

Response of onion (*Allium cepa* L.) to different levels of irrigation and sulphur in alfisols of northern transitional tract of Karnataka

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ABSTRACT

A field experiment was carried out during *rabi* 2002-03 at Saidapur farm, University of Agricultural Sciences, Dharwad to study the response of onion to different levels of irrigation and sulphur in alfisols. The experiment was laid out in split-plot design with three replications. The treatments comprised of four irrigation schedules (0.9, 1.1, 1.3 and 1.5 IW/CPE ratios) as main plots and four sulphur levels (0, 20, 40 and 60 kg S ha⁻¹) as sub plots. It revealed that 1.5 IW/CPE ratio Irrigation schedules showed significantly higher results for bulb yield (189.29 q ha⁻¹), yield components (like bulb length and bulb diameter) and growth components (*viz.*, Number of leaves, leaf area index, leaf area duration and total dry matter production per plant. Application of 40 kg S ha⁻¹ recorded significantly higher bulb yield (170.60 q ha⁻¹) compared to other sulphur levels but was at par with application of 60 kg S ha⁻¹. But significantly higher TSS (12.26 per cent) and pyruvic acid (3.1 µm/g) content in onion bulb were recorded in 60 kg S ha⁻¹ compared to other sulphur levels but was at par with 40 kg S ha⁻¹. Irrigation scheduled at 1.5 IW/CPE ratio recorded higher seasonal consumptive use of water (637 mm) and lowest in 0.9 IW/CPE ratio (541 mm). The sulphur application at 40 kg ha⁻¹ recorded highest (606 mm) seasonal consumptive use of water and closely (594 mm) followed by 60 kg S ha⁻¹. The highest water use efficiency (29.65 kg ha⁻¹ mm) was recorded in 1.5 IW/CPE ratio and closely followed by 1.3 (26.17 kg ha⁻¹ mm). The sulphur application at 40 kg ha⁻¹ recorded the highest water use efficiency (27.98 kg ha⁻¹ mm) closely followed by 60 kg S ha⁻¹. Among irrigation schedules 1.5 IW/CPE ratio extracted relatively more soil moisture (42.94 per cent) from the surface (0-15 cm) layer. Sulphur levels had no marked influence on soil moisture extraction from different soil layers.

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Onion (*Allium cepa* L.) ranks first in area and production among the various vegetable crops grown in India. In Karnataka, onion is being cultivated in about 0.85 lakh hectares. The productivity of onion in the country (10.06 tones per hectare) including Karnataka (6.69 tones per hectare) is very low compared to world average productivity (17.10 tones per hectare). The reasons for low productivity are mainly attributed to improper irrigation scheduling and inadequate supply of nutrients, particularly sulphur. Onion being a succulent crop, its productivity is highly related with irrigation and sulphur (Jana and Kabir, 1990). Water being a natural resource input and now a scare and costly input in the production of agricultural crops, has direct influence on the availability of nutrients from the soil. The response of onion to irrigation is a function of season, soil type and genetic make up. Sulphur has been recognized as an important nutrient for higher yield and quality of onion bulbs (Thippeswamy, 1993). Pungency in onion is attributed to presence of an alkaloid "Allyl propyl disulphide" which is chief component of sulphur. Therefore, the present experiment was undertaken to find out the study the

response of onion to different levels of irrigation and sulphur in alfisols with cv. BELLARY RED in *rabi* season in northern transitional zone of Karnataka.

MATERIALS AND METHODS

A field experiment was conducted during *rabi* 2002-03 at Saidapur Farm, University of Agricultural Sciences, Dharwad (Karnataka). The experiment was laid out in split plot design with three replications. There were 16 treatment combinations consisting of four irrigation levels (0.9, 1.1, 1.3 and 1.5 IW/CPE ratios) assigned to main plots and four sulphur levels (0, 20, 40 and 60 kg S ha⁻¹) to sub plots. The soil was red loamy having 6.93 pH, field capacity of 20.5 per cent, wilting coefficient of 9.1 per cent and bulk density of 1.4 Mg/m³. Onion cv. BELLARY RED was transplanted on 19th November 2002. A uniform fertilizer dose of 125 kg N, 50 kg P₂O₅ and 125 kg K₂O was applied. Scheduling of irrigation was done based on IW/CPE ratio approach with 50 mm depth of water in each irrigation. Sulphur was applied in the form of elemental sulphur. Calculated quantities of sulphur were added to the respective plots. The soil moisture was