

Genetic parameters study for yield and quality traits in tomato

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Accepted : July, 2008

ABSTRACT

Genetic parameters studies for variability, correlation and path coefficients analysis of sixteen genotypes of tomato for twelve yield and quality traits revealed that the characters plant height, number of primary branches, number of fruits per plant, fruit diameter, fruit weight, pericarp thickness, number of locules per fruit, number of seeds per fruit, ascorbic acid and yield per plant showed high GCV and high heritability along with high genetic advance and these characters are controlled by additive gene. The study of path analysis indicated that the direct selection of days to first picking, fruit diameter, plant height, fruit weight, days to 75% flowering, ascorbic acid and number of primary branches could be used as selection criteria for improvement. Association analysis revealed that selection criteria based on plant height, fruit diameter, fruit weight, pericarp thickness, number of locules per fruit and ascorbic acid can provide better result for improvement of fruit yield and quality in tomato.

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Key words : Genetic variability, Character association, Path coefficient, Tomato.

Tomato (*Solanum lycopersicon* Mill) occupies the prime position among different vegetables. It is high earning cash crop of the mid hills of Meghalaya. The present trend in crop improvement programmes is the development of hybrid cultivars to boost the productivity and profitability. To meet all the requirements of successful hybrids, it is necessary to be familiar with the detailed genetic structure of the selected material to be used for hybrid breeding. Genetic variability among the parents is a prerequisite to select better segregates for various economic characters. Knowledge of correlations is equally important in plant breeding for simultaneous and/or indirect improvement of characters that are difficult to quantify especially for those traits, which exhibit low heritability. Therefore, it is essential to make preliminary investigation of the characters of the lines to be used for the development of superior hybrids. In the light of the above, present investigation were undertaken to study the genetic variability, correlation among different quantitative and qualitative traits and path analysis in tomato genotypes to facilitate the selection of suitable superior genotypes for involvement in hybrids and standard cultivar breeding programmes.

MATERIALS AND METHODS

Sixteen diverse genotypes of tomato were transplanted in *rabi* season of 2005-06 at Horticultural Research Farm, ICAR Research Complex for NEH Region, Umiam (Meghalaya) in randomized block design with three replications at a spacing of 60 x 45 cm in plot size of 2.5 x 2.5 m consisting 23 plants in each plot. All the recommended cultivation practices were followed to

raise a good crop. The statistical analysis was done according to the methods of Ostle (1966) for the analysis of variance, Burton (1952) for genetic coefficients of variation, Allard (1960) for heritability in broad sense and Johnson *et al.* (1955) for genetic advance. Correlation coefficients were calculated by the method described by Al-jibouri *et al.* (1958) and path coefficients according to Wright (1921).

RESULTS AND DISCUSSION

Analysis of variance revealed that significant differences among the genotypes for all the traits under study. In general, phenotypic coefficients of variation were higher than genotypic coefficients of variation indicating that the genotypic influence is lessened under the influence of given environment (Table 1). A close correspondence between GCV and PCV varies in respect of all the characters indicated that environment has very little influence on the expression of the characters under study. The estimates of heritability (broad sense) for all the characters were high showing that the genotypes under study have a great scope for the selection based on these characters. High values of GCV and heritability estimates supplemented with greater gains also indicated additive gene effects regulating the inheritance such traits (Narayan *et al.*, 1996). The high GCV values for plant height, number of primary branches, number of fruits per plant, fruit diameter, fruit weight, number of seeds per fruit, number of locules per fruit, ascorbic acid and yield per plant were accompanied with high heritability indicating the scope for selection. Burton (1952) also suggested that genotypic coefficient of variation along