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Seema Agarwal
Ph.D. Scholar, Department of
Livestock Production and
Management, Ranchi Veterinary
College, BAU, Ranchi,
Jharkhand, India

Sushil Prasad
Professor, Department of
Livestock Production and
Management, Ranchi Veterinary
College, BAU, Ranchi,
Jharkhand, India

Ravindra Kumar
Assistant Professor, Department
of Livestock Production and
Management, Ranchi Veterinary
College, BAU, Ranchi,
Jharkhand, India

Soumen Naskar
Sr. Scie. ICAR-11 AB,
Department of Livestock
Production and Management,
Ranchi Veterinary College, BAU,
Ranchi, Jharkhand, India

Subhash Chandra
Block Animal Husbandry
Officer, Department of Livestock
Production and Management,
Ranchi Veterinary College, BAU,
Ranchi, Jharkhand, India

Corresponding Author
Seema Agarwal
Ph.D. Scholar, Department of
Livestock Production and
Management, Ranchi Veterinary
College, BAU, Ranchi,
Jharkhand, India

Evaluation of egg quality traits of indigenous chicken of Chotanagpur plateau of Jharkhand under intensive system

Seema Agarwal, Sushil Prasad, Ravindra Kumar, Soumen Naskar and Subhash Chandra

Abstract

A total of 55 fresh eggs of indigenous chicken of Chotanagpur plateau of Jharkhand reared under intensive system of management were collected at 30 weeks of age and studied for its egg quality traits. The average values of egg quality traits viz. egg weight (g), shape index (%), yolk index (%), albumen index (%), yolk index (%), shell thickness (mm) and Haugh unit were observed to be 41.055 ± 0.646 , 75.451 ± 0.325 , 12.409 ± 0.157 , 48.124 ± 0.159 , 0.375 ± 0.004 and 89.373 ± 0.383 respectively. The values of correlation coefficient of egg weight with egg length, egg width, albumen width, albumen height, yolk width and yolk height were 0.927, 0.824, 0.747, 0.334, 0.683, 0.521 respectively. However, the values of correlation coefficient of egg weight with shape index, albumen index, yolk index, shell thickness and Haugh unit were -0.244, -0.289, -0.348, -0.129 and -0.232 respectively. The native chickens are mainly reared by rural poultry farmers under backyard system. The present study was conducted to evaluate the egg quality traits of indigenous chicken under intensive system. The egg quality traits of indigenous chicken of Chotanagpur plateau of Jharkhand were good at the organized farm conditions.

Keywords: indigenous chicken, egg quality traits, intensive system, correlation coefficient

Introduction

Indigenous chickens are playing an important role in rural economies. It possesses some desirable characteristics such as hardiness, better feed conversion ability for non-conventional feed material, natural immunity against common diseases and local preference. Their plumage color and long shank length helps in protecting themselves against predators. It provides subsidiary income to rural people because their eggs and meat have huge demand and they fetch more price than those of exotic chickens. The present study was conducted to assess the egg quality traits of indigenous chicken of Chotanagpur plateau of Jharkhand under intensive system of management.

Materials and Methods

The experiment was carried out at Poultry farm, Ranchi Veterinary College, Kanke, Ranchi under standard management condition. A total of 55 fresh eggs of indigenous chicken of Chotanagpur plateau of Jharkhand at 30 weeks of age were utilized for this study. Eggs were evaluated on individual basis for their egg quality traits. The weight of each egg was taken by using a sensitive electronic weighing balance whereas, length and width of individual egg were measured with the help of Vernier caliper (cm), and shell thickness was measured with the help of Screw gauge. The albumen height and yolk height (mm) of each egg was taken with the help of Spherometer and width of thick albumen and width of yolk (mm) was measured by Vernier caliper. Shape, albumen and yolk indices and Haugh unit were determined following standard procedures.

Results and Discussion

The results of egg quality traits of egg of indigenous chicken of Chotanagpur plateau of Jharkhand reared under intensive system are presented in table 1. The overall mean egg weight was 41.055 ± 0.646 g, which was similar to the findings of Haunshi and Doley (2011) [5] in native chicken of Manipur and Kumar *et al.* (2016) [9] in indigenous chicken of Kerala. In contrast, lower egg weight was reported by Haunshi *et al.* (2009) [4] in Miri type chicken,

Kalita *et al.* (2012)^[8] in indigenous chicken of Assam, Roy *et al.*, (2018)^[14] in indigenous chicken of West Bengal and Mohanta *et al.* (2018)^[11] in indigenous dwarf chicken of Odisha.

Shape index is good indicator of uniformity in egg size. If shape index is higher the eggs are more uniform. The mean shape index (75.451±0.325 %) reported in this study was in consistent with observation made by Chatterjee *et al.* (2007)^[2] in Naked Neck, Frizzle Fowl and Brown Nicobari, Haunshi *et al.* (2015)^[6] in Ghagus and Mohanta *et al.* (2018)^[11] in indigenous dwarf chicken of Odisha but higher than the findings of Mohanty and Nayak, (2011)^[12], in native chicken of Bhubaneswar.

Albumen index is an indicator of the firmness and viscosity of albumen. The mean albumen index (12.409±0.157%) reported in this study was close to the findings of Chatterjee *et al.*, (2007)^[2] in Barred desi and Brown Nicobari but higher than the value reported in Kaunayen chicken (Vij *et al.* 2016)^[16], Assel, Nicobari and Kadaknath (Premavalli *et al.* 2016)^[13] and indigenous dwarf chicken of Odisha (Mohanta *et al.* 2018)^[11].

The mean yolk index (48.124±0.159 %) reported in this study was close to the findings of Iqbal and Pampoori (2008)^[7] in indigenous chicken of Kashmir, but did not agree with the findings of Premavalli *et al.* (2016)^[13] in Assel, Nicobari and Kadaknath, Mohanta *et al.* (2018)^[11] in indigenous dwarf chicken of Odisha, Vij *et al.* (2008)^[15] in Tellicherry breed who reported lower value of yolk index.

Shell thickness is also an important egg quality trait which denotes the breaking strength, keeping quality and transportability of eggs. The average shell thickness (0.375±0.004 mm) recorded in this study was comparable with the findings of Mohanty and Nayak, (2011)^[12] in native chicken of Bhubaneswar, Gopinath *et al.* (2013)^[3] in local

fowl of Karnataka and Premavalli *et al.* (2016)^[13] in Kadaknath, but did not agree with the findings of Haunshi *et al.* (2015)^[6] in Ghagus and Mohanta *et al.* (2018)^[11] in indigenous dwarf chicken of Odisha who reported lower value of shell thickness than the present study.

The Haugh unit plays an important role in determining the internal quality of egg particularly in the evaluation of albumen quality. Good Haugh unit score means good albumen quality and better internal egg quality. The average Haugh unit of eggs in the present investigation was 89.373±0.383 which shows the firmness and higher quality of eggs. The average Haugh unit score in this study was higher than the findings of Mohanty and Nayak, (2011)^[12] in native chicken of Bhubaneswar, Malik and Singh, (2013)^[10] in Tripura Black, Vij *et al.* (2016)^[16] in Kaunayen chicken, Mohanta *et al.* (2018)^[11] in indigenous dwarf chicken of Odisha and Vij *et al.* (2008)^[15] in Tellicherry chicken. However, Premavalli *et al.* (2016)^[13] reported higher haugh unit than the present study in eggs of Assel, Nicobari and Kadaknath.

Correlation coefficient among egg quality traits

The egg weight was positively correlated with egg length, egg width, yolk height, yolk width, albumen height and albumen width in eggs of indigenous birds under farm condition of management and the correlation was strong with egg length and egg width. However, the egg weight was negatively correlated with shape index, albumen index, yolk index, shell thickness and Haugh unit (Table 2). These findings also agreed with reports of Akhtar *et al.*, (2015)^[11] in desi birds and PB₂X desi under farm condition of management. Mohanta *et al.*, (2018)^[11] observed significant correlation between external and internal egg quality traits in indigenous dwarf chicken of Odisha.

Table 1: Egg quality traits of native birds reared under farm management system (N=55)

Parameters	Mean ± S.E.
Egg weight (g)	41.055±0.646
Egg Length (cm)	5.098 ±0.033
Egg Width (cm)	3.845 ± 0.023
Shape Index (%)	75.451±0.325
Albumen Width (mm)	56.290 ± 0.56
Albumen Height (mm)	6.955 ± 0.072
Albumen Index (%)	12.409±0.157
Yolk Width (mm)	37.109 ± 0.223
Yolk Height (mm)	17.850 ± 0.100
Yolk Index (%)	48.124±0.159
Shell Thickness(mm)	0.375±0.004
Haugh unit	89.373±0.383

N= Number of Observations, S.E.= Standard Error

Table 2: Correlation coefficient among egg quality traits of Desi birds under farm system of management (n=55)

Egg quality traits	Egg weight	Egg length	Egg width	Shape index	Albumen width	Albumen height	Albumen index	Yolk width	Yolk height	Yolk index	Shell thickness	Haugh unit
Egg weight	-	0.927	0.824	-0.244	0.747	0.334	-0.29	0.683	0.521	-0.348	-0.129	-0.232
Egg Length	-	-	0.777	-0.424	0.655	0.367	-0.19	0.548	0.369	-0.363	-0.125	-0.157
Egg width	-	-	-	0.24	0.689	0.408	-0.19	0.576	0.502	-0.189	-0.189	-0.053
Shape index	-	-	-	-	-0.023	0.028	-0.62	-0.016	0.157	0.292	-0.065	0.173
Albumen width	-	-	-	-	-	0.143	-0.62	0.358	0.236	-0.237	-0.202	-0.284
Albumen height	-	-	-	-	-	-	0.686	0.324	0.431	0.136	-0.009	0.838
Albumen index	-	-	-	-	-	-	-	0.0002	0.158	0.256	0.139	0.874
Yolk width	-	-	-	-	-	-	-	-	0.839	-0.394	-0.078	-0.058

Yolk height	-	-	-	-	-	-	-	-	-	0.168	-0.027	0.147
Yolk index	-	-	-	-	-	-	-	-	-	-	0.098	0.3427
Shell thickness	-	-	-	-	-	-	-	-	-	-	-	0.059

Conclusion

On the basis of above study, it is concluded that the egg quality traits of indigenous chicken of Chotanagpur plateau of Jharkhand was good at the organized farm conditions. However, no recorded information was available on this native germplasm, therefore this is an attempt to characterize this precious germplasm of Chotanagpur plateau of Jharkhand for further recognition. Moreover, further research is needed for improving egg quality traits as well as conservation of this germplasm to maintain its purity and existence for future use.

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