Comparison of Egg Weight Between Two Quail Strains

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Abstract: In order to investigate egg weight of two quail strains 2550 eggs of Japanese quail (Coturnix japonese) and 1975 eggs of Range quail (Coturnix ypsilophorus) were weighted individually at three age groups (first group: 60-145, second group: 145-230, and last group: 300-385 days of age). Body weights of two strains were not significantly different (p>0.05). Body weights at 60 days age were significantly different (p<0.01), but there were not any significant difference between the ages of 145 and 300 days (p>0.05). Egg weight of Japanese quails and Range quails were 11.23±0.03 and 11.17±0.05 respectively which were not significantly different (p>0.05). Effects of the interaction of strain, age and sex for egg weight and body weight were significantly different (p<0.01). Minimum and maximum egg weight for Japanese quail were 7.08 and 13.84gr respectively, however these records were 7.01 and 13.84gr for Range quail. Individual variation of in two strains for eggs weight were significantly different (p<0.01).

Key words: Coturnix japonese, Coturnix ypsilophorus, Quail, egg weight

Introduction
The Japanese quail is bred for egg and meat production (Minvielle, 1998; Baumgartner, 1994), but while reports on quail growth and body composition are numerous (e.g.: Marcks, 1993; Minvielle et al., 2000; Oguz and Minvielle, 2001; Veli et al., 2005a), only few studies have been published on egg production (Nestor et al., 1983; Bacon et al., 1986; Minvielle et al., 1997; Minvielle and Oguz, 2002) or on both types of traits (Strong et al., 1978; Minvielle et al., 1999). Moreover, reliable values of strain in quail are even less common. In the present work, egg weight production was measured in two quail strains: Japanese quail (Coturnix japonese) and Range quail (Coturnix ypsilophorus).

Materials and Methods
Thirty five pairs of Japanese quails (Coturnix japonese) and thirty one pairs of Range quails (Coturnix ypsilophorus) in three age groups of 60, 140, and 300 days of age were randomly selected from the parent populations (the parent population were included 500 Coturnix japonese and 500 Coturnix ypsilophorus). One male and one female quail were kept in an individual one-tier cage (50×50×70cm). All the birds were wing banded according to the cage number. The temperature in house was around 20°C and the light was given 15 hr per day (from 6:00 AM until 9:00 PM). Diet contained 20% crude protein and 2650 kcal/kg metabolizable energy. Food and water were available ad libitum (waterier and feeder were from trough type). The eggs were collected for 85 days. Every afternoon the collected eggs were marked according to cage number and then weighed individually. Quails were weighed at starting point of the experiment. 4525 eggs from two strains were recorded for weight at three age groups with a digital balance with accuracy 0.01 gr. Variance components of egg weights and body weights traits were estimated using the General Linear Models (GLM) procedures of SAS software (1998). The following model was used for analysis of data:

\[ Y_{ijkmn} = \mu + ST_i + AG_j + (SA\times AG\times SE)_{klm} + \epsilon_{ijkmn} \]

where: \( Y_{ijkmn} \) was an individual observation for trait \( Y \). \( \mu \) was overall mean for trait \( Y \), \( ST_i \) was fixed effect of the \( i^{th} \) strain. \( AG_j \) was fixed effect of the \( j^{th} \) age. \( (SA\times AG\times SE)_{klm} \) was fixed effects of the interaction of the \( k^{th} \) strain with the \( l^{th} \) age with \( m^{th} \) sex. \( \epsilon_{ijkmn} \) was random error associated with the measurement of each individual.

Results and Discussion
Description and statistical parameters of egg weight for both strains are shown in Table 1. Least-squares means and standard errors of strain and strain×age×sex for body weight and egg weight are shown in Table 2.

Body weights of two strains were not significantly different (p>0.05). Body weights at 60 days of age were significantly different (p<0.01), but there were not any significant difference between the age groups of 145 and 300 days (p>0.05). Veli et al. (2005a) reported body weight of two strains Japanese and Range quails at 63 days of age 198.46±2.17 and 192.81±2.93, respectively that did not show significant difference (p>0.05). Sex was a significant source of variation for body weight at several ages (p<0.01). Female quails showed a higher
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Table 1: Description of data for egg weight in two quail strains, (Co) Coturnix japonica, (Ra) Coturnix ypisilophorus or Range quails for a period of 85 days

<table>
<thead>
<tr>
<th>Strain</th>
<th>Age (days)</th>
<th>No. Obs.</th>
<th>Sum (gr)</th>
<th>Min (gr)</th>
<th>Max (gr)</th>
<th>Mean (gr)</th>
<th>SE</th>
<th>SD</th>
<th>CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co</td>
<td>60-145</td>
<td>803</td>
<td>8929.36</td>
<td>8.20</td>
<td>13.56</td>
<td>11.12</td>
<td>0.04</td>
<td>0.86</td>
<td>7.73</td>
</tr>
<tr>
<td></td>
<td>145-230</td>
<td>851</td>
<td>9990.74</td>
<td>8.74</td>
<td>13.93</td>
<td>11.74</td>
<td>0.09</td>
<td>1.11</td>
<td>9.49</td>
</tr>
<tr>
<td></td>
<td>300-385</td>
<td>896</td>
<td>9721.60</td>
<td>7.08</td>
<td>13.61</td>
<td>10.85</td>
<td>0.03</td>
<td>1.10</td>
<td>12.12</td>
</tr>
<tr>
<td>Ra</td>
<td>60-145</td>
<td>730</td>
<td>8504.50</td>
<td>8.08</td>
<td>13.57</td>
<td>11.65</td>
<td>0.03</td>
<td>0.80</td>
<td>6.87</td>
</tr>
<tr>
<td></td>
<td>145-230</td>
<td>641</td>
<td>7390.73</td>
<td>8.03</td>
<td>13.21</td>
<td>11.53</td>
<td>0.21</td>
<td>1.33</td>
<td>11.51</td>
</tr>
<tr>
<td></td>
<td>300-385</td>
<td>604</td>
<td>6245.36</td>
<td>7.01</td>
<td>13.84</td>
<td>10.34</td>
<td>0.03</td>
<td>1.06</td>
<td>10.28</td>
</tr>
</tbody>
</table>


Table 2: Least squares mean and standard error for body weight and egg weight (gr) in two quail strains

<table>
<thead>
<tr>
<th>Source of variance</th>
<th>BW (gr)</th>
<th>EW (gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall mean</td>
<td>216.77±2.07</td>
<td>10.85±0.02</td>
</tr>
<tr>
<td>Strain (both of sex)</td>
<td>Co</td>
<td>200.54±1.39*</td>
</tr>
<tr>
<td></td>
<td>Ra</td>
<td>202.30±2.34*</td>
</tr>
<tr>
<td>Age (both of sex)</td>
<td>60-145 day</td>
<td>193.56±2.72*</td>
</tr>
<tr>
<td></td>
<td>145-230 day</td>
<td>203.74±2.25*</td>
</tr>
<tr>
<td></td>
<td>300-385 day</td>
<td>206.96±2.05*</td>
</tr>
<tr>
<td>Strain×age×sex</td>
<td>Co</td>
<td>204.28±3.82*</td>
</tr>
<tr>
<td></td>
<td>Ra</td>
<td>207.51±8.36*</td>
</tr>
</tbody>
</table>
| BW: body weight, EW: egg weight, Co: Coturnix japonica, Ra: Coturnix ypisilophorus or Range quails, F: female, M: male

Letters a, b, c, d, e, f, g Means within each subclass column with different superscript are significantly different (P<0.01)

Fig. 1: Mean egg weight of Coturnix japonica from number 1 to 35

body weight than that of male quails, which was agreed with the results previous studies (Baumgartner, 1994; Minvielle et al., 2000; Vali et al., 2005a; Minvielle et al., 1999). Data from this study clearly indicated that effects of interaction of strain, age and sex were significantly different (p<0.01).

Egg weight of two strains did not show any significant difference (p>0.05), which was in agreement with the report of Vali et al. (2005b), but results of the present experiment showed that egg weight of both strains were heavier which may be due to different raring conditions. It is also interested that these egg weights were higher when compared with that of random bred control for Coturnix japonica in previous studies (Nestor et al.,
1983; Bacon et al., 1986; Vali et al., 2005a,b). The age effect was significantly different for egg weight (p<0.01), also as is shown in Table 2 the effects of interaction of strain, age and sex were significantly different (p<0.01). Individual variation of quails in two strains for eggs weight was also significantly different; with the minimum and the maximum egg weight for Japanese quails were 7.08 and 13.93gr respectively. However these records were 7.01 and 13.84gr for Range quails (Fig. 1 and 2).

Acknowledgment
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References
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