



Container Nursery Irrigation Practices In Georgia

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Nature of Work:

Container ornamental nursery production is one of the fastest growing segments of American Agriculture. The state of Georgia has several of the larger nurseries in the U.S. and the state supplies plant material through the Eastern states.

The production system for container nurseries is inherently different from traditional agriculture. Container nurseries grow in containers filled with artificial substrates, whereas traditional agriculture crops are produced in ground. Container nurseries are largely dependent on frequent supplemental irrigation. The amount of irrigation water utilized is better documented for row crops than for nursery crops.

The production of container ornamentals has evolved under a system of generous availability of water for irrigation. Severe drought conditions in many regions of the U.S. in recent years has raised issues such as water availability, efficiency of use, and value derived from this natural resource. The nursery industry in the Southeastern U.S. has responded, in part, by developing a set of Best Management Practices to guide production practices. To-date, we have limited information on the voluntary adoption of the SNA BMPs by the nursery industry.

The objectives of this study were to (a) evaluate irrigation practices for container nurseries such as quantity of water, (b) adoption of industry Best Management Practices, and (c) application methods.

Results and Discussion:

The efficiency of use of water applied to container nurseries is influenced by factors such as container density and method of application. The mean density, at final spacing, for the container sizes ranged from about 56,000 per acre for #1's to about 1740 per acre for #25's. The densities translate to container spacings, comparable to industry standards, such as 12" on-center for #1's and 24" on-center for #3. The #3 container spacing indicates that each plant requires about 576 square inches of nursery surface but the container occupies about 100 square inches of nursery area. This implies that the maximum interception efficiency of water applied by overhead irrigation would be about 17% for #3 containers and 25% for #1 containers.

The containers represent a small percentage of the production bed area and therefore the

efficiency of water use would be greatly influenced by the method of application. Container nursery producers in Georgia were asked to indicate the percentage of production, by container size, that was irrigated by overhead/broadcast method versus directed or drip/spray methods. Essentially all of the smaller containers (liners, #1, #3 and #5) are irrigated by overhead methods. Directed application of irrigation water (drip/spray) is practiced with the larger containers. Directed application was utilized in #7 containers (49%), #15 (85%) and #25 (75%). The use of directed application is highest with containers of lowest density. However, the #1, #3 and #5 containers comprise the largest segment of the product mix and production bed area.

Nurseries apply about one acre-inch of water by overhead irrigation per event for #1 and #3 containers, while about one-half inch is applied for the #5, #7 and #15 containers. The amount of water applied by directed irrigation (drip/spray) increased with container size. The #3, #7, #15 and #25 containers each received 0.4, 1.1, 1.5 and 1.7 gallons, respectively, per irrigation event. The frequency of irrigation varied, although not significantly, among container sizes. However, there was a large difference in frequency of irrigation events between growing season and winter months. The summer irrigation frequency was about three times that of the winter season. This information on rate and frequency could be utilized to compute peak irrigation demand, and hence irrigation system specifications for nurseries.

Georgia nurseries were asked several questions regarding Best Management Practices. Forty eight percent of the nurseries collect runoff irrigation water in a basin or pond. For nurseries that collect runoff water, the mean percentage of nursery area that drains into a basin/pond is 71%. This indicates runoff water is collected from about 34% of the production area.

All nurseries use well water (100%) for irrigation purposes and respondents estimated that about 50% of total water use comes from a well. The percentage of irrigation water from a well was higher (58%) for nurseries that did not collect runoff water than for nurseries collecting runoff water (44%). The results demonstrate that only half of the water used by nurseries comes from ground water with the other half coming from surface sources.

Forty-four percent of the nurseries practice cyclic irrigation. For nurseries utilizing cyclic irrigation, 77% of the nursery was irrigated using this method. This suggests that about 34% of the nursery area is subject to cyclic irrigation.

Ninety-two percent of the nurseries water early in the morning and 75% of the nursery could be watered during this period. Therefore, approximately 69% of nursery area is irrigated in the morning period.

The use of grass/riparian strips is recommended as an aid to improve quality of runoff water. The grass strips can reduce sediment transfer to ponds or streams, calcium that may reach from use of lime rock beds, and fertilizers. Sixty percent of the nurseries utilize grass strips/erosion filters between production beds and drainage areas. The estimated mean for these nurseries was 80% of production bed area filtered by grass strips. This suggests that runoff water from about 53% of nursery production

area is filtered through grass strips.

The use of recycled water can help reduce the need for ground water or fresh water. Although 48% of Georgia nurseries recycle water, only 17% treat the recycle water prior to use. Sixteen percent of the nurseries used acid injection to control pH of irrigation water.

Significance to Industry:

The survey of Georgia container nurseries provides data which can be used by nurseries to compare their watering practices to the rest of the industry and provides a bench-mark to monitor industry changes in irrigation practices. The Georgia container nursery industry is making extensive use of Best Management Practices designed to reduce water use and improve quality of run-off water.