

ABSTRACT

Response of *Capsicum chinense* Jacq. 'West Indies Red'
to water availability and stress:
implications for irrigation in Barbados

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This study sought to investigate some of the responses of *Capsicum chinense* 'West Indies Red' to water availability and stress, with the ultimate aim of making recommendations which can improve the water management of this crop.

Container-grown plants droughted during first flowering phase (when 50 % of plants bore flowers) had less leaf area, fewer leaves, less stem length, fewer flowers and fruit at the end of the phase than those well watered. At the end of first fruiting, plants not experiencing water stress generally grew more rapidly, vegetatively and reproductively, than plants stressed during first flowering and first fruiting (when 50 % of plants had flowers). Plants stressed during first flowering lagged the productivity of the other two treatments at the end of the phase.

In general, plants responded to withholding of water with reduced leaf, stem and fruit development in six days. The flowering response took 10 days. Plants

expressed a response to rewatering within a day or two after and made great recovery, but were however not as productive as plants never droughted.

Plants of 'West Indies Red' were also subjected to different water application rates using drip irrigation in the field. It was determined that the minimum amount of water for optimum development early in the life cycle of the crop (about 30 days after transplanting) was $0.3 E_0$. This translated to $0.5 E_0$ if solely rainfed or if sprinkler irrigation is used. Relative water content (W_R) of plants given different amounts of water also suggested that close to $0.5 E_0$ should be applied for high W_R . A repeat of the field experiment suggested that from 30 days after transplanting the irrigation by drip should be increased until it reaches $0.6 E_0$ by 91 days after transplanting. This translated to $1.1 E_0$ by 91 days after transplanting in solely rainfed conditions or if sprinkler irrigation is used.

The adjusted values, along with soil water capacity and evaporation data across Barbados, were used to provide irrigation recommendations for 'West Indies Red' as well as estimates of the start, end and length of the rainfed growing season. There was a clear distinction between the wettest (central) and driest (southern and northern) parts of the island, and the wettest and driest months. This implies that water management strategies depend on where and when cropping occurs.

Keywords: *Capsicum chinense* 'West Indies Red'; water availability and stress; irrigation; Barbados.