Short Communication

Effects of the oviposition time on egg quality in quails

Einfluss des Eiablagezeitpunkts auf die Eiqualität von Wachteln

C. Erensayin and Ö. Camci

Introduction

It was reported in quails that eggshell thickness, albumen index, yolk index and Haugh unit varied between 0.02–0.03 mm, 5.77–6.68%, 43.15–44.57%, and 82.75–85.53, respectively (VOGT 1968, ULUOCAK et al. 1995).

Different researchers found that morning eggs were heavier than later ones and egg weights decreased by the time. However, a sudden increase was observed in the late afternoon and also oviposition time had no significant effect on egg shape index (BRAKE 1985; LEE and CHOI 1985; OKAN and ULUOCAK 1992; TSEVENI GOSI 1987; ALTAN and OCUZ 1995; BAYLAN et al. 1997). ESEN and EKANEM (1990) reported that oviposition time had no significant effect on Haugh Unit value and yolk index for laying hens. Brown laying hens laid the heaviest eggs in the morning, afternoon eggs were lighter and late afternoon eggs were heavier again (ÖGUİK 1995). The objective of the present research was to investigate egg quality characteristics related to oviposition time in Japanese quails (Coturnix coturnix japonica).

Materials and Methods

Eggs from a production flock of 4 months of age were used. Birds were housed in group cages, exposed to 16 hours lightening and received a commercial layer diet (Table 1). During a five days period 60, 60, and 50 eggs were collected randomly at 8:30 am, 12:00 am and 15:00 pm, respectively. In total 170 eggs were examined for egg weight, shell thickness, albumen index, yolk index, Haugh Unit (HU) and Internal Quality Unit (IQU) values. Both methods were included in this survey for comparison. IQU values were calculated by an equation of KONDAIHA et al. (1983). The following equations were used for calculating these characteristics:

\[
\text{Albumen Index} = \frac{\text{Thick albumen height (mm)}}{\text{Mean of length and width (mm)}} \times 100
\]

\[
\text{Yolk Index} = \frac{\text{Yolk height (mm)}}{\text{Yolk width (mm)}} \times 100
\]

\[
\text{Egg Shape Index} = \frac{\text{Egg width (cm)}}{\text{Egg length (cm)}} \times 100
\]

Table 1. Calculated nutrients of commercial layer diet (%)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Layer diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>89.1</td>
</tr>
<tr>
<td>Crude protein</td>
<td>17.5</td>
</tr>
<tr>
<td>ME* (kcal/kg)</td>
<td>271.1</td>
</tr>
<tr>
<td>Ca</td>
<td>2.29</td>
</tr>
<tr>
<td>P</td>
<td>0.61</td>
</tr>
<tr>
<td>Methionine + Cyst.</td>
<td>0.76</td>
</tr>
<tr>
<td>Lysine</td>
<td>0.88</td>
</tr>
<tr>
<td>Crude fat</td>
<td>4.98</td>
</tr>
<tr>
<td>Crude fibre</td>
<td>4.19</td>
</tr>
</tbody>
</table>

* Calculated after SAUVANT et al. (1987) and VAN SEEST and WISE (1967)

HU = 100 log [H + 7.57 - 1.7W^{0.37}]

IQU = 100 log [H + 4.18 - 0.8999W^{0.6674}]

(H: Albumen height (mm), W: Egg weight (g))

An analysis of variance was applied to all obtained data. For this purpose the statistical program Minitab for Windows (version 12.2) was used.

Results

Egg quality characteristics determined at the end of the research are shown in Table 2. There was no significant difference between groups, but eggs collected at 8:30 am (12.59 g) were heaviest and eggs collected at 15:00 pm (12.16 g) were lightest. Average weight of eggs collected at 12:00 was 12.40 g. In the same way no significant difference was determined for egg weights between groups and it was observed that shell thickness was increased by the time of delayed oviposition. While shell thickness of the eggs collected at 8:30 was 220.6 µm, it was increased to 222.5 µm and 222.8 µm for eggs collected at 12:00 and 15:00, respectively.

Albumen indexes were determined for the eggs collected in the morning, noon and afternoon as 5.99%, 5.93% and 5.93%, respectively. And no significant differences between groups could be observed for egg yolk index. Egg shape indexes were calculated in the groups of eggs collected in the morning, noon and afternoon as 79.0%, 79.6% and 78.7%, respectively. In the same way there were no significant differences between groups for

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Table 2. Determined egg quality characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Time</th>
<th>n 8:30</th>
<th>n 12:00</th>
<th>n 15:00</th>
<th>F</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg weight (g)</td>
<td>60</td>
<td>12.59 ± 0.14</td>
<td>12.40 ± 0.15</td>
<td>12.16 ± 0.18</td>
<td>1.90</td>
<td>NS</td>
</tr>
<tr>
<td>Shell thickness (µ)</td>
<td>60</td>
<td>220.50 ± 0.85</td>
<td>222.50 ± 0.73</td>
<td>222.80 ± 0.87</td>
<td>2.19</td>
<td>NS</td>
</tr>
<tr>
<td>Albunein index (%)</td>
<td>60</td>
<td>5.99 ± 0.09</td>
<td>5.93 ± 0.02</td>
<td>5.93 ± 0.03</td>
<td>0.38</td>
<td>NS</td>
</tr>
<tr>
<td>Yolk index (%)</td>
<td>60</td>
<td>48.78 ± 0.31</td>
<td>48.73 ± 0.31</td>
<td>48.82 ± 0.28</td>
<td>0.02</td>
<td>NS</td>
</tr>
<tr>
<td>Egg shape index (%)</td>
<td>60</td>
<td>78.95 ± 0.26</td>
<td>79.58 ± 0.23</td>
<td>78.74 ± 0.29</td>
<td>2.90</td>
<td>NS</td>
</tr>
<tr>
<td>Haugh Unit</td>
<td>60</td>
<td>83.60 ± 0.27</td>
<td>83.72 ± 0.20</td>
<td>83.78 ± 0.21</td>
<td>0.15</td>
<td>NS</td>
</tr>
<tr>
<td>Internal Quality Unit</td>
<td>60</td>
<td>46.41 ± 0.78</td>
<td>47.09 ± 0.68</td>
<td>47.68 ± 0.77</td>
<td>0.70</td>
<td>NS</td>
</tr>
</tbody>
</table>

egg shape index. Furthermore, no significant differences between groups for HU and IQU values were found. HU and IQU values for the groups of oviposition time were 83.6, 83.7, 83.8 and 46.4, 47.1, 47.7, respectively.

Discussion

Though there was no significant difference, the heaviest egg weight with a later time of oviposition seemed to be consistent with reports of several researchers (Brake 1985, Lee and Choi 1985, Yannakopoulos and Tserveni Gousi 1987, Okan and Uluocak 1992, Altan and Oguz 1995, Baylan et al. 1997).

In the same way no significant differences were observed for egg quality characteristics such as egg weight, shell thickness, albumen index, yolk index, egg shape index, HU and IQU between groups of oviposition time. In fact the values were similar for groups. Shell thickness was increased by a later time of oviposition. These results were in agreement with data reported for quails or hens in literature (Voigt 1968, Essien and Ekanem 1990, Oguike 1995, Uluocak et al. 1995).

In conclusion, it can be stated in the context of the above-mentioned materials and methods, oviposition time had no significant effect on the examined egg quality characteristics.

Summary

In this experiment the effects of oviposition time on egg quality characteristics in Japanese quails were investigated (Coturnix coturnix japonica). The eggs collected at 8:30, 12:00 and 15:00 were compared for egg weight, shape index, shell thickness, albumen index, yolk index, Haugh Unit and IQU (Internal Quality Unit). In conclusion, it was determined that oviposition time had no significant effect on egg quality characteristics.

Keywords

Quail, oviposition time, egg quality characteristics

Zusammenfassung

Einfluss des Eiablagezeitpunkts auf die Eiqualität von Wachteln

In der vorliegenden Untersuchung wurde der Einfluss des Eiablagezeitpunktes auf Merkmale der Eiqualität bei Wachteln (Coturnix coturnix japonica) ermittelt. Die um 8:30, 12:00 und 15:00 gesammelten Eier wurden hinsichtlich Eigewicht, Schalendicke, Formindex, Eiklarindex, Dotterindex, Haugh-Einheiten und IQU (Index der inneren Eiqualität) verglichen. Es kann der Schluss gezogen werden, dass der Eiablagezeitpunkt keinen signifikanten Einfluss auf die Eiqualitätsmerkmale hat.

Stichworte

Wachteln, Eiablagezeitpunkt, Eiqualitätsmerkmale

References

Altan, O., Oguz, L., 1995: Japon bildircinlerinda (Coturnix coturnix japonica) yanin ve yumurtlama zamaninini kimi yumurta ozeli­kerine etkileri. Turk Veterinerlik ve Hayvanlcilik Dergisi 19, 405-408.
Brake, J., 1985: Relationship of egg weight, specific gravity, and shell weight to time of oviposition and feeding in broiler breeders. Poultry Science 64, 2037-3040.

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