

Use of Reclaimed Water in Production Nurseries

Tom Yeager, Environmental Horticulture, yeagert@ufl.edu
Shawn Steed, IFAS Extension Hillsborough County, ststeed@ufl.edu

ABSTRACT

Reclaimed water (processed and disinfected sewage sludge) is a potential irrigation water source for commercial nurseries. A demonstration is proposed to evaluate reclaimed water use at a nursery and determine container plant growth responses compared with those of plants irrigated with well water currently used by the nursery. This report expounds on the process of getting reclaimed water transferred from the municipal system to the nursery for irrigation.

INTRODUCTION

The Southwest Florida Water Management District (SWFWMD) personnel were in the process of renewing the consumptive use permit for Mid-Florida Nurseries in Plant City when discussion ensued with the nursery owner about the use of reclaimed water for irrigation. A reclaimed water distribution pipe is located adjacent to property border. The nursery owner contacted UF/IFAS Extension personnel and indicated he was concerned about the reclaimed water damaging plants. UF/IFAS personnel suggested a demonstration be established to evaluate plant responses to reclaimed water used for overhead sprinkler irrigation. Funding from the FNGLA Endowed Research Fund was received to conduct the demonstration.

OBJECTIVES AND METHODS

The objective was to evaluate on the nursery site the impact of reclaimed water on the growth of container-grown plants. After obtaining the results of the evaluation, the nursery owner would be able to confidently decide about converting the irrigation water source for the nursery to reclaimed water. Thus, the consumptive use permitted well water could be placed on standby with the District and reclaimed water would be the primary source for irrigation.

We were unaware of the challenges for getting a reclaim water connection at the nursery even though Plant City personnel were willing to add reclaim water users. Thus, we have experienced a delay; however, our experiences will be documented and made available to FNGLA membership so that nursery personnel can be apprised of what is expected and needed for the process of connecting their irrigation to municipal reclaimed water. In addition, after we complete the connection and conduct the demonstration, our results will provide a list of container-grown plants produced with reclaimed water applied with overhead sprinklers. Our results will note any difficulties encountered as well as any plants that did not respond favorably.

Present Status

An overview of activities involving Plant City personnel, UF/IFAS personnel, and Mid-Florida Nurseries' personnel is presented in **Table 1**. The Plant City Water Resources Department agreed to connect and transfer via a 6-inch diameter pipe the reclaimed water onto the nursery property at no charge. However, various infrastructure items are needed, and fees will be collected — possibly from Plant City Building Department and Engineering.

Table 1. Summary of activities completed as part of process to establish reclaimed water connection at Mid-Florida Nurseries in Plant City.

Date	Action Items
Sept. 18, 2018	UF/IFAS and Mid-Florida Nurseries' representatives met with Plant City personnel, presented objective of project and reason for project. Discussed reclaimed water use cost per gallon and physical separation of well water and reclaimed water.
Nov. 16, 2018	UF/IFAS representative met with Mid-Florida Nurseries' representative and established reclaimed water entry point and location of irrigation zones.
Dec. 20, 2018	UF/IFAS and Mid-Florida Nurseries' representatives met with Plant City personnel, presented diagram of connection, and discussed procurement of meter and backflow device with approximately 3000 gal/day for the proposed demonstration.
Feb. 18, 2019	UF/IFAS phone call with Plant City representative to determine actions needed to proceed.
May 3, 2019	UF/IFAS representative met with Mid-Florida Nurseries' representatives and reviewed progress.
June 5, 2019	UF/IFAS and Plant City personnel met at Mid-Florida Nurseries and discussed establishing reclaimed water connection and confirmed location of 6-inch connection.
July 18, 2019	UF/IFAS phone discussion with Plant City representative regarding clarification of actions and fees mentioned in summary of June 5 meeting received by email from Plant City representatives.
July 19, 2019	Conference call with Mid-Florida Nurseries' representative and UF/IFAS representatives regarding potential costs including fees to establish reclaimed water connection.
Aug. 7, 2019	UF/IFAS personnel met with Mid-Florida Nurseries' representative and confirmed the need for development of detailed costs analysis proposal for presentation to SWFWMD, FDACS, and NRCS regarding cost share funds.

We are currently in the process of determining the cost of the infrastructure and what fees will be imposed along with who will have the financial responsibility for the fees.

A backflow device and meter are required on the reclaimed water pipe entering the property. The backflow and meter will be located on the east side of the property near County Line Road as seen in **Figure 1**. We are currently conducting a water use and flow audit of the current nursery irrigation system so that we can size and appropriately justify the meter and backflow size. Each irrigated zone is 40 x 300 feet and irrigated with 16 Mini-Wobblers® (Senninger®) on 4-feet high risers spaced 20 feet down the zone and 26 feet across the zone. Output from each lavender nozzle is projected to be 2 gallons per minute (gpm). Irrigation is usually applied using four zones per event (128 nozzles) for a total flow of 256 gpm. Water from the well is currently distributed to irrigation zones by 4-inch pipes. Based on flow, distance, elevation, and pipe size, it is anticipated that a 6-inch pipe with meter and backflow will be used for reclaimed water. The pipe transferring reclaimed water across the property will be terminated at current pump station approximately 1200 feet from where reclaimed water entered the property (**Figure 1**). An adapter will be used to separate reclaimed water use from well water use. Approximate costs for infrastructural items are given in **Table 2**.

Nursery owner would like to seek cost share funds from SWFWMD, Florida Department of Agriculture and Consumer Services (FDACS), and Natural Resources Conservation Service (NRCS). Meetings with the representatives from these agencies are planned. Agency support for implementation of a BMP, such as use of reclaimed water for irrigation that has been evaluated by UF/IFAS personnel, is common in the nursery industry.

Methods to Conduct Demonstration and Obtain Results

After reclaimed water is connected to the nursery irrigation system, the demonstration will be conducted and the impact of reclaimed water irrigation on plant growth will be determined. This impact will be determined by growing the same plants in adjacent production zones. One zone will use the nurseries’ current irrigation water (well) and the other adjacent zone will have reclaimed water irrigation. Plant data from both zones will be monitored. Plant sizes will be measured monthly and container substrate electrical conductivity monitored. In addition, irrigation water (reclaimed and well) will be analyzed for nutrient constituents. Aberrant growth or foliage will be documented with photographs. It is anticipated that within a year, twenty species can be evaluated in each irrigated zone. Species selected for evaluation will be plants commonly grown in central Florida. year, twenty species can be evaluated in each irrigated zone. Species selected for evaluation will be plants commonly grown in central Florida.

RESULTS

Project has not gotten far enough for definitive results due to the delay encountered in establishing a reclaimed water connection to the nursery irrigation system. Progress has been made and effort will continue to establish the connection and conduct the demonstration for plant evaluation as stated in the objective. A summary of activities in pursuit of accomplishing the objective is presented in **Table 1**.

CONCLUSION

Work on this project will continue to overcome the challenges needed to evaluate plant responses to reclaimed water. The immediate need is to accomplish tasks required by the Plant City Water Resources Department to transfer reclaimed water to the nursery property. Once the transfer or connection is complete, plants will be irrigated with reclaimed and well water to demonstrate the usefulness of reclaimed water.

Table 2. Items needed to establish reclaimed water connection at Mid-Florida Nurseries in Plant City.

Items		Approximate Cost \$
Water meter 6-inch		\$4,500
Double check valve assembly backflow device 6-inch		\$10,000
Reclaimed pipe 6-inch x 1200 feet		\$4,800
Reclaimed pipe fittings L's		\$300
Total		\$19,600



Figure 1. Reclaimed demonstration site is located adjacent to plants irrigated with well water. Purple line denotes proposed reclaimed water distribution pipe.