

Effect of Age on Production Performance, Egg Geometry and Quality Traits of Lakha Variety of Aseel Chicken in Pakistan

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Abstract: Aseel chicken is indigenous to Asian subcontinent famous for its vigor, body characteristics and fighting behavior. Moreover, these birds are also able to withstand harsh climatic conditions of tropical and sub-tropical areas but its rearing is getting less importance due to its poor egg production. The present study was conducted to evaluate the effect of age on production performance, egg geometry and egg quality traits of Lakha variety of Aseel maintained under standard managemental conditions at Indigenous Chicken Genetic Resource Center (ICGRC), University of Veterinary and Animal Sciences, Lahore, Pakistan. For this purpose, a total of 42 birds, 14 birds in each of the following age group (30, 70 and 110 week), were kept up to four months. Collected data were analyzed under Completely Randomized Design (CRD) with comparison of means using Fisher's LSD test. Statistical analyses revealed significantly higher egg production and egg mass in first age group (30 week), higher egg weight in third age group (110 week) and better FCR/ dozen eggs and FCR/ kg egg mass in second (70 week) and third age (110 week) groups with non-significant differences in feed intake. Regarding egg geometry, all parameters were significantly higher in third age group than that of second and first age groups. In egg quality, Haugh unit score was significantly higher in third age group while yolk index and shell thickness showed non-significant differences among all age groups. So it can be concluded that with increasing age, egg production and egg mass decreases with increase in egg geometry traits.

Keywords: Aseel, Age, Production Performance, Egg Geometry, Egg Quality.

INTRODUCTION

Poultry is one of the fastest growing industries of Pakistan with annual growth rate of 8-12%. The contribution of poultry sector in livestock is 10.4 % while the rural chickens contribute 11% of total poultry birds with 12% meat and 28% eggs in total meat and egg production of Pakistan [1].

Pakistan is an agricultural country with more than 65% people residing in villages and keeping backyard chickens like Aseel, Naked neck, Fayoumi and Desi for their rural household. Aseel is an important but unexploited chicken genetic resource in Pakistan having better disease resistance and able to withstand sub-tropical climatic conditions of the country [2]. In Asian subcontinent Aseel breed is mainly used for cock fighting purpose but its rearing, propagation and commercialization is getting less importance due to its poor egg production, shorter clutches, and greater broody behavior. Though, these characters can be improved through proper housing, management, fulfilling nutritional requirements but it is impossible without getting information about baseline requirements of Aseel breed under local environmental conditions. So, it is need of the time to standardize its production performance under various managemental situations to make it useful in commercial as well as rural poultry

sector. Keeping it in mind, the present study was conducted to evaluate the production performance, egg geometry, and quality parameters of Lakha Aseel at different ages.

MATERIALS AND METHODS

The present study was conducted at Indigenous Chickens Genetic Resource Centre (ICGRC) of University of Veterinary and Animal Sciences Lahore, Pakistan. A total of 42 birds of Lakha variety of Aseel were distributed in three groups with 14 birds in each group based on their ages (30, 70 and 110 weeks). Birds were reared in three tiered cages having single bird compartment and each bird was considered as a separate replicate. Birds were reared under standard managemental conditions and were given ad-lib access to water. Sixteen hours light was given to the birds. Feed was formulated according to NRC-1994 standards and 150 grams of feed was offered on daily basis. Daily feed intake, egg number and egg weight was recorded for the calculations of egg production%, egg mass, FCR/ dozen eggs and FCR/ Kg egg mass. While three eggs from each hen on monthly basis were taken for the calculations of egg quality (Egg length, Egg breadth, Egg surface area, Egg volume, egg shape index) and egg geometry parameters (Haugh unit, Yolk index, Shell thickness). The Haugh unit values were calculated for individual egg using the following formula: $HU = 100 \log (H - 1.7w^{0.37} + 7.6)$

Where, H is the observed height of the albumen in millimeters and W is the weight of egg in gram. Yolk

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Index is the measure of yolk quality and is calculated by using the following formula. Yolk Index = yolk height / yolk width

Statistical Analysis

The data thus collected were analyzed using SAS (Statistical Analysis System) version 9.1 under Completely Randomized Design (CRD). One-way ANOVA technique was applied [3] whereas, Post hoc analysis using Fisher's LSD (Least Significant Difference) test.

RESULT AND DISCUSSION

Production Performance

In this study significantly higher egg production was observed in first age group than that of second and third (Table 1) which might be attributed to the low level of fat deposition on the reproductive organs in younger birds because fat deposition on the ovary increases with increasing age and can be removed through induced molting [4]. These findings are in line with the findings of Usman, Ahmad [5] who reported the decreased in egg production with advancing age.

In the present study, significantly higher egg weight was observed in third age group followed by second and first age groups (Table 1) which might be due to higher body weight of respected age group. Similar findings has been reported by [6] who reported that increase in egg weight has been associated with the advancement of hen's age. Similarly it also has been reported that age has a significant effect on egg weight [7]. However, contrarily in another study, Usman, Ahmad [5] reported no effect of age on egg weight.

Regarding egg mass, first age group showed significantly higher egg mass followed by second and third age groups (Table 1) which might be due to higher egg production of first age group in the same experiment. Statistically analyzed data revealed non-significant differences in the feed intake among all the three age groups. As in the following experiment, egg production and egg mass was significantly higher in first age group further explaining significantly better FCR/ dozen eggs and FCR/ kg egg mass in the first age group in present study. Likewise another scientist [8] reported that FCR values of layers during the first production cycle were better than in the second production cycle. Contrarily, Vargas, Baratto [9] reported in another study that feed conversion was not influenced by age of the breeders.

Table 1: Production Performance, Egg Geometry and Quality Traits of Indigenous Lakha Aseel at Three Ages

Parameters	1 st production cycle	2 nd production cycle	3 rd production cycle	P value
Production Performance				
Feed intake (kg)	7.59±0.14	8.16±0.21	8.12±0.18	NS
Egg production %	15.89±0.29 ^a	13.63±0.4 ^b	11.79±0.27 ^c	<.0001
Egg weight (g)	43.63±1 ^c	47.57±0.93 ^b	50.87±0.84 ^a	<.0001
Egg mass (g)	832.21±23.84 ^a	780.14±31.88 ^{ab}	720.34±23.17 ^b	0.0184
FCR/dozen eggs	6.96±0.25 ^a	6.06±0.26 ^a	4.79±0.12 ^b	<.0001
FCR/ Kg egg mass	11.44±0.48 ^a	10.71±0.55 ^a	9.21±0.29 ^b	0.0044
Egg Geometry				
Egg length	5.28±0.06	5.26±0.07	5.25±0.06	NS
Egg breadth	3.92±0.04 ^b	3.99±0.05 ^b	4.18±0.05 ^a	0.0019
Egg surface area	59.73±1.02 ^b	61.14±1.26 ^b	64.84±1.02 ^a	0.0069
Egg volume	39.46±1.009 ^b	40.88±1.26 ^b	44.59±1.07 ^a	0.0071
Egg shape index	74.6±1.39 ^b	76.07±1.08 ^{ab}	79.78±1.64 ^a	0.0344
Egg Quality				
Haugh unit score	100.05±0.03 ^a	99.96±0.03 ^b	99.89±0.03 ^b	0.0016
Yolk index	0.42±0.01	0.43±0.01	0.39±0.01	NS
Shell thickness	3.55±0.08	3.62±0.09	3.59±0.08	NS

Note: Different superscripts on different values represent significant differences among their means (P≤0.05).

Egg Geometry and Quality

In the present study, egg breadth, egg surface area, egg shape index and egg volume was significantly higher in third age group compared with second and first age groups which could be due to the higher egg weight of the eggs laid by birds of third age group (Table 1). In another study, higher egg breadth in older birds has been reported [6] further explaining the weight of oviduct which is directly proportional to the egg breadth. Contradictory statement has been reported by Sohail, Muhammad [10] who observed non-significant differences in egg surface area of chickens at different ages. Brand, Parameter [11] reported that egg shape index is directly proportional to egg breadth and inversely related to egg length.

Regarding internal egg quality parameters, Haugh unit score was significantly higher in first age group than that of second and third age groups whereas yolk index and shell thickness showed non-significant differences among all age groups (Table 1). These results are in agreement with the findings of Shafiq, Usman [12], who reported that Haugh unit decreases as the age of bird decreases. In contradiction, Hussnain, Akram [13] observed non-significant difference of age on Haugh unit of eggs.

CONCLUSION

On the basis of our data it can be concluded that egg production and FCR decreased with increasing age while egg geometry parameters increased with increasing age.

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