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Evaluation of egg quality traits and cholesterol content of eggs of Aseel crossbreds

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Abstract
An experiment was conducted to evaluate and compare the egg quality traits of eggs obtained from hens of Aseel × Naked Neck (ANN), Aseel × New Hampshire (ANH) and Aseel × Rhode Island Red (ARIR) crossbreds under farm conditions. The egg quality traits recorded at 40 weeks of age were satisfactory for all the three crossbred groups. The mean shape index of eggs at 40 weeks of age in ANN, ANH and ARIR was 75.82, 74.39 and 77.30, respectively, and the values did not differ significantly. The mean albumen index of eggs at 40 weeks of age was 0.06, 0.08 and 0.09 in ANN, ANH and ARIR, respectively, and the albumen index in ANN was significantly lower when compared to the other two experimental groups (p<0.05). The mean yolk index of eggs at 40 weeks of age in ANN, ANH and ARIR was 0.38, 0.40 and 0.40, respectively, and the values were similar. The mean shell thickness of eggs from ANN at 40 weeks of age was 0.25±0.01 mm which was significantly higher (p<0.05) than that of eggs from ANH (0.20±0.007 mm) and ARIR birds (0.20±0.007 mm). The mean Haugh unit score of eggs from ARIR birds (82.18) was significantly (p<0.05) higher than that of eggs from ANN and ANH birds (67.78 and 77.22 respectively). The mean value of yolk cholesterol in ANN, ANH and ARIR was 15.25, 14.84 and19.11 mg per gram of yolk, respectively.

Keywords: Egg quality, Aseel crossbreds, yolk cholesterol, shell thickness

Introduction
Indian native breeds of chicken have special characteristics of adaptability, disease resistance, and meat and egg quality. Indigenous chicken breeds have become increasingly popular around the globe due to their better adaptability to local environmental conditions and good immune profile (Iqbal *et al.*, 2012) [1]. Attempts should be made to utilize some of these good qualities of Indian breeds by crossbreeding them with suitable exotic breeds to evolve a more productive hybrid chicken. This may lead to economically viable type of birds for backyard system of farming which is an instrument for the upliftment of rural poor people. The main constraints in backyard system of poultry rearing are losses due to predation and diseases. The native breed, Aseel despite its low production potential is well known for its pugnacity, high stamina, and intelligent defensive tactical thinking to keep power for long time in endurance fight. The Aseel breed is capable of self-defence from predators due to its alertness, longer shank length, camouflagic characters and aggressiveness. This breed can be effectively used for the development of germplasm suitable for backyard poultry farming. Among the desi birds, Naked Neck fowls have better egg production potential under tropical climate. These birds are having feather colours suited for backyard system of rearing. High yielding germplasm have contributed significantly in the progress of rural poultry production. New Hampshire and Rhode Island Red are two exotic dual purpose breeds which have been extensively used for production of brown eggs. These breeds can be successfully maintained under backyard as well as farming conditions in different parts of the country and has the potential for a higher economic return as layers (Javed *et al*., 2003) [2]. They have colored plumage and have good production potential that are advantageous for rearing in the backyard system. Nowadays egg quality is also a major concern in the egg industry as it affects grading, price and consumer demands. Furthermore, quality of internal egg content also affects hatching results, particularly chick yield (Rehman *et al.*, 2017) [3]. Fertility and hatchability rates are in turn decided by eggshell thickness and the eggshells must be free from any deformities for ideal gas exchange and pipping process, and from hair-like cracks to avoid unnecessary moisture loss. This is the reason why most breeding companies focus on egg-quality traits (Bain, 2005; Sekeroglu & Altuntas, 2009) [4, 5]. Considering the above facts, the present study was undertaken to evaluate and compare the physical quality characteristics eggs

of crossbreds of Aseel with Naked Neck, New Hampshire and Rhode Island Red in intensive system of housing.

Materials and Methods

The experiment was carried out in the Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy, to evaluate and compare the quality traits of eggs procured from Aseel × Naked Neck (ANN), Aseel × New Hampshire (ANH) and Aseel × Rhode Island Red (ARIR) crossbred hens maintained under deep litter system of rearing. The experimental birds required for the study were hatched out by mating males of Aseel with Rhode Island Red, New Hampshire and Naked Neck female lines.

Fifty eggs from each group were collected over a period of four days from birds at forty weeks of age. The egg quality parameters determined were shape index, yolk index, albumen index, Haugh Unit score, cholesterol content of egg yolk and shell thickness. The height of albumen and yolk was measured by using Ame's tripod stand micrometer. The width of the yolk and albumen was measured by using hand slide calipers. Shell thickness was measured using electronic digital micrometer to the nearest 0.01mm. Haugh Unit Score (HU) was computed as per the formula, HU = 100 log (H+7.57-1.7$W^{0.37}$), where H is the albumen height in millimeters and W, the weight of the egg in grams.

Various indices were computed as given below.

Shape index = $Breadth\ of\ egg\ (mm)/Length\ of\ egg\ (mm)\ x\ 100$

Yolk index = $Height\ of\ yolk\ (mm)/Diameter\ of\ yolk\ (mm)$

Albumen index = $Height\ of\ thick\ albumen\ (mm)$/ Mean width $of\ thick\ albumen\ (mm)$

The cholesterol content of egg yolk of 10 eggs from each crossbred groups was estimated by Wybenga and Pileggi method (Wybenga *et al*., 1970) [6].

Results

The egg quality traits studied at 40 weeks of age of all the three crossbred groups are indicated in Table 1. The mean shape index of eggs at 40 weeks of age was higher in ARIR (77.30±1.27) than in the ANN (75.82±0.76) and ANH (74.39±0.74). The mean values did not differ significantly.

The mean albumen index ANN, ANH and ARIR were 0.06±0.005, 0.08±0.006 and 0.09±0.005 respectively. The mean values were compared and values of ANH and ARIR birds were significantly (p<0.05) higher than that of ANN.

The mean yolk index of eggs in ANN (0.38±0.01), ANH (0.39±0.007) and ARIR (0.40±0.005) did not differ significantly.

The mean shell thickness of ANN (0.25±0.01 mm) was significantly higher than ANH (0.20±0.007 mm) and ARIR (0.2040±0.007 mm).

The mean Haugh unit score of ANN (67.78±3.38) was significantly (p<0.05) lower from that of ANH (77.22±3.47) and ARIR (82.18±2.52).

The mean value of cholesterol in mg per g of yolk was significantly (p<0.05) higher for Aseel × Rhode Island Red (19.11±1.02 mg per g of yolk) when compared with the mean values of Aseel × Naked Neck (15.25±0.88 mg per g of yolk) and Aseel ×New Hampshire (14.84±0.70 mg per gm of yolk).

Table 1: Egg quality traits of Aseel × Naked Neck (ANN), Aseel ×New Hampshire (ANH) and Aseel × Rhode Island Red (ARIR) at 40 weeks of age

Trait	ANN	ANH	ARIR
	(Mean±SD*)	(Mean±SD)	(Mean±SD)
Shape index	75.82±0.76	74.39±0.74	77.30±1.27
Albumen index	0.06^{b}±0.005	0.08^{a}±0.006	0.09^{a}±0.005
Yolk index	0.38±0.01	0.39±0.007	0.40±0.005
Shell thickness (mm)	0.25^{a}±0.01	0.20^{b}±0.007	0.20^{b}±0.007
Haugh unit score	67.78^{b}±3.38	77.22^{a}±3.47	82.18^{a}±2.52
Cholesterol (mg/ g of yolk)	15.25^{b}±0.88	14.84^{b}±0.70	19.11^{a}±1.02

The mean values carrying similar superscript within a row did not differ significantly (p<0.05).

*SD= standard deviation (n = 50 eggs for each group); 10 eggs per group has been evaluated for cholesterol levels.

Discussion

The present study evaluated and compared the egg quality traits and yolk cholesterol content of three chicken genotypes produced using Aseel as male line.

The mean shape index values of all the three crossbreds revealed that all eggs were of normal shape. The shape index value of eggs from three crossbreds are closer to the values reported by Pandey *et al*. (1987) [7] in RIR birds, Singh *et al.* (2000b) [8] in Aseel birds, Padhi *et al*. (1998) [9] in Naked Neck chicken and Malik and Singh (2010) [10] in CARI-Nirbheek birds. The mean albumen index value was significantly lower for ANN crossbred group. Similarly the yolk index was also comparatively lower for ANN group. Naked Neck female line might be responsible for this lower value in the crossbred group. A similar value for albumen index was reported by Padhi *et al*. (1998) [9] and Jayasree (2000) [11] in naked neck birds. But in general yolk index values were similar to the values reported by Pandey *et al*. (1987) [7] in RIR birds, Jayasree (2000) [11], Singh *et al.* (2000b) [8] in Aseel birds, Padhi *et al.* (1998) [9] in Naked Neck birds, Sasikumar (2003) [12] and Malik and Singh (2010) [10] in desi crossbreds. The mean shell thickness was significantly higher than in ANN group, which might have caused by female line involved, but in general shell thickness in all the groups were lower than those reported by Jayasree (2000) [11], Padhi *et al.* (1998) [9] and Malik and Singh (2010) [10]. The mean Haugh unit score of ANN was significantly lower from that of ANH and ARIR. The higher score of ARIR eggs could be attributed to the high egg weight and albumen height. The value obtained for ARIR is in agreement with that of Mohan *et al*. (2008) [13] in Aseel and Malik and Singh (2010) [10] in Aseel × CARI-Red pullets and greater than those obtained by Akhtar *et al.* (2007) [14] in RIR and Gupta *et al.* (2007) [15] in ARIR birds. The results obtained in the present study are lower than those reported by Jayanthy (1992) [16], Jayasree (2000) [11] in NN and NH, Jomy (2000) [17] in naked neck crossbreds, Padhi *et al.* (1998) [9] in

naked neck birds. Bekele *et al*. (2010) [18] reported that there was no significant difference between naked neck × Fayoumi (FN) and local Netch × Rhode Island Red crosses in any main effects of the egg quality traits. Rajkumar *et al*. (2010) [19] reported the mean shape index, shell thickness and Haugh Unit Score in Naked Neck as 71.92±0.78, 0.37±0.004 mm and 72.40±1.02, respectively at 40 weeks of age.

The mean value of yolk cholesterol in mg per g of yolk was significantly higher for ARIR when compared with the mean values of ANN and ANH. The values of ANN and ANH lies within the normal range and similar to that obtained by Jayasree (2000) [11] in Naked Neck and New Hampshire. On a health friendly point of view, eggs of ANN and ANH eggs will be preferable. A higher value for yolk cholesterol was reported by Kundu and Singh (1991) [20] in Aseel (22.19) and RIR birds (22.35).

Conclusion

The egg quality parameters evaluated in the present study significantly varied among the different Aseel crossbred hens. The information on egg quality traits of Aseel crossbreds c is very useful as limited information is available which will strengthen the published scientific data and also help the farmers in choosing the good quality eggs and birds suitable for backyard rearing.

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References

1. Iqbal A, Akram M, Sahota AW, Javed K, Hussain J, Sarfraz Z, *et al*. Laying characteristics and egg geometry of four varieties of indigenous Aseel chicken in Pakistan. J Anim Plant Sci. 2012; 22(4):848-852.
2. Javed K, Farooq M, Mian MA, Durrani FR, Mussawar S. Flock size and egg production performance of backyard chicken reared by rural woman in Peshawar, Pakistan . Livest. Res. Rural Dev, 2003, 15(11). Available from: http://www.lrrd.org/lrrd15/11/jave1511.htm [Google Scholar]
3. Rehman MS, Mahmud A, Mehmood S, Pasha TN, Hussain J, Khan MT. Comparative evaluation of egg morphometry and quality in Aseel hens under different rearing systems. J Appl. Poult. Res. 2017;26(3):401-409.
4. Bain MM. Recent advances in the assessment of egg shell quality and their future application. Worlds Poult Sci J. 2005; 61(2):268-277.
5. Sekeroglu A, Altuntas E. Effects of egg weight on egg quality characteristics. J Sci. Food Agric. 2009;89(3):379-383.
6. Wybenga DR, Pileggi VJ, Dirstine PH, Giorgio JD. Direct manual determination of serum total cholesterol with a single stable reagent. Clin Chem. 1970;16(12):98-4.
7. Pandey NK, Mahapatra CM, Verma SS. Physico-chemical evaluation of egg quality and prediction of shell quality traits in Rhode Island Red chickens. Indian J Anim. Sci. 1987;57:609-613.
8. Singh M, Singh U, Gurung BS. Evaluation of egg weight and its various measurement attributes in indigenous Aseel breed of chicken. Indian J Poult. Sci. 2000b;35:312-314.
9. Padhi MK, Rai RB, Senani S, Saha SK. Assessment of egg quality in different breeds of chicken. Indian J Poult. Sci. 1998;33:113-115.
10. Malik S, Singh NP. Performance of CARI Nirbheek in agro climatic conditions of Tripura. Indian J Anim. Sci. 2010;80:1213-16.
11. Jayasree KS. Comparative performance of New Hampshire and Naked neck in cages. M.V.Sc. thesis, Kerala Agricultural University, Thrissur; c2000. p. 80.
12. Sasikumar P. Performance of Crosssbred Colourline and Austra-White Chicken for Layer Traits. M.V.Sc. thesis, Kerala Agricultural University, Thrissur; c2003. p. 74.
13. Mohan J, Sastry KVH, Moudgal RP, Tyagi JS. Production and other characteristics of Aseel peela desi hens under normal rearing system. Indian J Poult. Sci. 2008;43(2):217-219.
14. Akhtar N, Mahmood S, Hassan M, Yasmeen F. Comparative study of production potential and egg characteristics of Lyallpur Silver Black, Fayoumi and Rhode Island Red breeds of poultry. Pakistan Vet. J. 2007;27:184-188.
15. Gupta CS, Kumar A, Arya R, Patel M, Ghosh, AK, Palod J. Evaluation of egg quality of crossbred chickens reared under backyard farming in tarai areas of Uttaranchal. Indian J. Anim. Research. 2007;41:216-219.
16. Jayanthy MV. Performance of Desi × exotic cross-bred layers. M.V.Sc. thesis, Kerala Agricultural University, Thrissur; c1992. p. 83.
17. Jomy J. Performance of crosses of Indigenous Naked Neck with White leghorn and New Hampshire. M.V.Sc. thesis, Kerala Agricultural University, Thrissur; c2000. p. 107.
18. Bekele F, Adnoy T, Gjoen HM, Kathle, J, Abebe, G. Production performance of dual purpose crosses of two indigenous with two exotic chicken breeds in sub-tropical environment. Intl. J Poult. Sci. 2010;9(7):702-710.
19. Rajkumar U, Sharma RP, Bhattacharya TK, Niranjan M, Rajaravindra KS, *et al*. Inheritance of egg quality traits in broiler based Naked neck and dwarf chicken. Indian J Poult. Sci. 2010; 45(1):1-5.
20. Kundu A, Singh RP. Egg-yolk cholesterol in various avian species of commercial importance. Indian J Poult. Sci. 1991;26:152-155.