

## VI. SUMMARY

Milk production records of the Friesian herd, located at Sakha Experimental Station (140 Km to the north of Cairo), Animal Production Research Institute, Ministry of Agriculture, Egypt were used in this study. First, second and third-lactation records (1653, 1075 and 683 records, respectively) obtained through the period from 1960 to 1986 were used to investigate the non-genetic factors influencing 305-day (M305) and total milk yield (TMY), lactation length (LP), dry period (DP), gestation length (GL), calving interval (CI) and days open (DO). Also heritabilities and genetic and phenotypic correlations for these traits were estimated. Sires with 5 or more daughters were evaluated by best linear unbiased prediction procedure (BLUP). Mixed model procedures were followed for analysing such data.

Results obtained can be summarized as follows

(1) Overall means of uncorrected records in first, second and third lactations, respectively were 2149.3, 2466.4 and 2669.2 Kg for M305; 2460.7, 2747.2 and 2922.6 Kg for TMY; 341.2, 342.9 and 332.4 days for LP; and 135.1, 112.2 and 99.2 days for DP. The average length for first, second and third gestation was 278.3, 277.8 and 277.6 days, respectively. The corresponding averages for CI were 459.3, 433.6 and 413.9 days, while for DO were 190.1, 170.7 and 149.7 days.

(2) Year of calving affected significantly ( $P < 0.01$ ) M305 and TMY in the first three lactations. Length of LP varied significantly ( $P < 0.01$  or  $P < 0.05$ ) with year of calving only for the first and the third lactation. Year of calving did not constitute a signif-

icant source of variance in DP of any of the first three lactations. The contribution of year of calving in the variance of either GL, CI or DO was small although it proved significance ( $P < 0.05$ ) for DO of the first and third lactation.

(3) Season-of-calving effects did not contribute significantly to the total variance of M305 and TMY of any of the first three lactations of the study. These effects proved to be highly significant ( $P < 0.01$ ) on LP (in the first and second lactations only) DP (in both the first and third lactation) and on GL of the first lactation. CI of the second lactation varied significantly ( $P < 0.05$ ) with season of calving. No significant effects for season of calving on DO in any of the first three lactations were detected.

(4) The partial regression coefficients of M305, TMY and LP on age at calving were highly significant ( $P < 0.01$ ) for the first lactation only, while LP, DP, GL, CI and DO were not significantly linearly dependent on age at calving at all lactations. Most estimates of partial linear and quadratic regression coefficients of CI and DO on age at calving were negative ( $P > 0.05$ ) in the first three lactations, while GL and DP showed positive dependent quadratic relationship on age at calving which proved significant ( $P < 0.01$ ) in the second and third lactations, respectively.

(5) Most estimates of partial linear and quadratic regressions of M305, TMY, LP and DP on DO were highly significant ( $P < 0.01$ ) for all lactations studied. Linear and quadratic regression coefficients for CI on DO were positive and highly significant ( $P < 0.01$ ), while those of GL on DO were non-significant in the first

three lactations.

(6) Sire effects were found to be mostly highly significant ( $P < 0.01$ ) on TMY, M305 and DO in the first three lactations, on LP and CI in the first and second lactations, on DP in the first lactation and on GL in the second lactation. The sire component of variance ( $\sigma^2_s$ ) ranged between 5.8 to 10.4, between 2.4 to 5.0%, between 0.01 to 2.5, between 0.01 to 4.0 between 0.01 to 4.1 % for milk yield, LP, GL, CI and DO, respectively.

(7) Heritability estimates in the first, second and third lactations, respectively were  $0.25 \pm 0.07$ ,  $0.31 \pm 0.10$  and  $0.42 \pm 0.14$  for M305;  $0.27 \pm 0.07$ ,  $0.28 \pm 0.10$  and  $0.33 \pm 0.13$  for TMY;  $0.14 \pm 0.06$ ,  $0.20 \pm 0.09$  and  $0.10 \pm 0.12$  for LP;  $0.12 \pm 0.06$ , 0.00 and  $0.10 \pm 0.12$  for DP; 0.00,  $0.10 \pm 0.09$  and  $0.05 \pm 0.79$  for GL;  $0.16 \pm 0.07$ ,  $0.07 \pm 0.08$  and 0.00 for CI and  $0.08 \pm 0.06$ , 0.00 and  $0.16 \pm 0.12$  for DO.

(8) Genetic correlations in the first three lactations were always positive and mostly high between M305 and each of TMY and LP, and between TMY and LP. Correlations were negative between M305 and DP, between TMY and DP, between LP and DP and between GL and CI. It was mostly low between GL and DO and between CI and DO. Positive estimates of genetic correlations ( $r_g$ ) were obtained between milk yield and each of CI and DO. LP, in general, had positive  $r_g$  with GL, CI and DO. DP was positively correlated with each of GL, CI and DO.

(9) Positive phenotypic correlations among M305, TMY, LP, GL and DO and between CI and DO were obtained. Phenotypic correlations between lactation traits (M305, TMY and LP) and DP and among GL and each of CI and DO were negative.

(10) Environmental correlations  $r_E$  between M305, TMY, LP, DP and each of GL and DO were positive. Positive estimates of  $(r_E)$  were obtained between DP and each of CI and DO. Positive environmental correlations  $(r_E)$  among M305, TMY, LP, GL and DO. DP, in general, had positive  $r_E$  with CI and DO.

(11) BLUP estimates for M305, DP and CI in first, second and third lactations were obtained for sires having 5 or more daughters. Percentages of sires with BLUP estimates of  $> +200$  Kg in both M305 and TMY ranged between 12.2 and 14.3 % in the first three lactations. There was a difference of 92, 98 and 112 days in LP between the top and bottom sires for the first, second and third lactations, respectively. The differences between top sires and bottom ones for DP and CI, respectively, were 154 and 199 days for the first lactation, 106 and 245 days for the second lactation and 94 and 105 days for the third lactation.

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