



## Evapotranspiration and Crop Coefficient of Magnolia under Three Irrigation Systems.\*

Luis C. Nogueira<sup>1</sup>, Dorota Z. Haman<sup>2</sup>, Robert H. Stamps<sup>2</sup>, Michael D. Dukes<sup>2</sup>

<sup>1</sup> Researcher at Embrapa Coastal Tablelands, Aracaju, SE, Brazil, e-mail: lcnogueira@gmail.com.

<sup>2</sup> Professors at the University of Florida, Agricultural and Biological Engineering, Gainesville, FL, USA.

There is an increasing demand for landscaping plants with low water requirements, however limited information about water use of these plants is available. Measurement of plant water use during nursery production is useful for predicting the relative water use after establishment in the field. In addition, advances in irrigation technology provide numerous tools to water agencies and managers for decisions on conserving water in landscapes. The objective of this work was to study the water use of one-year old clonal southern magnolia plants (*Magnolia grandiflora* 'D.D. Blanchard'). The experiments were conducted in a woody ornamental container nursery in Florida, USA. Three different irrigation systems (overhead sprinkler, microirrigation, and ebb and flow outdoor irrigation system) were compared using experimental plots with magnolia plants within the regular production areas of the farm. Plants were grown in 56.8-liter plastic containers. Six plants in each experimental plot were selected for water balance monitoring and plant growth measurements. Climatological data was monitored using an automatic weather station. Substrate moisture content was monitored using TDR sensors. Daily averages of crop evapotranspiration (ET<sub>c</sub>) were calculated using a water balance method. Reference evapotranspiration (ET<sub>o</sub>) was calculated using the FAO Penman-Monteith equation. Peak value of crop evapotranspiration occurred in July for all three systems: 6.09 mm d<sup>-1</sup> (ebb and flow), 4.91 mm d<sup>-1</sup> (overhead sprinkler), and 2.98 mm d<sup>-1</sup> (microirrigation). The highest value of reference evapotranspiration (ET<sub>o</sub>) was 6.15 mm d<sup>-1</sup> and occurred in May, followed closely by 6.05 mm d<sup>-1</sup>, occurred in July. The ebb and flow system promoted highest K<sub>c</sub> values (ranging from 0.80 to 1.21), followed by overhead sprinkler (from 0.33 to 0.99), and microirrigation (from 0.15 to 0.68). These results confirm the highest efficiency of microirrigation systems, which should be preferred for conserving water resources, with advantages of saving energy and protecting the environment.

Key-words: *Magnolia grandiflora*; nursery production; microirrigation; woody ornamentals.

\* Acknowledgments: EMBRAPA, CAPES, Holloway Tree Farm and University of Florida.