actual and predicted value. The higher R^2 values indicated a good fit in models and also between actual and predicted values (Alam et al., 2009) and Khan et al. (2012).

Although the R^2 value of all the trait was lowered however, no significantly differences were observed between the actual and predicted values of all traits.

CONCLUSION

From the study it may be concluded that the average live weight of indigenous hen in winter 912.73g and the highest clutch size of egg production in summer 12.2 in number. The highest egg weight found in summer 40.23 gm. So it was found performance of indigenous chicken (clutch size, egg weight) higher in summer except live weight. The actual and predicted value of the traits (live weight, clutch size, egg weight) were more similar in summer than winter except egg weight.

The study helps the people to know about productive, reproductive traits and live weight and weight gain of indigenous chicken under scavenging system. There will also chance to know whether the non-descriptive deshi chicken genetics is inert or not. Due to short duration of the study period sample size of current study was very small. If the sample size is large, the more significant result could be achieved.

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ANNUXURE

Questionnaire

Farm Owner name: ……

Address: ……..

Age: ……

Sex: …….

Mobile no: ……..

Total no of poultry…..

Total no of laying Hen……

Age of laying hen…….

Clutch size…….

Age of sexual Maturity: .....

Rearing system: Scavenging / semi scavenging

Feed intake……..

Body weight of hen…….

Egg weight of hen……

Egg weight of dam……

Diseases……..

Vaccination and deworming…….

Data collector: Anamul Haque

Intern id: 59

Date of data collection:

Biography

I am Anamul Haque, son of Mr. Habibur Rahman and Mrs. Noorjahan Begum. I passed SSC from Horina Bagbati High School in 2011 and HSC from Ullapara Science College in 2013 from Rajshahi board, Bangladesh. Now I am intern student of faculty of veterinary medicine,

Chittagong Veterinary and Animal Sciences University. This study was the inauguration of myself in the era of research and I have a strong intention to involve myself in this types of activities in future. I want to be a veterinarian and poultry practitioner in future.