5 . SUMMARY

Data of milk production traits (305-day milk yield ; length of lactation period ; dry period) and reproductive ones (calving interval ; age at first calving) using 5662 normal lactations produced by 1029 Holstein cows during nine consecutive years started by 1984 in a commercial herd of Holstein cattle located in El-Salhia farm , Ismailia Governorate , Egypt , were used in this study . The objectives of this study were : (1) to test the significance of sire and non-genetic fixed factors influencing milk production and reproductive traits of the study by using the least-squares Maximum Likelihood mean weighted programe (Harvey , 1990) , (2) to obtain the components of variance for each trait and covariances between each pair of these traits through the Restricted Maximum Likelihood (REML) procedure (SAS , 1996) to be used as starting values needed for applying the multi-trait animal model analysis and (3) to obtain heritability estimates for each of milk production and reproductive traits of the study and to obtain the coefficients of genetic and phenotypic correlation coefficient among all traits of the study once when using data of all available lactations produced and another time when using only data of the first lactation . (4) to estimate breeding values of cows , sires , and dams once when using data of all available lactations and another time when using only data of the first lactation .

Actual means of the studied traits , genetic parameters and breeding values were obtained through analyzing the data by Multiple trait Derivative Free Restricted Maximum Likelihood (MTDFREML) procedure (Meyer , 1998) using multi-trait Animal model Analysis .

The main results obtained can be summarized as follows :

1- Sire constituted a significant source of variation in 305-day milk yield , length of lactation period dry , period , and calving when interval when analyzing data of all available lactations . Also , sire effect was found to be significant on dry period , calving interval and age at first calving when analyzing data of only the first lactation

2- When using data of all available lactations , year of calving , season of calving , age at calving , days open effects were proved to be significant on 305-day milk yield , length of lactation period and dry period . Also , year of calving , season of calving and age at calving showed significant effects on calving interval .

3- When using only records of the first lactation , year of calving and age at calving showed significant effects on 305-day milk yield and calving interval length . Season of calving had significant effect on only dry period . Days open effect was found to be significant on 305-day milk yield , length of lactation period and dry period , season of birth and the interaction between year of birth and season of birth influenced age at first calving significantly .

4- Heritability estimates calculated when using data of all the available lactations were 0.24 , 0.07 , 0.05 and 0.07 for 305-day milk yield , length of lactation period , dry period and calving interval , respectively .

5- Heritability estimates obtained when using data of only the first lactation were 0.43 , 0.31 , 0.09 , 0.05 and 0.04 for 305-day milk yield , length of lactation period , dry period , calving interval and age at first calving , respectively .

6- The genetic correlation coefficients , reached by analyzing data of all the available lactations , among milk production traits of the study and calving interval were positive except those between dry period and each of 305-day milk yield and length of lactation period were negative . Their magnitudes ranged from low to high . At the same time 50% of the phenotypic correlation coefficients among the same traits , when using data of all available lactations , were positive the remainder 50% were negative and also their magnitudes rangd from low to high .

7- Most of the genetic correlation coefficients , obtained by analyzing data of only the first lactation , were positive and the remainder ones were negative . The same picture was shown with the phenotypic correlation coefficients .

8- Breeding values of cows , sires and dams for milk production and reproductive traits the study were obtaind once when using data of all available lactations and another time when using only data of the lactation .