

Using Effluent Volumes to Control Leaching in Large Container Nursery Crops[©]

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Over-irrigating container-grown crops can lead to increased nutrient leaching and negatively impact water quality. Leaching is implemented to reduce substrate salt concentrations within the container. The term, “leaching fraction” (effluent volume/irrigation volume) has historically been described by best management practices to monitor irrigation efficiency. Recommendations for leaching fraction for container crops and methods for controlling leaching fraction can greatly vary. Therefore, a study was conducted to determine predicted leaching fraction versus actual leaching fraction with parameters for container water-holding capacity and antecedent substrate moisture content included. Three replications for three container sizes (3.8, 10.4, and 20.7 L) with coarse pine bark substrate were dried to 95, 80, and 70% of container capacity following saturation. Containers were subsequently irrigated to achieve targeted leaching fractions of 0.0, 0.2, 0.4, and 0.6 of applied irrigation. At termination of leaching, effluent was collected and actual leaching fractions were calculated. Actual leaching fractions were found to be higher than treatment targets, and varied according to antecedent substrate moisture content. When irrigation and effluent volumes were compared to container capacity, a linear relationship was found between percent of container capacity leached at irrigation termination and total percent of container capacity leached, regardless of antecedent moisture content. Soluble salt concentrations were measured on leachate samples collected from volumetric intervals after commencement of leaching, and compared to total effluent salt content. The proportion of salts leached was highest in the initial volumetric samples. Container water-holding capacity and antecedent substrate moisture can greatly affect the volume of irrigation needed to produce target leachate volumes. Measuring leachate as a percent of container capacity can provide a more standardized method for achieving targeted leaching volumes.

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