

Correlation and path analysis in tomato (*Lycopersicon esculentum* Mill.)

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ABSTRACT

Correlation and path analysis were carried out in 67 tomato genotypes using growth, earliness, quality and yield characters. The results indicated the inverse relationship between growth and earliness characters but strong association between growth and yield characters. Total yield per plant was positively and significantly associated with early yield per plant, equatorial diameter of the fruit, fruit volume, average fruit weight, polar diameter of the fruit, number of fruits per plant, per cent fruit set, stem girth at 90 DAT, number of locules per fruit, plant height at 60 DAT, pericarp thickness and number of seeds per fruit. Total yield per plant was negatively and significantly associated with number of flowers per cluster and number of fruits per cluster. Path analysis revealed that early yield and average fruit weight had high direct positive effects on total yield. Hence, direct selection for early yield and average fruit weight is suggested for yield improvement.

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Tomato is one of the most popular, widely grown and versatile vegetable used for culinary purposes. Ripped tomato fruit is consumed fresh as salads, after cooking and utilized in the preparation of range of processed products such as puree, paste, powder, ketchup, sauce, soup and canned whole fruits. Unripe green fruits are used for preparation of pickles and chutney. Information regarding association of characters like growth, earliness, quality yield and its component characters is very useful for plant breeder in developing commercial variety or hybrid. Many of these characters are inter related in desirable and undesirable direction. Correlation study measures the mutual relationship between various characters and helps in determining the component characters on which selection can be based for improvement in yield. The implications of correlation studies become more evident when correlations are partitioned into its components in path analysis in order to determine the relative magnitude of various attributes contributing to correlation. Hence, an attempt has been made in the present investigation to study the association of different traits, direct and indirect effects of characters based on *per se* performance.

MATERIALS AND METHODS

Total of 67 genotypes collected from different sources were evaluated in randomized block design with three replications at spacing of 75 x 60 cm. Observations on growth, earliness, quality and yield characters were recorded. Genotypic correlation coefficients were worked out among different traits using *per se* values (n = 201). Correlations and path analysis was carried out

according to procedure given by Al-jibouri *et al.* (1958), and Goulden (1959), respectively.

RESULTS AND DISCUSSION

As the genotypic associations are inherent, the correlation and path analysis is discussed at genotypic level only (Table 1 and 2). Number of primary branches at 90 days after transplanting (DAT) was positively and significantly correlated with plant height at 60 DAT (Mohanty, 2003). Stem girth at 90 DAT was positively and significantly correlated with plant height at 60 DAT and number of primary branches at 90 DAT. This indicates that there was strong association between vegetative traits. Days to first flowering, days to fifty per cent flowering, days to first fruit set and days to first fruit maturity were significantly and negatively associated with plant height (at 60 DAT), number of primary branches (at 90 DAT) and stem girth (at 90 DAT). These results elucidated the inverse relationship between earliness and growth parameters. Days to first flowering, days to fifty per cent flowering, days to first fruit set and days to first fruit maturity were significantly (at $p=0.01$) and positively associated among themselves with greater than 0.760 correlation coefficients indicated the presence of very strong association among the earliness parameters.

Per cent fruit set was positively and significantly correlated with plant height at 60 DAT, stem girth at 90 DAT, number of locules per fruit and number of seeds per fruit, but it had negative and significant association with number of flowers per cluster (Rajjadhav *et al.*, 1996) and equatorial diameter of the fruit. This indicates