

Effect of Partial Root Zone Drying on Growth, Yield and Biomass Partitioning of a Soilless Tomato Crop

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Abstract : The object of the present research was to assess the effects of partial root zone drying (PRD) as a water supply strategy on tomato growth, productivity, biomass allocation and water use efficiency (WUE). Plants were grown under greenhouse, on a sand substrate. Three treatments were applied: a control that was fully and conventionally irrigated, PRD-70 and PRD-50 in which, respectively, 70% and 50% of water requirements were supplied using PRD. At planting, the root volume was divided into two halves each half was irrigated separately. Alternation of irrigation between the two root halves took place each three days. The total yield statistically differed ($P < 0.05$) with control giving the highest total yield (252 tons/ha). Compared to PRD-70 and control, PRD-50 yield decrease rates were, respectively, 16% and 30%. In terms of fruit number, PRD-50 showed 23% and 16% less fruits than PRD-70 and control, respectively. Fruit size was affected by treatment with PRD-50 treatment producing 66% and 53% more class 3 fruits (small size) than, control and PRD-70 ($P < 0.05$), respectively. For plant growth, the difference was not significant when comparing control to PRD-70 but was significant when comparing PRD-70 and control to PRD-50 ($P < 0.05$). No effect was on total biomass but root biomass was higher for stressed plants compared to control ($P < 0.05$). WUE was 66% and 27% higher for PRD-50 and PRD-70 respectively compared to control.

Keywords : biomass, growth, partial rootzone drying, water use efficiency yield

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