Development of Prediction Equation for Total Milk Yield from Partial Yield in Native Goats

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ABSTRACT

Data for the current work was collected on 43 native Black does kept at commercial farm over the period 20th February, 2010 to 2nd December, 2010. Milk was recorded at monthly intervals starting one month post kidding till the does were dried off. On the day of test, the kids were separated from their dams at 8:00 p.m. on the following morning does were hand milked at 8:00 a.m. Total milk yield averaged 153.58 Lt. The correlation coefficient between total milk yield and each monthly milk yield were all positive and highly significant according to the range being 0.665-0.932. Multiple regression equation using maximum R-Square improvement between total milk yield and monthly yield, the best equation for prediction is:

Total milk yield = 58.60 + 3.002 milk yield at 2nd month

Keywords: prediction, milk yield, goat

INTRODUCTION

Goats are important domestic animals in many parts of the world including Iraq, because of their adaptability to different environmental condition (Gall, 1981), and utilizing poor quality feed stuffs (Delgadillo and Malpaux, 1996).

Genetic evaluation of dairy animals at an early age on the basis of part yields is beneficial to dairy farmer as it cuts down the cost of rearing the animals and also helps in progeny testing (Ranjan et al., 2005). Furthermore, Part yields (monthly milk yield) or cumulative monthly records have been shown to have a very genetic and phenotypic relationship with full records (Koul, 1973). Thus, it appears essential to predict lifetime performance of an animal at the earliest possible stage on the basis of allied characters for judicious culling of inferior stock so as to result in a profitable animal farming and improvement of the animal genetically (Alkass et al., 2000). The present study was, therefore, undertaken to develop the prediction equations for total milk yield on the basis of partial records.

MATERIALS AND METHODS

Data for the present work was collected on 43 native Black does, 2-6 years old kept at commercial farm over the period 20th February, 2010 to 2nd December, 2010. Milk was recorded at monthly interval starting one month post kidding till the does were dried off (<100 ml milk) according to ICAR (2007). On the day of test, the kids were separated from their dams at 8:00 p.m. On the following morning, does were hand milked at 8:00 a.m., and the quantity of milk was recorded using a graduated cylinder. Daily milk yield was obtained by multiplying test daily milk yield by 2.

The Multiple regression analysis models were obtained using the stepwise method of MINITAB (Minitab Inc., 2007). Variables were added or removed with a significance level of P<0.01. All coefficients of determination (R^2) were adjusted to the number of variables included in the model (Chatterjee et al., 2000) to avoid artifact improvement in R^2 associated with variable addition (Weiss, 1993). Models were selected based on the highest adjusted R^2 with the least number of variables. Model selection was also based on visual appraisal of residual plots. The correlation coefficients between total milk yield (TMY) and each of monthly milk yields were also calculated.

RESULTS AND DISCUSSION

Means of milk yield at first (MY1), second (MY2), third (MY3), fourth (MY4), fifth (MY5), sixth (MY6) months and total milk yield (TMY) were 43.24, 32.67, 29.02, 23.94, 15.95, 10.92 and 153.58 Lt., respectively.

In order to estimate the relationship between each of six partial milk yields and total milk yield, the simple correlations between them have been calculated. Form Table (1) it can be observed that there was a significant positive correlation (P<0.01) between each part and total milk yield and particularly for MY2 (0.932). Thus, the critical appraisal could be drawn that partial yield could be used as an indicator of total yield. Similarly, significant positive correlations between different parts of lactation and total milk yield were observed in goats (Asofi et al.,
Table 1: Multiple regression equations using maximum R-square improvement between total and monthly milk yield

<table>
<thead>
<tr>
<th>Step</th>
<th>Intercept</th>
<th>R-sq</th>
<th>My1</th>
<th>My2</th>
<th>My3</th>
<th>My4</th>
<th>My5</th>
<th>My6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58.60</td>
<td>0.885</td>
<td>3.002**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6.49</td>
<td>0.947</td>
<td>2.350**</td>
<td>2.61**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-2.31</td>
<td>0.969</td>
<td>0.910**</td>
<td>1.551**</td>
<td>2.47**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.58</td>
<td>0.991</td>
<td>1.039**</td>
<td>0.589**</td>
<td>1.77**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.33</td>
<td>0.994</td>
<td>1.073**</td>
<td>1.015**</td>
<td>1.45**</td>
<td>0.67</td>
<td>1.16</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3.65</td>
<td>0.998</td>
<td>1.020**</td>
<td>0.900**</td>
<td>0.97**</td>
<td>1.05**</td>
<td>0.87**</td>
<td>1.29**</td>
</tr>
</tbody>
</table>

Correlation coefficient with TMY = 0.882**, 0.932**, 0.665**, 0.728**, 0.850**, 0.770**

TMY = Total Milk Yield, My1, My2, My3, My4, My5 and My6 = Milk Yield at 1st, 2nd, 3rd, 4th, 5th and 6th months; **P<0.01

Table (1) revealed the leaders in the ordering within each set of monthly milk yield combination according to the maximum R² values. In view of the results presented in Table (1) entering new additional trait improved the predicted TMY according to the importance and correlated response of the monthly milk yield with TMY. Although, R-Square value increased from 0.885 to 0.998, its gain decreased after introducing two variables. To select the simplest equation, it can be suggested that step would be more reliable than others. Therefore, the best equation will be:

TMY = 58.60 + 3.002 MY2

Conclusion

From the results obtained in the current study, it can be concluded that 2nd month was the best for prediction total milk yield of native goats.

REFERENCES


