6. SUMMARY

The present investigation entitled "Studies on genetic divergence in morphological and quantitative characters of sweet basil (Ocimum basilicum L.)" was conducted during kharif 2005-06 and 2006-07 at the Research Farm, Janta Vedic College, Baraut, Baghpat, U.P.

The aim of the present investigation was to work out variability, heritability, genetic advance, character association, path coefficient analysis and genetic divergence among 30 genotypes (20 Exotic collections and 10 Indigenous Collections) of Ocimum basilicum. The seeds of genotypes were obtained from the National Bureau of Plant Genetic Resources, New Delhi. These were grown in two years in kharif seasons (2005-06 and 2006-07) at Research Farm J.V. College, Baraut. Normal cultural packages and practices were followed in all the experiments to raise the good crop.

The observations were recorded on 10 morphological characters viz., stem colour, lamina colour, lamina shape, lamina margin, lamina pubescence, lamina surface, inflorescence type, flower colour, seed shape and seed colour and 17 quantitative characters namely number of primary branches per plant, lamina length, lamina width, leaf stem ratio, days to flower initiation, number of spikes per plant, spike length, number of flower whorls per spike, number of flowers per whorl, plant height, fresh herbage yield per plant, dry herbage yield per plant, days to seed maturity, seed yield per plant, 1000-seed weight, essential oil content, essential oil yield per plant on thirty genotypes.
The aspect wise results are summarized as follows:

1. Highly significant genotypic differences were observed for all the characters except lamina length in first year and except essential oil content in second year. However, in pooled analysis highly significant genotypic differences were observed for all the characters.

2. There was sufficient variation at genotypic and phenotypic levels of the maximum variability observed for seed yield per plant, leaf stem ratio, number of spikes per plant and essential oil yield per plant. These characters may offer considerable scope for improvement in these genotypes.

3. In over all pooled analysis of the data, the highest value of GCV and PCV was observed in seed yield per plant followed by leaf stem ratio and number of spikes per plant. Medium values of GCV and PCV were observed in essential oil yield per plant, essential oil content, fresh herbage yield per plant, number of primary branches per plant and dry herbage yield per plant.

4. Pooled analysis showed the high heritability in leaf stem ratio, seed yield per plant, plant height, fresh herbage yield per plant and dry herbage yield per plant. These attributes may be improved through simple selection. It may be possible to improve the seed yield per plant and leaf stem ratio as these characters exhibited high genetic advance also.

5. Genotypes namely IC 333332, IC 338959, EC 388890, EC 338785 and EC 112548 had high essential oil yield per plant in pooled data. These can be utilized in breeding programme to developed an improved
variety coupled with high seed yield potential to enhance the production and productivity of oil in these crops.

6. The genotypic correlation in over all pooled analysis indicated that essential oil yield per plant had high positive correlation with fresh herbage yield per plant, dry herbage yield per plant and essential oil content. However, this character had highly negative correlation with number of spikes per plant, days to flower initiation and number of primary branches per plant.

7. The phenotypic correlation in over all pooled analysis indicated that essential oil yield per plant had highly significant positive correlation with essential oil content followed by fresh herbage yield per plant, dry herbage yield per plant and positive correlation with 1000-seed weight and seed yield per plant.

8. A perusal of path coefficient for over all pooled analysis at genotypic level revealed that essential oil yield per plant had the highest direct positive effect on fresh herbage yield per plant followed by essential oil content, number of spikes per plant, seed yield per plant, 1000-seed weight and days to seed maturity. The maximum direct negative effect was observed in dry herbage yield per plant followed by leaf stem ratio, number of flower whorls per spike, lamina length, plant height, days to flower initiation, number of primary branches per plant, lamina width and spike length.

9. Path coefficient for over all pooled analysis at phenotypic level revealed that essential oil yield per plant had the highest direct positive effect on essential oil content followed by fresh herbage yield per plant,
number of spikes per plant, lamina length, 1000-seed weight and spike length. The maximum direct negative effect was observed in leaf stem ratio, days to seed maturity, lamina width, number of flower whorls per spike, seed yield per plant, days to flower initiation and number of primary branches per plant.

10. Based on the $D^2$ analysis 30 Ocimum genotypes were grouped in 8 clusters in both the years. Maximum inter cluster distance was observed between III and VI (8.437) and minimum inter cluster distance was observed between cluster IV and VI (2.850). Intra cluster distance was observed in cluster V (3.023) while cluster VII had minimum intra cluster distance (0.003). The genotypes were not consistent in a particular cluster across the years exemplifying great variations due to environments.