

Studies on the Effect of Levels of Irrigation and Fertigation on Nutrient Uptake, Nutrient and Water Use Efficiencies in Tomato

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ABSTRACT

Field experiments were conducted during *rabi* seasons of 2007 and 2008 to investigate the influence of levels of irrigation and fertigation on nutrient concentration in haulms and fruit, nutrient uptake, fertilizer and water use efficiencies in respect of tomato crop at Water Technology Center, College of Agriculture, Rajendranagar, Hyderabad. Two irrigation levels and six fertigation levels were tested in strip plot design with three replications. The concentration of nitrogen in haulm and fruit varied significantly due to fertigation levels only. Maximum concentration of N was recorded in fertigation level where 100 per cent R D N in combination with 100 per cent R D K was applied and it tended to decrease with decrease in the level of application of R D N (50%). However, the level of irrigation and fertigation failed to influence significantly the concentration of P and K in haulm and fruit. Similarly higher total uptake (haulm + fruit) of N, P and K was recorded in the treatment combination where 100 per cent R D N and R D K were applied and the uptake tended to decrease with the decrease in the application levels of R D N (50%) and R D K (75%). Similar results were obtained in case of concentrations and uptake of N, P and K by haulm and fruit. Scheduling of irrigation at 1.0 E pan resulted in significantly higher total uptake of N, P and K compared to scheduling of irrigation at 0.8 E pan. Among the fertigation levels highest nitrogen use efficiency was attained with the application of 50 per cent R D N combined with 75 per cent or 100 per cent R D K. Highest K use efficiency was recorded in the treatment combination of 75 per cent of R D K with 75 per cent or 100 per cent R D N. Similarly highest P use efficiency was recorded with 75 per cent or 100 per cent R D N with 100 per cent R D K. Scheduling of irrigation at 0.8 E pan recorded higher water use efficiency ($116 \text{ kg ha}^{-1} \text{ mm}^{-1}$) compared to 1.0 E pan ($91.9 \text{ kg ha}^{-1} \text{ mm}^{-1}$) with a saving of 58 mm of applied water. Further application of higher levels of recommended dose of N (75-100%) with 100 per cent R D K recorded maximum water use efficiency and this tended to decrease at lower levels of application.

Key words : Nutrient uptake tomato, Nutrient, Water use efficiencies.