

Comparative evaluation of egg quality traits of chicken housed in hilly regions of Wayanad, Kerala

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Abstract

The information on egg quality traits of different varieties of chicken housed in high altitude area like wayanad hilly regions are very scanty, although lot of work has been carried out on egg quality traits. The present study aims to study egg quality traits of New Hampshire, Giriraja, Gramasree, Kadaknath, and Athulya varieties of chicken in hilly regions of wayanad, Kerala. Twelve eggs from each variety at 44th week of age were collected for the study. The mean egg weight of New Hampshire, Giriraja, Australorp, Kadaknath, Gramasree, and Athulya was 59.38, 68.13, 56.25, 41.88, 53.75 and 59.38 g respectively. The study reveals that shape index was ranges from 53.12 to 75.39 per cent and there was significant ($p < 0.05$) difference between different varieties of chicken. The surface area (cm²) of Giriraja (96.69); kadakanath (46.99) were differ significantly. The albumen height, yolk length, width, height (mm) yolk index results were significantly ($p < 0.05$) differ between varieties of chicken.

Keywords: Egg quality traits, New Hampshire, Giriraja, Gramasree, Kadaknath, Athulya

Introduction

In Kerala improved varieties of chicken are rearing either for backyard or commercial purpose. The performance and egg qualities of these improved varieties

are varied from place to place. Gramasree (GS), ILM 90 (Athulya), Giriraja (GR) are improved varieties of chicken popularized for backyard and commercial purpose. Kadaknath (KN) the native chicken of Madhya Pradesh is being popularized in Kerala for its black flesh and claimed as having medicinal value compare to other improved varieties and heavy demand for ayurvedic preparation. The Newhampshire (NH) dual purpose breed was selected for improving native (desi) chicken.

The parent stocks of improved varieties, kadaknath, australorp and newhampshire performances are varied from place to place. The study on external and internal egg quality traits may indicate whether parent stock of these varieties could be reared in hilly regions of wayanad, Kerala. The study place located at altitude of 700 to 2100 meters from the sea level, lies between north latitude 11degree 26'28'' and 11degree 48'22'' and east longitude 75 degree 46'38'' and 76 degree 26'11'' with the average annual rain fall of 3000 to 4000 mm with high velocity of winds. Several reports are available on the growth and production performance of these improved varieties, kadaknath and newhampshire native breeds (Haunshiet *al.* 2011 and 2013). However,

little information is available in the literature about the external and internal quality traits.

Materials and Methods

Twenty four eggs from each variety at 44th– 48th week of age were collected for the study. The egg weight were recorded to the nearest of 0.01g by taking average weight of twelve eggs. The length and width of egg, yolk was measured for in mm with the help of a vernier caliper. Shape index was calculated as the ratio of breadth to length times 100. Surface area (S) was calculated with a formula of $S=4\pi r^2$. Radius (r) was calculated as $\frac{1}{4}$ (length + breadth) of the egg. The height of the albumen and yolk were measured at the top by spherometer. The height of the albumen was measured

at 3 or 4 locations and averaged. Yolk was gently separated from the albumin, adherent albumin was removed by rolling the yolks over a filter paper and the yolk weight was recorded. Yolk indices were estimated in percentage. Yolk ratios were calculated taking their individual weights as the percentage of total egg weight. Yolk diameter was estimated as the average of yolk length and breadth. Means of various traits between these varieties and breeds were statistically compared using GLM, multivariate of SPSS 21.0 statistical software.

Results and Discussion

A summary of external and internal egg quality traits are compared and presented in Table-1.

Table 1: External and Internal Egg quality traits of different varieties of Chicken

| Traits | New Hampshire | Giri Raja | Australorp | Kadakhnath | Gramasree | Athulya |
|---------------------------------|---------------|--------------|---------------|-------------|---------------|--------------|
| Egg weight (g) | 59.96±4.19c | 68.48±3.69d | 57.80±2.28bc | 42.40±3.7a | 54.30±5.08b | 59.95±4.86c |
| Egg Length (cm) | 5.47±0.86ab | 6.38±0.37c | 6.02±0.31c | 5.03±0.33a | 5.90±0.37bc | 5.89±0.20bc |
| Egg Width (cm) | 4.06±0.48b | 4.71±0.22c | 3.90±0.42b | 2.68±0.038a | 3.73±0.39b | 3.90±0.52b |
| Shape Index (%) | 75.39±11.89c | 74.18±6.05c | 64.67±5.36b | 53.12±6.9a | 59.59±8.06b | 66.29±8.85b |
| Surface area (cm ²) | 72.41±17.76b | 96.69±6.66c | 77.70±10.26b | 46.99±7.4a | 73.10±9.85b | 75.49±9.01b |
| Yolk Weight (g) | 15.52±2.52ab | 18.52±2.21cd | 19.89±1.54d | 15.07±0.33a | 17.08±2.08bc | 19.19±1.61d |
| Yolk Ratio (%) | 26.00±4.85a | 27.17±4.00a | 34.49±3.17b | 35.80±3.50b | 31.63±4.40b | 32.15±3.42b |
| Yolk Height (mm) | 19.27±3.76bc | 20.59±0.91c | 19.50±1.01bc | 17.57±1.60a | 19.48±0.49bc | 19.77±0.51c |
| Yolk Weight (g) | 42.65±0.88d | 42.48±0.42cd | 41.94±0.39ab | 41.33±0.42a | 42.03±0.27bc | 41.88±0.34ab |
| Yolk Length (mm) | 44.88±1.12c | 44.71±0.74bc | 44.13±0.77abc | 43.63±0.43a | 44.35±0.84abc | 44.00±0.49ab |
| Yolk Index (percent) | 43.99±8.54ab | 47.22±2.07b | 45.32±2.26ab | 41.37±4.00a | 45.11±1.22ab | 46.04±1.42b |
| Albumen Height (mm) | 8.24±1.42ab | 9.57±0.74b | 8.40±1.66ab | 6.89±1.43a | 8.66±1.14ab | 8.49±3.20ab |

Egg weight

In general KN lays smallest eggs compared to other varieties and values were comparable to Parmaret *al* (2006). The Gramapriya (Niranjan *et al.*, 2008) variety lays average egg weight of 51.0 g which comparable to Gramasree variety reported in this study. The egg weight values reported in the present study heavier than even imported breeds and the results were significantly differ ($P < 0.05$). Baishya *et al.*, (2008) reported lesser egg weight of 52.72 g in Giriraja variety compared to this study.

Shape Index

Shape index is the ratio of the width to length of the egg. The average mean shape index value of KN was observed to be 74.35 ranging from 73.56 to 75.66 (Parmaret *al.*, 2006) where as in this study low index value of 53.12 is reported.

Internal Quality Traits

The values of internal quality parameters like yolk weight, yolk index studied in this study for KN breeds are comparable to other researchers (Biswas *et al.*, 2010; Haunshi *et al.*, 2013).

The Albumen height reported in this study ranges from 8.24 ± 1.42 to maximum of 9.57 ± 0.74 mm observed in the experiment is within the range value for superior quality as mentioned by Zeidler (2002). The higher albumen height may be due to the freshness of eggs and young age of hens. However, the reported value for KN in this study was 6.89 ± 1.43 mm. Baishya *et al.*, (2008) reported yolk weight (20.62 ± 0.44 g) and yolk index

(0.38 ± 0.006) for Giriraja variety which were comparatively lesser than this study.

Conclusion

The improved varieties external and internal egg quality traits studies were varieties were very scanty. The results of this indicate the egg quality characteristics are comparable to other indices. Hence, it was recommended to rear parent stocks in hill regions climate.

References

- Biswas A., J. Mohan and K. V. H. Sastry. 2010. Effect of Vitamin E on Production Performance and Egg Quality Traits in Indian Native Kadaknath Hen. *Asian-Aust. J. Anim. Sci.* **23**,(3): 396 – 400.
- Baishya, D., Dutta K.K., Mahanta J.D. and Borpujari R.N. 2008. Studies on certain qualities of different sources of chicken eggs. *Tamil Nadu J. Veterinary & Animal Sciences* **4** (4):139-141.
- Haunshi S, M. Niranjan, M. Shanmugam, M. K. Padhi, M. R. Reddy, R. Sunitha, U. Rajkumar and A. K. Panda. 2011. Characterization of two Indian native chicken breeds for production, egg and semen quality, and welfare traits. *Poultry Science*. **90** :314–320.
- Haunshi Santosh, M.K Padhi, M Niranjan, U Rajkumar, M Shanmugam and R N Chatterjee. 2013. Comparative evaluation of native breeds of chicken for persistency of egg

- production, egg quality and biochemical traits. *Indian Journal of Animal Sciences* 83(1): 59–62.
- Niranjan M., R.P. Sharma, U. Rajkumar, B.L.N. Reddy, R.N.Chatterjee and T.K. Battacharya. 2008. Comparative evaluation of Production Performance in Improved Chicken Varieties for Backyard farming. *International Journal of Poultry Science*.7 (11):1128 -1131.
- Parmar S N S , Thakur M S, Tomar S S and Pillai P V A 2006: Evaluation of egg quality traits in indigenous Kadaknath breed of poultry. *Livestock Research for Rural Development*.18:(9)
- Zeidler, G.2002. Shell egg quality and preservation. In: Bell, D.D. and Weaver, W.D, Jr., editors. *Commercial Chicken Meat and Egg Production*. 5thRevision. Kluwer Academic Publishers, Norwell, MA. p. 1199-1217.