RESEARCH PAPER International Journal of Agricultural Sciences, Vol. 5 Issue 1, January to May, 2009 : 233-235

Study of different soil moisture regime on the yield attributes of tomato during *rabi* season in Baster region

D. KHALKHO*, D.S. RAM, R.S. NETAM AND S. KUMAR
S.G. College of Agriculture and Research Station, IGKV, Jagdalpur, BASTAR (C.G.) INDIA

ABSTRACT

Efficient water management is fast becoming more important as multipurpose uses of water are increasing. A field experiment was conducted to study the response of different available soil moisture regime over the yield and growth parameters of tomato crop. Eight treatments of irrigation at seven different available soil moisture level of 70, 60, 50, 40, 30, 20 and 10 per cent along with one treatment of irrigation at different vegetative stages of tomato was tested during *rabi* season in Bastar region of Chhattisgarh state. Results showed that treatment T_2 with irrigation at 60% available soil moisture level gave the best yield with 42.39 t/ha whereas the best WUE was shown by treatment T_1 with 1.87 t/ha-cm. Result also showed that there was a significant reduction in the yield of tomato from treatment T_5 of irrigation at 30% available soil moisture. The stress limit of tomato crop survives the moisture deficiency by 60 per cent and thereafter reasonable reduction can be observed in the yield of the crop. A simple guideline based on the moisture condition was developed for the tribal farmers so that they can analyze their field condition and irrigate the crop when required.

Key words : Available soil moisture, Irrigation, Yield attributes, Tomato response.

INTRODUCTION

Bastar plateau, the tribal enriched zone of chhattisgarh state, encompassing geographical area of 3.906 million hectares, is bounded with the ill practice of mono cropping system. Only 3.60 per cent of the total cropped area is under irrigation. The tribal farmers of region depend entirely on rainfall for farming and practice only paddy cultivation during *kharif* season with no intention to have *rabi* season crop. The average annual rainfall of the region varies between 1200-1400 mm. Blessed with good amount of rain water, the tribal farmer of the region is not utilizing this precious natural resource for the second crop. Under many development activities, the tribal farmers are motivated to take vegetables during *rabi* season with proper utilization of the harvested water. Tomato is one of the mainly grown vegetable crops with 20% share in total vegetable production of the state. Tomato being a good yielding *rabi* crop is also very sensitive to water application (Helyes *et al.*, 1999). Irrigation management based on crop physiological stages has been most practical criterion (Michael and Pandey, 1970). Under and over irrigation, both are undesirable for proper growth of the crop. Every crop takes its nourishment from the available moisture of the soil. Appropriate level of soil moisture is very essential for proper growth and good yield. But due to lack of awareness and knowledge, the tribal farmer cannot judge on their field condition about the appropriate time for water application so as to achieve profitable returns. The present study was carried out to determine the optimal Irrigation schedule for tomato crop during *rabi* season in Bastar region along with to determine the potentially lowest irrigation resistant limit of these crops on water stress.

MATERIALS AND METHODS

The experiment was carried out in two consecutive years at the research farm of Shaheed Gundadhoor College of Agriculture and Research Station, IGKV, Jagdalpur, Bastar, Chhattisgarh, India, during the *rabi* season of 2005-06 and 2006-07. Details of the soil physical properties of the experiment plot are given in Table 1. The experiment consisted of eight treatments of Irrigation at seven different level of 70, 60, 50, 40, 30, 20 and 10 per cent available soil moisture along with one treatment of irrigation at different vegetative growth stages of the crop. The treatments were tested for Swaraksha variety of tomato crop on ridge and furrow method of irrigation in Randomized block design with three replications. The size of the experimental plot taken was 18 m^2 (6x3 m) net and 2550 m^2 (50x51 m) gross along with sufficient spacing for irrigation and drainage channels. Recommended dose of fertilizer was applied in the crop. Daily soil moisture readings were taken by calibrated tensiometers (vacuum gauge and mercury manometer), gypsum blocks and was even validated by digital soil moisture meter. Depth of water application was measured precisely, as only the amount of irrigation water required for replenishing the soil to its field capacity was delivered at a time. Soil moisture contents were measured at 10 and 15 cm depths. As it's always difficult for layman to evaluate the moisture status of the soil, simple indigenous method was identified to know the available soil moisture

* Author for correspondence