

Impact of hydrophilic polymer on irrigation requirement and biophysical parameters in tomato

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ABSTRACT

A field experiment was conducted during *Rabi* 2008-09 at Main Research Station College of Agriculture, University of Agricultural Sciences, Dharwad to study the impact of hydrophilic polymer on irrigation requirement and biophysical parameters in tomato. The treatments consisted of different concentrations of hydrophilic (0.50 to 1.75 g/plant) and another was control. These treatments were imposed at the time of transplanting of seedlings. The results of the investigation revealed that among the treatments the application of liquasorb (1.75 g/plant) into the soil reduced the irrigation frequency of crop as recorded in treatments T₄, T₅ and T₆ to the extent of 33 per cent less than that of control (T₁). While maximum seedling establishment (98.9%) and minimum wilting symptoms was observed with higher concentration of hydrophilic polymer. The relative water content (RWC) was also maximum in T₆ (90.2%) treatment throughout the growth period of the crop compared to the control (75%).

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Key words : Hydrophilic polymer, Relative water content (RWC), Wilting symptom irrigation, Tomato

INTRODUCTION

Tomato [*Ycopersicum esculentum* (L.) Mass] is one of the most important vegetable crops grown widely all over the world. It is a self-pollinated crop and is a member of Solanaceous family with $2n = 24$ chromosomes. Peru Equador region is considered to be the center of origin (Rick, 1969). English traders of East India Company introduced tomato into India in eighteenth century. Vegetables are high yielding and provide nutritional security, more employment, more cash and foreign exchange. Tomato is always in great demand to meet the requirement of kitchen and processing industry. It is one of the most popular vegetable in India accounting 6.3 per cent of total world production. To increase the yield of tomato application of minor and major nutrients is helpful as well as this can also be improved by breeding.

Nowadays hydrophilic polymer have been tried to improve growth and ultimately yield. The use of hydrophilic polymers, particular under green house condition has shown that they have great potential to hold water and release slowly for crop growth and development Polymeric soil conditioners were known since the 1950s (Hedrick and Mowry 1952). However, their wide commercial application failed even though the scientific basis for their use was quite well established. These polymers were developed to improve the physical

properties of soil in view of: increasing their water-holding capacity, increasing water use efficiency, enhancing soil permeability and infiltration rates, reducing irrigation frequency, reducing compaction tendency, stopping erosion and water run-off, increasing plant performance (especially in structure less soils in areas subject to drought). When these hydrophilic polymers (hydro gel) used in correctly and in ideal situations will have at least 95% of their stored water available for plant absorption (Johnson and Velkamp, 1985). These substances can hold 400-1500 g of water per dry gram of hydro gel and degradation in soil was found to be approximately 10% per year (Tolstikh *et al.*, 1992). In arid region of the world, hydrophilic polymer is being used quite to stabilized soil structure, which leads to increased infiltration and reduced the erosion on furrow irrigated fields (Lentz and Sojka, 1994).

MATERIALS AND METHODS

The experiment was carried out in E-block, plot No.125 belonging to Department of Crop Physiology, Main Research Station College of Agriculture, University of Agricultural Sciences, Dharwad. Tomato seedlings of variety Shakatiman were obtained from KLE nursery Pvt. Ltd., Belgaum and transplanted 31st October, 2008. The experiment was laid out in Randomized Block Design with

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