different generations. Incidence of bacterial wilt was recorded at weekly intervals up to 90 DAT (days after transplanting).

Generation mean analysis was carried out to estimate the genetics of various morphological and biochemical traits. Six generations ($P_1$, $P_2$, $F_1$, $B_1$, $B_2$ and $F_2$) of six crosses were evaluated in a Randomized Block Design with three replications during summer-rainy, 2006 at the experimental farm HAREC, Bajaura, CSK HPKV. The generation means were used to determine the additive, dominance and epistatic components using the procedure given by Mather (1949) and Hayman and Mather (1955) and a perfect fit solution of Jinks and Jones (1958) and Mather and Jinks (1982). The phenotypic and genotypic coefficients of correlation were computed following Al-Jibouri et al. (1958), whereas the path coefficient analysis of component traits with plant survival were carried out by following Dewey and Lu (1959).

Studies on genetics of bacterial wilt resistance revealed that the resistance was dominant in nature and the degree varied from incomplete dominance to complete dominance depending upon not only the resistant parent used, but also the susceptible parent. Single dominant gene was observed to govern bacterial wilt resistance in PBC-631 x CW, PBC-631 x YW and IHR-546 x CW and the segregation of their test cross ($B_2$) populations was in the ratio of 1(R) : 1(S).

Results revealed that sufficient genetic variability was generated through hybridization for all the horticultural and quality traits. The presence of dominance components for yield per plant in all the crosses along with complementary type of interaction in IHR-546 x YW suggested the exploitation of heterosis breeding for improving yield per plant. Similarly, positive dominance components were recorded in most of the cross combinations for number of fruits per plant, which further indicate the
importance of exploiting hybrid vigour for this trait. However, most of the crosses had negative additive component and positive additive x additive [i] gene interactions suggesting to delay the selection for improving average fruit weight. In the present study, the nature and magnitude of gene effect varied with different crosses for most of the quantitative as well as qualitative traits. So, specific breeding strategy has to be adopted for a particular cross to get improvement. In some crosses, inbreds can be developed through hybridization following the pedigree method of selection. In other crosses, although high magnitude of dominance gene effects and dominance x dominance interactions were present, but it is difficult to exploit them due to the presence of duplicate epistasis. In such cases, some form of recurrent selection like diallel selective or biparental mating can be effective.

Studies on correlation coefficient indicated that genotypic correlations were higher than the corresponding phenotypic correlations which suggested the existence of inherent association among these traits. Plant survival exhibited significant and positive correlation with ascorbic acid content, total phenols, ortho dihydroxy phenols, peroxidase and polyphenol oxidase activity, whereas this association was significant and negative with total sugars, reducing sugars and non-reducing sugars. However, in path analysis, some of the characters that showed positive or negative correlation were not able to display the corresponding direct effects in same direction. In such traits, majority of the association was contributed via the indirect effect of ascorbic acid content. Thus, on the basis of path analysis, ascorbic acid content, total sugars, reducing sugars, non-reducing sugars, ortho dihydroxy phenols and polyphenol oxidase activity played an important and crucial role in determining the resistance to bacterial wilt.
Studies on extent of heterosis and mean performance revealed that the hybrid YW x CW was the most consistent for yield per plant, number of fruits per plant, average fruit yield per plant, number of pickings and plant height. Although, other hybrids have also exhibited remarkable heterosis for yield per plant and number of fruits per plant, but these hybrids have low average fruit weight and are not bell shaped. Since the fruits of most of F₁s were not bell shaped or blocky as preferred by consumers, so the fruit shape of F₁s can be improved through repeated back crossing with commercial cultivars accompanied by selection for bacterial wilt resistance.