INTRODUCTION

I. INTRODUCTION

Crossbreeding of temperate breeds of dairy cattle with native animals has been used as a tool to produce animals with high milk yields and early maturity (due to genes transfered from European dairy cattle) along with their adaptability to stand heat stress, diseases, low quality of feeding and management (due to genes transfered from local breeds). Although crossbreeding trials in dairy cattle in Egypt have been evaluated by considerable research work (e.g. El-Itriby and Asker, 1958; El-Itriby et al, 1963; Aboustate, 1975; Fahmy et al., 1976; Arafa, 1987; Mostageer et al., 1987), the genetic analysis and reporting of these results have often been insufficient. Generally, the breed group means and heterosis values have been presented in most of the studies. Unfortunately, little attention has been paid to estimate the genetic components of these crossbreeding trials such as individual (direct) additive effect, maternal additive effect, individual (direct) heterosis, maternal heterosis, individual (direct) recombination loss, maternal recombination loss. Also, development of parameters that allow prediction of the performance of crosses that have not been actually tested was not attempted. Although these genetic effects are rather low compared with the within breed genetic variability, they may generate significant bias in genetic evaluation, and the consequences of their inclusion in the model of analysis should be investigated (Boichard et al., 1993).

Genetic superiority of standard breeds (e.g. Friesian, Shorthorn, Jersey, ... etc.) for milk traits over native Egyptian cattle has been demonstrated in many Egyptian studies (El-Itriby and Asker, 1958; El-Itriby et al., 1963; Aboustate, 1975; Fahmy et al., 1976; Arafa, 1987; Mostageer et al., 1987). One of the largest trials concerning Domiati cattle in comparison with Friesian, Shorthorn and Jersey was conducted in Egypt by Animal Production Research Institute, Ministry of Agriculture. To define such breeding strategies which are appropriated to the production systems of Ministry of Agriculture in Egypt, three grading trials were set up to measure up-grading effect of native Domiati cows with Friesian, Shorthorn and Jersey cattle. Few genetic information are available on heterosis, additive effects and recombination losses for milk production traits and reproductive intervals of those trials.

The objective of the present study was to quantify the heterotic components of direct additive effect (G^I), maternal additive effect (G^M), direct heterosis (H^I), maternal heterosis (H^M), direct recombination effect (R^I) and maternal recombination effect (R^M) for milk production traits and reproductive intervals in three up-grading trials in Egypt. These trials included Friesians, Domiati and their up-grades; Shorthorns, Domiati and their upgrades; Jerseys, Domiati and their up-grades. To compare the lactational performance of different up-grades genetically, estimates of heterotic components in each separate up-graded group were evaluated relative to estimates of their relevant purebreds.