EVALUATING THE GEOMETRICAL AND EGG QUALITY CHARACTERS FOR TWO DEVELOPED LAYING STRAINS


Corresponding author: Hanan Hassan Ghanem Email: hananhasen2003@yahoo.com

ABSTRACT: This study aimed to evaluate the egg quality traits of Golden Sabahia (GS) and Silver Sabahia (SS) as new developed Egyptian chicken strains at 36, 46, and 56 wks of age. Four hundred–eighty eggs were randomly collected from GS and SS chickens to determine external and internal egg quality traits and to calculate the geometrical egg parameters. Results showed that the (GS) strain had significantly greater egg weight, diameter egg (DG), and egg surface area (S) compared to those of SS strain. The yolk (weight and index %), albumen (weight, height, and Haugh unit), and eggshell weight values of GS eggs were significantly higher than those of the SS strain. As expected, internal and external qualities were increased by advances age. In conclusion, the geometrical parameters of egg quality for GS and SS strains may be taken into account for improving the hatchability of the expected commercial breed. Also, it is expected from the mentioned results of egg quality that Silver Sabahia could be valid become maternal line and Golden Sabahia as paternal line for producing commercial egg-type breed.

Key world: Golden Sabahia, Silver Sabahia, egg quality, egg geometrical
INTRODUCTION
The poultry industry is one of the important agricultural commodities, and the source of high-quality animal protein in developing countries (Aggery et al., 2023). Also, egg is a component of healthy diets for adults and as a major source of essential nutrients, and protein for children (Abeyrathne et al., 2013; El Sabry et al., 2022). The implications of climate changes, epidemics, and the delay in the food chains have attracted the attention of scientists to consider the local chicken breeds, which are more adapted to harsh conditions (El Sabry et al., 2021a and b) such as Fayoumi. However, the egg weight and production % of the local chicken breeds/strains are still below average compared to modern table egg strains. From another perspective, these local breeds are important as genetic sources for conservation and breeding programs (Al-Atiyat et al., 2023). Therefore, efforts have been made to improve the performance of local laying strains. In parallel, the quality of eggs such as egg weight, albumen height, and yolk (weight, index %, color) should be considered in the breeding programs to meet consumer’s needs (Kella and Tumovi, 2016).

Egg characteristics are affected by several factors such as genetic background, age of hens, strain, housing system, and nutrition (Ahmadi and Rahmi, 2011, El Sabry et al., 2013, Yang et al., 2014; Sharma et al., 2022). Genotype is one of the most influential factors in birds’ characteristics, affecting mainly egg weight and eggshell characteristics (El Sabry et al., 2017). For example, Ahmed et al. (2017) found that shape index significantly differs between the lines. Also, internal egg qualities such as yolk and albumen quality characteristics are affected by chicken strain (Tamova et al., 1993). Past investigations stated that the age of the hen has a direct effect on egg quality characteristics and egg weight (Ulmer et al., 2010). Moreover, age of the hens affects eggshell quality, albumen and yolk characteristics (Zita et al., 2009). In this context, egg geometrical parameters are critical for the mathematical model for egg processing, manipulation, transport applications, and predictions in poultry production (Severa et al., 2013).

This study aimed to evaluate some egg quality traits for two new developed chicken strains named Golden Sabahia and Silver Sabahia and to determine the effect of these strains and their ages on the geometrical and egg quality characters under Egyptian conditions.

MATERIAL and METHODS
This study was conducted at El-Sabahia Poultry Research Station, Alexandria, Animal Production Research Institute, Agriculture Research Center.

Flock History
From 2004 to 2017, a recurrent selection program was applied to establish two new egg-type chicken strains named Golden Sabahia (GS) (Ghanem et al., 2017) and Silver Sabahia (SS) )Ali et al., 2017 which used as a grandparent lines for producing a commercial egg-type breed competing the international commercial egg-type breeds.

For establishing GS strain, crossing between 87% blood of Lohman Brown (LB) and 12.5% from four developed strains (Mandarh, Baheije, Silver Montazah and Golden Montazh), also, for developing SS, was contributed from 78.5% blood of Lohman Brown (LB) and 12.5% from four developed strains (Matrouh, Baheije, Silver Montazah and Golden Montazh). The productive and phenotypic characteristics of the two studied strains are shown in Table (1) and Fig (1).

Management and experimental design
The chickens were brooded on the floor and grown in the opening house up to 16 weeks of age. Then, the hens were transferred to laying cages. The temperature during the experiment period ranged from 20 to 25 °C. Natural photoperiod was used in the growing period and increased to 16 hours in the laying period. Feeding system, starter diet was crude protein 23% and ME 2916 kcal/ kg diet from 0 to 2 weeks of age, crude protein 20% and ME 2966 kcal/ kg diet from 3 to 8 weeks of age, grower diet 15% crude protein and ME 2715 kcal/ kg diet from 9 to 17 weeks of age, 17% crude
protein and ME 2711 kcal/kg diet from 18 to 20 weeks of age and layer diet 18% crude protein and ME 2850 kcal/kg diet from 21 to 60 weeks of age.

**Egg quality traits**

Four hundred and eighty eggs were randomly collected from GS and SS chickens at 36, 46, and 56 wks of age. Random samples from eggs within four hours after laying were used to evaluate some external and internal egg quality characteristics. The eggs were numbered and weighed using a sensitive scale to the nearest 0.01 g. The dimensions of the eggs (width and length) were measured using a digital caliper. Then, eggs were broken out on a flat glass to measure the yolk height, diameter and albumen height by a standard tripod micrometer. Dry eggshell, yolk, and albumin weights were recorded, and their relative weights were calculated: item weight (g)/ egg weight (g) *100. Also, the yolk index was calculated as yolk height /yolk diameter*100. The yolk color was determined using the La Roche yolk color fan. Haugh units were calculated according to Stadelman et al. (1988). The eggshell thickness (mm) was measured at three different points of the egg by a digital micrometer.

**Geometrical parameters:**

Based on the measurements of egg length (L) and width (w), five geometrical parameters; the egg shape index (SI), the geometrical mean diameter of eggs (Dg) and the surface area of egg (S), were calculated formulas as follow:

\[
SI= \frac{W}{L}\times 100 \quad \text{Sarica and Erensayin, 2004.}
\]

\[
Dg = \frac{\pi}{2}\sqrt{LW} \quad \text{Mohsenin, 1970.}
\]

\[
S = \pi Dg^2 \quad \text{Baryeh and Mangope, 2003.}
\]

\[
\text{Sphericity of eggs (} \phi \text{)} = \frac{Dg}{L}\times 100; \quad \text{and}
\]

\[
\text{Volume of eggs (V)} = \frac{\pi}{6}LW^2 \quad \text{( Kumbar et al., 2016).}
\]

**Statistical analysis**

Data were analyzed by a two-way ANOVA using general linear model (SAS 2004). The main effects were chicken ecotype (GS vs. SS) and age (36, 46 vs 56 wk). The interaction between the two main factors (ecotype x age) was tested. A p-value ≤ 0.05 was used to declare statistical significance.

\[Y_{ij} = \mu + S_i + A_j + e_{ijk} \]

Where: \( Y_{ij} \): an observation, \( \mu \): overall, \( S_i \): effect of strain, \( A_j \): effect of age, \( e_{ijk} \): the residual effect. Duncan Multiple Range test was used to test the significant differences (Duncan 1955).

**RESULTS AND DISCUSSION**

Egg weight is the main phenotypic parameter that affects egg quality. Results presented in Table (2) show that the egg weight of the GS (53.74 g) was significantly (P ≤ 0.01) heavier than that of SS (51.69 g). A similar notice was reported by Sharma et al. (2022), who found that laying hen strain affects performance, egg quality indices, and eggshell microbial load. Also, Vits et al. (2005) and Ghanem and Afifi (2013) assumed that genotype influences egg weight. Concerning egg weight measured during different ages, results show that egg weight was significantly (p≤0.01) increased by age (50.85, 53.67, and 56.69 g) for GS strain (47.83, 51.48, and 54.76 g) for SS one at different ages (36, 46 and 56 wks ), respectively. The heaviest egg weight (p≤0.01) was recorded at 56 wk of age for GS followed by those for SS strain.

These results are in line with findings reported by Zita et al.(2009) who showed that egg weight was significantly increased by age from 30 to 60 wks of age. Also, Sirri et al. (2018) and Sharma et al. (2022) found the same results of the significant effect of ages and genotype on the mentioned parameters.

Results in Table 2 showed that the albumen weight, and shell weight values were significantly (p≤0.01) higher in GS eggs (30.73, and 5.2 g) compared with those of SS one (29.02, 4.77 g), respectively. While, there were no significant differences with respect to yolk weight. The averages of egg weight components for GS and SS strains were higher than those reported by Ali et al. (2010) due to crossing between two local Egyptian strains. However, these parameters were significantly increased (P≤ 0.01) among the different ages. The increase of yolk, albumen and shell weight with age advance were previously supports by Rajkumar et al., 2009 , padhi et al., 2013 and Kowalsko et al., 2021.
The percentage of yolk differs significantly (p≤0.05) between the two studied strains as shown in Table (3), where SS eggs had a higher value of yolk% than that of GS. Also, the yolk percentage at the studied third age (56wk) had the highest significant (p≤0.01) value compared to the other experimental ages. These results are not agreement with those reported by Afifi et al. (2007) who found that age and strain had no effect on yolk %. Concerning albumen weight percentage, there was no significant difference between the two studied strains, moreover, albumen weight % had the lowest significant (P≤0.01) value at the third age (56 wk) compared with those for first and the second ones. These results are keeping with those reporte by Silversides and Scott (2001) and Tumova and Gous (2012) who found that albumen% decreased as age advances. As for the egg shell%, results show significant differences (p≤0.01) between both strains and among ages where GS eggs had higher eggshell % than that of SS one. Egg shell weight % significantly decreased at 56 wk of age when compared to 36 and 46 wks of age for the two studied strains, and there results are in harmony with that of Zita et al. (2009) who reported that egg shell % decreased with age of hen from 26 to 54 wk for ISA, Hisex Brown and Moravia chickens, while, Padhi et al. (2013) showed that chickens age had no significant influence on eggshell%. The interaction analysis in this table reveals that lowest yolk % was found at 46 wk of age for GS, while, the highest values of albumen and shell weights percentages were detected for GS at 46 wk of age when compared with SS among the studied ages. Resulted in Table 2and3 indicated that the egg weight and egg weight component and percentages had been increased by age and affected by chicken strain.

Egg shell of GS strain was significantly thicker (0.32mm) than that of SS (0.31mm) (Table3). These results are in agreement with the results reported by Zita et al. (2009) who found that the shell for ISA Brown eggs was significantly (p≤ 0.01) thicker than those for both of Moravia hens and Hisex Brown hens. Also, eggshell thickness of Rhode Island Red breed was greater than that of Hy-line brown (0.339 vs 0.351), respectively (Sokotowicz et al., 2018). By age of hen, eggshell thickness were significantly (p≤0.01) reduced as the studied ages 36,46 and 56 wks, represented 0.322, 0.312 and 0.308mm , respectively. These results parallel earlier studies by Afifi et al., 2007 and Fathi et al., 2010 for local developed strain but with higher results of thickness. While, conflicted reports were previously reported by different authors as Padhi et al. (2013) and Van Den Brand et al. (2004).

In Table (4), the results showed significant (p≤0.01) differences in albumen height and Haugh unit as results of interaction between strains and flock ages. Golden Sabahia recorded higher values for albumen height and Haugh unit (1.64, 93.46) than those of SS (1.60, 90.80), respectively. However, Zita et al. (2009) and Sokotowicz et al. (2018) reported that albumen height and HU values were significantly affected by genotype. While these traits significantly decreased with increasing the age of the two studied strains. These results agree with the findings of Alo et al. (2023) who showed that the albumen height and HU had higher values at 32 weeks of age than those at 60 weeks of age for Funaab-alpha broiler breeder hens. Table 4 represented poorest significant values of albumen height and HU for SS eggs at 56 wk of age compared with the other values of interactions. These results are in agreement with those reported by Tumova and Gous (2012) and Padhi et al.(2013) who observed that the Haugh unit score was decreased toward the later part of the laying cycle. On the contrary, Rizzi and Chiericato (2005) found that the values of Haugh unit were increased with the age of hens and significantly affected by the strains.

No significant difference was found between the two strains concerning the yolk color values (Table 4), while, it was significantly (p≤0.05) increased by advancing age. High color intensity was observed at the third experimental age (56 wk), Hammershoij et al., 2021 observed that the yolk color was influenced by genotype and age. Contradicted results were...
Golden Sabahia, Silver Sabahia, egg quality, egg geometrical

reported by Niranjan et al. (2008) and Rajkumar et al. (2009) reported that yolk color not affected by age or strains. Also, Yeon-Hwakim et al. (2015) reported that the color of egg yolk depending on the diet of the chicken that laid the egg.

The yolk index can be used successfully to monitor egg quality in dependent of hen age, as shown in Table 4. Yolk index did not represent any significant change with respect to chicken strain and flock age. The same result was reported by Ghanem and Afifi (2013) who found no significant differences between strains at 40 wks of age. The interaction analysis reveals that the highest numerical values of yolk index were observed for both strains at 56 wk of age. These results support the previous report by Padhi et al. (2013) who found no significant different between 40 and 70 wks of age.

Egg geometrical characters for GS and SS at 36, 46 and 56 wk. of ages are shown in Table (5). Data of this table recorded that chickens strain had a significant influence on geometric mean diameter of eggs (DG), surface area (S) and volume (V), (3.91cm, 48.13cm² and 49.73cm³) for GS and ( 3.85, 46.49 and 46.87) for SS, respectively. While, chickens age had significantly influence on all studied parameters except of degree of sphericity ((ɸ)). All the significant increase of these parameters with age advance was notice in the third studied age (56wk) for SS strains compared with the other values of interaction. Discrepancies were found in the literature concerning egg shape index with reported with Tumova and Gous (2012) and Padhi et al., 2013 who found that no significant differences between age, while, Zita et al., 2009 observed a significant differences between age and genotypes.

The significant increase of egg weight for GS compared to SS as represented in the current results could be explained on the light of improvement in the geometrical parameters for these chicken strains. These results and conclusion had been previously mentioned by Wang et al., 2021 who found that the same studied parameters would be very helpful for the evaluation of egg shape and size, also, the eggs have large contours of diameter, surface area and volume have a highly egg weight.

CONCLUSION

It could be concluded from the current results that chickens strain on flock age had a marked influence on the quality and the geometrical parameters of eggs. These parameters may be taken into consideration to improve the hatchability of the expected commercial breed. Also, it is expected from the mentioned results of egg quality that Silver Sabahia could be valid become maternal line and Golden Sabahia as paternal line for producing commercial egg-type breed.

Table (1): Productive parameters of Golden Sabahia (GS) and Silver Sabahia (SS) strains

<table>
<thead>
<tr>
<th>Trait</th>
<th>GS</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hen’s BW at sexual maturity(g)</td>
<td>1800</td>
<td>1650</td>
</tr>
<tr>
<td>Egg number / 52 weeks</td>
<td>219</td>
<td>220</td>
</tr>
<tr>
<td>Egg weight (g)</td>
<td>58</td>
<td>57</td>
</tr>
<tr>
<td>Eggshell color</td>
<td>Brown</td>
<td>Tint</td>
</tr>
<tr>
<td>Fertility (%)</td>
<td>88</td>
<td>87</td>
</tr>
<tr>
<td>Hatchability of fertile eggs (%)</td>
<td>84</td>
<td>88</td>
</tr>
</tbody>
</table>
Table (2): Weights of egg, yolk, albumen and shell egg of Golden Sabahia (GS) and Silver Sabahia (SS) strain at 36, 46 and 56 weeks of age

<table>
<thead>
<tr>
<th>Traits Items</th>
<th>Egg weight (g)</th>
<th>Yolk weight (g)</th>
<th>Albumen weight (g)</th>
<th>Shell weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Sabahia</td>
<td>53.74±0.4&lt;sup&gt;A&lt;/sup&gt;</td>
<td>16.27±0.1</td>
<td>30.73±0.3&lt;sup&gt;A&lt;/sup&gt;</td>
<td>5.20±0.4&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Silver Sabahia</td>
<td>51.69±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>16.30±0.2</td>
<td>29.02±0.2&lt;sup&gt;B&lt;/sup&gt;</td>
<td>4.77±0.4&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 wk</td>
<td>49.34±0.3&lt;sup&gt;C&lt;/sup&gt;</td>
<td>14.84±0.1&lt;sup&gt;C&lt;/sup&gt;</td>
<td>28.32±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>4.78±0.4&lt;sup&gt;C&lt;/sup&gt;</td>
</tr>
<tr>
<td>46 wk</td>
<td>52.58±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>16.00±0.1&lt;sup&gt;B&lt;/sup&gt;</td>
<td>30.35±0.3&lt;sup&gt;A&lt;/sup&gt;</td>
<td>5.07±0.06&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>56 wk</td>
<td>55.73±0.6&lt;sup&gt;A&lt;/sup&gt;</td>
<td>18.00±0.2&lt;sup&gt;A&lt;/sup&gt;</td>
<td>30.94±0.6&lt;sup&gt;A&lt;/sup&gt;</td>
<td>5.25±0.06&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means ±SE followed by uppercase superscripts, within the same trait, in the columns significantly differ. *: P-Value at (p≤0.05), **: P-Value (p≤0.01), NS: non significant.

Table (3): Yolk, albumen and shell egg relative weights and shell thickness of Golden Sabahia (GS) and Silver Sabahia (SS) strains at 36, 46 and 56 weeks of age

<table>
<thead>
<tr>
<th>Traits Items</th>
<th>Yolk weight (%)</th>
<th>Albumen weight (%)</th>
<th>Shell weight (%)</th>
<th>Shell thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Sabahia</td>
<td>30.44±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>56.91±0.4</td>
<td>9.8±0.1&lt;sup&gt;A&lt;/sup&gt;</td>
<td>0.32±0.002&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>Silver Sabahia</td>
<td>31.73±0.2&lt;sup&gt;A&lt;/sup&gt;</td>
<td>56.45±0.2</td>
<td>9.4±0.1&lt;sup&gt;B&lt;/sup&gt;</td>
<td>0.31±0.002&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 wk</td>
<td>30.28±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>57.17±0.4&lt;sup&gt;A&lt;/sup&gt;</td>
<td>9.7±0.1&lt;sup&gt;A&lt;/sup&gt;</td>
<td>0.32±0.002&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>46 wk</td>
<td>30.51±0.3&lt;sup&gt;B&lt;/sup&gt;</td>
<td>57.64±0.3&lt;sup&gt;A&lt;/sup&gt;</td>
<td>9.7±0.1&lt;sup&gt;A&lt;/sup&gt;</td>
<td>0.31±0.002&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>56 wk</td>
<td>32.46±0.4&lt;sup&gt;A&lt;/sup&gt;</td>
<td>55.23±0.5&lt;sup&gt;B&lt;/sup&gt;</td>
<td>9.5±0.1&lt;sup&gt;B&lt;/sup&gt;</td>
<td>0.30±0.004&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means ±SE followed by uppercase superscripts, within the same trait in the column, significantly differ. *: P-Value at (p≤0.05), **: P-Value (p≤0.01), NS: non significant.
Golden Sabahia, Silver Sabahia, egg quality, egg geometrical

Table (4): Albumen height, Haugh unit, yolk color and yolk index of Golden Sabahia (GS) and Silver Sabahia(SS) at 36, 46 and 56 weeks of age

<table>
<thead>
<tr>
<th>Traits Items</th>
<th>Albumen height</th>
<th>Haugh unit</th>
<th>Yolk color</th>
<th>Yolk index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Sabahia</td>
<td>1.64±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
<td>93.46±0.7&lt;sup&gt;A&lt;/sup&gt;</td>
<td>7.04±0.1</td>
<td>44.3±0.32</td>
</tr>
<tr>
<td>Silver Sabahia</td>
<td>1.60±0.01&lt;sup&gt;B&lt;/sup&gt;</td>
<td>90.80±0.7&lt;sup&gt;B&lt;/sup&gt;</td>
<td>7.07±0.1</td>
<td>43.9±0.33</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 wk</td>
<td>1.65±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
<td>96.68±0.6&lt;sup&gt;A&lt;/sup&gt;</td>
<td>6.93±0.1</td>
<td>43.8±0.27</td>
</tr>
<tr>
<td>46 wk</td>
<td>1.62±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
<td>91.56±0.8&lt;sup&gt;B&lt;/sup&gt;</td>
<td>7.05±0.1&lt;sup&gt;AB&lt;/sup&gt;</td>
<td>44.3±0.44</td>
</tr>
<tr>
<td>56 wk</td>
<td>1.570±0.02&lt;sup&gt;B&lt;/sup&gt;</td>
<td>83.44±1&lt;sup&gt;C&lt;/sup&gt;</td>
<td>7.35±0.1&lt;sup&gt;A&lt;/sup&gt;</td>
<td>44.5±0.58</td>
</tr>
<tr>
<td>Strain * Age</td>
<td>GS 36 wk</td>
<td>1.66±0.01&lt;sup&gt;a&lt;/sup&gt;</td>
<td>98.03±0.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.79±0.2</td>
</tr>
<tr>
<td></td>
<td>46 wk</td>
<td>1.63±0.01&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>92.4±1&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>7.13±0.1</td>
</tr>
<tr>
<td></td>
<td>56 wk</td>
<td>1.63±0.02&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>85.75±1&lt;sup&gt;d&lt;/sup&gt;</td>
<td>7.40±0.1</td>
</tr>
<tr>
<td>SS 36 wk</td>
<td>1.63±0.01&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>95.33±0.8&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>7.06±0.2</td>
<td>43.6±0.35</td>
</tr>
<tr>
<td></td>
<td>46 wk</td>
<td>1.59±0.02&lt;sup&gt;b&lt;/sup&gt;</td>
<td>90.72±1&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.96±0.1</td>
</tr>
<tr>
<td></td>
<td>56 wk</td>
<td>1.51±0.02&lt;sup&gt;c&lt;/sup&gt;</td>
<td>81.02±1.4&lt;sup&gt;e&lt;/sup&gt;</td>
<td>7.31±0.7</td>
</tr>
</tbody>
</table>

Means ±SE followed by uppercase superscripts, within the same trait in the column, significantly differ. *P-Value at (p≤0.05), **: P-Value(p≤0.01), NS: non significant

Table (5): Egg geometrical parameters of Golden Sabahia (GS) and Silver Sabahia(SS) at 36, 46 and 56 weeks of age

<table>
<thead>
<tr>
<th>Traits Items</th>
<th>Shape index(%)</th>
<th>Diameter of egg (cm)</th>
<th>Egg surface area (Cm²)</th>
<th>Sphericity Degree (%)</th>
<th>Volume cm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS 36 wk</td>
<td>77.04±0.3</td>
<td>3.91±0.01&lt;sup&gt;A&lt;/sup&gt;</td>
<td>48.13±0.31&lt;sup&gt;A&lt;/sup&gt;</td>
<td>72.2±0.17</td>
<td>49.73±0.5</td>
</tr>
<tr>
<td></td>
<td>76.39±0.26</td>
<td>3.85±0.01&lt;sup&gt;B&lt;/sup&gt;</td>
<td>46.49±0.24&lt;sup&gt;B&lt;/sup&gt;</td>
<td>71.93±0.16</td>
<td>46.87±0.41</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 wk</td>
<td>76.7±0.28&lt;sup&gt;B&lt;/sup&gt;</td>
<td>3.82±0.01&lt;sup&gt;c&lt;/sup&gt;</td>
<td>45.8±0.19&lt;sup&gt;c&lt;/sup&gt;</td>
<td>72.17±0.17</td>
<td>45.60±0.33&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>56 wk</td>
<td>76.11±0.31&lt;sup&gt;B&lt;/sup&gt;</td>
<td>3.87±0.01&lt;sup&gt;B&lt;/sup&gt;</td>
<td>47.03±0.24&lt;sup&gt;B&lt;/sup&gt;</td>
<td>71.71±0.19</td>
<td>47.73±0.42&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>GS 36 wk</td>
<td>77.78±0.49&lt;sup&gt;A&lt;/sup&gt;</td>
<td>4.02±0.02&lt;sup&gt;A&lt;/sup&gt;</td>
<td>50.85±0.59&lt;sup&gt;A&lt;/sup&gt;</td>
<td>72.45±0.27</td>
<td>54.63±1.01&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td>46 wk</td>
<td>77.34±0.8&lt;sup&gt;B&lt;/sup&gt;</td>
<td>4.01±0.05&lt;sup&gt;A&lt;/sup&gt;</td>
<td>50.74±1.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>72.19±0.42</td>
<td>54.7±1.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>56 wk</td>
<td>78.22±0.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.03±0.02&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50.96±0.45&lt;sup&gt;a&lt;/sup&gt;</td>
<td>72.70±0.35</td>
<td>54.56±0.8&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>SS 36 wk</td>
<td>76.52±0.36&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.77±0.01&lt;sup&gt;a&lt;/sup&gt;</td>
<td>44.55±0.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>72.19±0.33</td>
<td>43.56±0.32&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>46 wk</td>
<td>75.14±0.43&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.83±0.13&lt;sup&gt;c&lt;/sup&gt;</td>
<td>46.14±0.33&lt;sup&gt;c&lt;/sup&gt;</td>
<td>71.17±0.27</td>
<td>46.23±0.54&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>56 wk</td>
<td>78.22±0.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.03±0.02&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50.96±0.45&lt;sup&gt;a&lt;/sup&gt;</td>
<td>72.70±0.35</td>
<td>54.56±0.8&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Means ±SE followed by uppercase superscripts, within the same trait in the column, significantly differ. P-Value at (p≤0.05), **: P-Value(p≤0.01), NS: non significant
REFERENCES


Yousria K. Afiffi .et al.


Yang, H.M.; Yang, Z.; Wang, W.; Wang, Z.Y.; Sun, H.N.; Ju, X.J. and Qi, X.M. 2014. Effect of different housing systems on visceral organs, serum biochemical proportions, IZ Immune performance and
Golden Sabahia, Silver Sabahia, egg quality, egg geometrical

eyeg quality of laying hens. Europ.Poul.".
Sci. 78.10.1399/eps 2014:48


الملخص العربي

تقييم المقياس الهندسي وصفات جودة البيض لسالاتين مستنبتتين من الدجاج البياض

يسريه كالعفيف، ماجده مصطفى بلاط، امامي عادل الصحه، عفاف ابراهيم التركى، اسمه محمود على، نعمه مسعد، حنان حسن عام

الهدف من هذه الدراسة هو تقيم صفات جودة البيض لكلا من سالاتين الصبيحية الذهبى والصبيحية الفضي. سالاتين مصيرتين جديدتين. عند اعمار 32 و 46 أسبوع من العمر. تم اخذ 480 بضعة عثمانها من الصبيحية الذهبى والصبيحية الفضي لقياس صفات جودة البيض الداخلية والخارجية أيضا لحساب المقياسات الهندسية البيض.

وتحدد النتائج أن سلالة الصبيحية الذهبى كانت أحسن معيونيا لكلا من صفات وزن البيض، قطر البيضه الهندسي، مساحة البيضه مقاسة بسلاسة الصبيحية الفضي. كما ان قيم صفات الصفار (الوزن و % للدليل) وصفات البياض (وزن و ارتفاع ووحدات هي) و أيضا وزن قطرة البيض كانت أعلى معيونيا في سلالة الصبيحية الذهبى مقاسة بسلاسة الصبيحية الفضي. وجد أن صفات جودة البيض الداخلية والخارجية زادت مع التقدم بالعمر.

و نتىجنا سيق ان المقياسات الهندسية لجودة البيض يمكن استخدامها في تحسين صفات التغريز للفصول التجارية المتوقعة ناتجه و كذلك يمكن القول ان سلالة الصبيحية الفضى يمكن استخدامها في تكوين خط الآماهات ولسلالة الصبيحية الذهبى يمكن استخدامها في تكوين خط الآباء لانتاج قطيع بيض تجارى.

201