

Evaluation of a control system based on the Irrigas[®] sensor for irrigation scheduling of hydroponic tomato in Ceará, Brazil

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The study was carried out aiming to evaluate two irrigation scheduling techniques for hydroponic tomato production in Ceará, northeastern Brazil. The experiment was set up as a split-plot randomized block design, with six replications. On the main factor two irrigation scheduling techniques were tested: (a) Automatic scheduling using matric sensors – a closed loop irrigation control system based on the Irrigas[®] sensor was used to start irrigation pulses whenever matric potential in the substrate reached -4 kPa. (b) Time clock scheduling - irrigation applications were programmed at fixed intervals and rates, according to drainage fraction observed on the previous day and water retention capacity of the substrate. Tomato hybrids “Miramar” and “Ellen” were evaluated in the subplots. The growing medium was coconut fiber in bags of 40 L. Automatic irrigation scheduling based on Irrigas[®] sensors did not affect tomato yield, fruit weight, and number of fruit per plant significantly ($p>0.05$) as compared to time clock scheduling. However, automatic irrigation control reduced water application by 4.3% as compared to time clock scheduling, without affecting pH and electrical conductivity levels of the drained solution. The tomato hybrid “Miramar” presented yield and number of fruits per plant significantly higher ($p<0.05$) than hybrid “Ellen”, which presented higher fruit weight.