V. SUMMARY

This study was carried out in the growth chamber, greenhouse and laboratories of the genetics Department, Faculty of Agriculture, Ain- Shams University, Shoubra El-Kheima, Cairo, Egypt, during the period from 2000 to 2003. The objectives of this study were: first, to obtain reliable information about performance of yield components under salinity stress tolerance of three bread wheat cultivars. Secondly objective, to develop effective molecular marker associated with salinity tolerance to assist in breeding programs to select tolerant genotypes.

The main results could be summarized as follows:

1. Evaluate three Egyptian wheat cultivars differing in their tolerance to salinity stress and differing also in their yield performance.
2. This is happen when these cultivars were planted in sand cultur experiment in the greenhouse and treated with salt solution.

3.The two selected cultivars, their F1 and F2 plants (300 individual plants) were tested for their salinity tolerance in sand culture experiment according to their performance for the following vegetative and mature yield- related traits: plant height (cm), stem diameter (cm), number of flag leaves, number of tillers/ plant, number of spikes/ plant, main spike length (cm), main spike weight (gm), number of spiklets/ main spike, number of grains/ main spike, one hundred grain weight (gm), grain yield/ plant (gm), biomass (gm) and harvest index.

4. The F_2 plants (300 individual plants) were classified into two mainly groups according to their behavior under salinity treatment.
5. The most tolerant and most sensitive plants were chosen from F_2 and were sampled along with F_1 and their parents to detect molecular genetic markers for salinity tolerance trait.

6. Bulked segregant analysis was used to analyze DNA extract with RAPD-PCR technique for the two contrasting parents, their F_1 and two extremes of F_2 groups (salinity tolerance and salinity sensitive). Using six random primers (OP-A16, OP-B01, OP-B06, OP-B10, OP-B18, OP-Z08), only primer OPA-16 showed clear-cut molecular markers for salinity tolerance.

7. Fifteen pairs of SSR primers specific for bread wheat were used to develop some molecular markers associated with salinity tolerance using bulked segregant analysis (BSA). Only 11 SSR pairs showed polymorphism and 7 of them exhibited 7 molecular markers associated with salinity tolerance.