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Response of varying levels of nitrogen and different dates of planting on growth and yield of *rabi* tomato (*Lycopersicum esculentum* Miller)

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SUMMARY
A field experiment was conducted during two consecutive *rabi* seasons in 2002-03 and 2003-04 to find out the planting date and nitrogen relationship in tomato (*Lycopersicum esculentum* Miller) cultivar ACC-99, experiments were conducted in the split plot design under field conditions. Planting dates significantly influenced the height of plant and dry matter accumulation and crop planted in October-last week produced tallest plants and maximum dry matter accumulation of plant. The yield of fruit in both the years was significantly influenced by planting dates and decreased with delay in planting. On the basis of mean value of 2 years, reduction in fruit yield was 8.93% and 18.05% with second week of November and last week of November planting dates respectively. Compared with last week of October planting. These reductions in fruit yield due to delay in planting were statistically significant. The maximum yield of 292.78 and 274.04 q/ha from October-last week and November-second week planted crop could be obtained with the application of 116.82 and 132.41 kg N/ha, respectively.

Key words: Planting date, Nitrogen, Growth, Yield, Tomato.

The tomato is a warm season fruit vegetable and requires a relatively long season to produce profitable yields. It is tender and will not withstand a hard freeze. In regions having less than 3½ months frost free period, the tomato is made likely to be profitable. High humidity with high temperature favours the development of foliage diseases. On the other hand, hot drying winds often result in the dropping of the blossoms. Knott (1955) mentioned that warm season crops like tomato, egg plant, pepper, pumpkin, bean and okra require different ranges of temperature for their better performance and suggested suitable ranges of optimum, maximum and minimum mean temperature for such crops.

Thus, time of planting is an important factor, which governs the growth, development and ultimately yield of the crop. Because the weather conditions like temperature, relative humidity, rainfall and sunshine etc., affects directly the growth and development of the plants. Different dates of planting provide different environmental condition. The range of temperature, which allows successful conduct of processes viz., transpiration, cell enlargement, cell differentiation, photosynthesis, respiration and cell division, may be termed as optimum temperature range. Within this range lies a temperature, which is optimum for maximum accumulation of dry matter.

The low production of vegetables only caused is poor supply of Nutrients to the plants. It seems in general, the soils of India are poor in nitrogen, phosphorus and potash status which results in the low yield of crop. Nitrogen is an essential constituent of protein and chlorophyll. It has great physiological importance in plant metabolism enzymes, hormones, vitamins etc. Nitrogen encourages the development of leaves and shoots and imparts a deep green colour to them. Vegetables are also made succulent by it. In addition, nitrogen is found in such important molecules as purines, pyrimaidens, prophyrines and co-enzymes. It is also essential for photosynthesis and respiration.

Selection of suitable date of planting and optimum dose of nitrogen is most important factors for maximizing tomato production. Response to nitrogen varies with change in planting dates. The information is limited on response of tomato to nitrogen under different dates of planting. Therefore, the present investigation was undertaken.

MATERIALS AND METHODS

The present investigation was undertaken during *rabi* seasons of 2002-03 and 2003-04 at the Zonal Agricultural Research Station, Jhabua (M.P.). The experiments were laid out in a split plot design with 9 treatment combinations and six replications. The ACC-99 cultivar of tomato was selected and nearly 30 days old seedlings were transplanted as per scheduled dates viz. last week of October, second week of November and last week of November on pre-marked spacing of 60 cm × 40 cm. during both the years. In the light of treatments of nitrogen levels 80 Kg/ha, 100 Kg/ha and 120 Kg/ ha included in this investigation, the amount of nitrogen was supplied through urea (46% N). Similarly, the fixed amounts of phosphorus and potash were supplied through single super phosphate (16% P_2O_5) and murate of potash (48% K_2O). Half amount of urea and full dose of SSP and MoP were applied to each plot as basal dressing at transplanting. The remaining half dose of urea was applied around each plant 45 days after transplanting and after 1st picking of fruits as per treatment in two equal doses. The planting dates were randomly allotted in each replication as the main-plot treatments, and N levels were randomly allotted within each main-plot treatment as the sub-plot treatments. The data were recorded on different

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