EGG PRODUCTION PERFORMANCE AFTER FIVE GENERATIONS OF SELECTION IN THE EGYPTIAN DANDARAWI CHICKEN

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INTRODUCTION

Relationship between body weight and other production traits after short or long-term selection had been studied (Marks, 1985; Siegel and Dunnington, 1987; Chambers, 1990; Hunton 1990 and Abdellatif, 1999). Similarly, the relationship between selection for egg production and other economic traits had been mentioned in the literature (Quadeer et al., 1977; Marks, 1981; Gowe and Fairfull, 1985; Poggenpoel et al., 1996 and Kosba et al., 1997).

The present study was aimed at identifying the direct and indirect responses after five generations of selection on either 8-week body weight or the egg number at 40 weeks of age in a population of the Egyptian Dandarawi chickens.

MATERIAL AND METHODS

Randombred population of Dandarawi chickens maintained in the Poultry Farm of Assiut University was the base population of the selection program since 1995. Two selected lines, line B selected for 8 week body weight and line E selected for egg number at 40 weeks of age were considered in the program and their responses compared with a non-selected control (Line C). Inbreeding was avoided by using different mating systems between sires and dams.

The present study involved 267, 215 and 391 laying hens for line C, B and E, respectively. The sire families within each line were 20, 18 and 24 sires for line C, B and E, respectively.

All birds were kept under similar recommended conditions of management. The studied traits are body weight (g) at 20 weeks (BW20), shank length (mm) at 20 weeks (SL20), wattle length (mm) at 20 weeks (WL20), age (day) at sexual maturity (AGSM), body weight (g) at sexual maturity (BWSM), egg weight (g) at sexual maturity (EGSM), body weight (g) at 40 weeks of age (BW40), shank length (mm) at 40 weeks of age (SL40), wattle length (mm) at 40 weeks of age (WL40), egg number at 40 weeks of age (EN40), egg weight (g) at 40 weeks of age (EW40), annual (365 days) egg number, average egg weight (EW) and annual egg mass (EM).

Least square means were calculated per line and the significant differences between any two means were tested. Deviations from control line were considered to indicate direct or correlated responses due to selection.

RESULTS AND DISCUSSION

Deviations of least square means of selected lines (B and E) as compared to control (line C) are presented in Table 1. Differences between lines for growth measurements at 20 and 40 weeks
of age, body weight at sexual maturity and egg number at 40 weeks of age were very highly significant, \((P<0.001)\) and were significant \((P<0.005)\) for age at first egg, egg weight, at 40 weeks of age, annual egg number and egg mass. No significant differences were found between lines for egg weight at sexual maturity and average egg weight.

An indirect positive response due to selection for 8 week body weight was observed on other measurements of body weight, at 20 weeks, sexual maturity at 40 weeks of age, where the deviations from control were highly significant. The obtained results agreed with that mentioned in the literature (Marks, 1985; Hunton, 1990; Chambers 1990 and Abdellatif, 1999). Similarly, shank length at 8 weeks or 40 weeks of age deviated positively and significantly from control. This means that shank lengths at 20 or 40 weeks of age indirectly responded to selection on body weight, at 8 weeks of age, as Marks (1985) reported. In contrast, selection for 8 weeks body weight led to an increase in age at sexual maturity by 1.1 days as compared to control and the difference was significant. It means that the relationship between the two traits was negative as Marks (1985) reported. It seemed that selection for 8 weeks body weight had no indirect effects on wattle length at 20 weeks, egg weight at sexual maturity, annual egg number, egg weight mean and egg mass where no significant deviations from control were found.

Deviations of the selected line E from control (Table 1) showed highly significant direct effect on egg number at 40 weeks of age.

### Table 1. Least-squares mean ± standard error of the mean in the control line (C) and deviations of selected lines B and E, from control, for the studied traits

<table>
<thead>
<tr>
<th>Trait</th>
<th>Line C</th>
<th>ΔG Line B</th>
<th>ΔG Line E</th>
<th>F values</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW 20 (g)</td>
<td>998.2±8.3</td>
<td>315.9b</td>
<td>33.2c</td>
<td>***</td>
</tr>
<tr>
<td>SL 20 (mm)</td>
<td>78.4±0.4</td>
<td>3.0b</td>
<td>-4.1c</td>
<td>***</td>
</tr>
<tr>
<td>WL 20 (mm)</td>
<td>19.0±0.3</td>
<td>-0.2a</td>
<td>-4.1b</td>
<td>***</td>
</tr>
<tr>
<td>AGSM (days)</td>
<td>153.7±0.4</td>
<td>1.1b</td>
<td>-0.6a</td>
<td>*</td>
</tr>
<tr>
<td>BWSM (g)</td>
<td>1062.6±8.9</td>
<td>306.1b</td>
<td>33.4c</td>
<td>***</td>
</tr>
<tr>
<td>EWSM (g)</td>
<td>32.7±0.3</td>
<td>0.3</td>
<td>-0.5</td>
<td>N.S.</td>
</tr>
<tr>
<td>BW 40 (g)</td>
<td>1233.2±23.1</td>
<td>375.7b</td>
<td>-38.8a</td>
<td>***</td>
</tr>
<tr>
<td>SL 40 (mm)</td>
<td>77.1±1.3</td>
<td>7.7b</td>
<td>-1.2a</td>
<td>***</td>
</tr>
<tr>
<td>WL 40 (mm)</td>
<td>16.8±0.3</td>
<td>1.2b</td>
<td>-1.0c</td>
<td>***</td>
</tr>
<tr>
<td>EN 40</td>
<td>62.0±0.3</td>
<td>2.4b</td>
<td>2.5b</td>
<td>***</td>
</tr>
<tr>
<td>EW 40 (g)</td>
<td>42.1±0.4</td>
<td>0.1b</td>
<td>-0.1a</td>
<td>*</td>
</tr>
<tr>
<td>EN (365 days)</td>
<td>175.8±0.4</td>
<td>0.0b</td>
<td>1.2b</td>
<td>*</td>
</tr>
<tr>
<td>EW (g)</td>
<td>43.2±0.04</td>
<td>1.1</td>
<td>0.1</td>
<td>N.S.</td>
</tr>
<tr>
<td>EM (g)</td>
<td>7591.5±20.0</td>
<td>14.4a</td>
<td>64.7b</td>
<td>*</td>
</tr>
</tbody>
</table>

*a-c: Any two least square means with a different letter are significantly different.

* \(P<0.05\) and \(P<0.001\), respectively.
In the same time, there were indirect responses on shank length at 20 and 40-weeks of age, wattle length at 20, 40 weeks of age and body weight at 40 weeks of age, which exhibited significant and negative deviations between the selected line E and the control. These results are in full agreement with that of Marks (1981), Kosba et al. (1997) and Poggenpoel et al., (1996). Selection for egg number at 40 weeks of age indirectly improved body weight at 20 weeks of age and body weight at sexual maturity. Similar results were noticed by Vasquez and Bohren (1982). Annual egg number and egg mass were indirectly improved as compared to control (line C) where their deviations were positive and significant in favor of the selected line E. The result was in full agreement with that mentioned in the literature (Marks, 1981; Siegel and Dunnington, 1987; Poggenpoel et al., 1996 and Kosba et al., 1997).

REFERENCES