

Collecting Water Samples at Container Nurseries ¹

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Many nurseries in the southeast are confronted with water management regulations. These regulations often focus on ground water, and regulate the quantity used for irrigation and the time of day irrigation can be applied. Consequently, some nurseries are collecting and recycling production bed runoff water, utilizing water reclaimed by municipalities, or collecting and storing rain water for irrigation because these sources of water are usually less regulated than ground water. Other nurseries are utilizing these alternative sources of irrigation water because of poor quality ground water.

When utilizing these alternative water sources, it is very important to monitor water quality; however, prudent management strategies should include water quality monitoring regardless of source. Water leaving the property is sampled to ensure the best quality water possible is discharged; whereas, runoff water in collection basins and well water is sampled to ensure its suitability for application to plants. Monitoring the water quality will reveal changes in inorganic ion composition of the water. Common ionic analyses include pH, electrical conductivity (EC), nitrate nitrogen, phosphorus, calcium, magnesium, chloride, and iron. Water analyses can be performed by university or private laboratories.

Water quality guidelines and laboratories are listed in the *Best Management Practices Guide for Producing Container-grown Plants* (3). Water quality standards for potable water are given in *Ground Water and Wells* (2).

A critical part of monitoring water quality is taking samples. It is important that samples represent the water source and that sampling procedures are reproducible and consistent. Water samples are usually taken from the source, such as a well or surface water, water running off production areas, collection basins or reservoirs, and water leaving the property. An important consideration when taking samples is safety (1). This is particularly important when sampling runoff collection basins, small bodies of water, or streams where water exits the property. Dense vegetation around water can harbor dangerous animals. Also, if sampling is done from piers or planks that extend over water, check their structural integrity. A second consideration is whether sampling can be repeated (1) at the specific location and depth. A third consideration is appropriate documentation (1) of the sampling location. There should be sufficient landmarks noted on a map that will enable others to sample at the same location.

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Documenting the nutrient composition of water used and discharged is an important management practice. For example, the electrical conductivity or soluble salts of the irrigation water may become elevated during times of inadequate rain. This can only be detected by periodic monitoring; however, frequency of sampling may vary. Collection of samples every two to four months is usually sufficient for routine monitoring; whereas, weekly sampling may be needed for trouble shooting a specific problem. At each sampling location, collect three replicate samples. Water samples should be obtained from the irrigation water source, reservoirs or basins containing irrigation water, runoff from production beds, and water discharged from the property.

Sample Collection Procedures

The following is a list of procedures for sampling well water, runoff water, reservoirs or collection basins, or water from irrigation risers. Sample collection from streams or discharge would be similar to reservoirs except sample depth is usually less for streams or discharge. This information was compiled after several years of sampling at container nurseries in Florida. Perhaps you can add additional procedures.

General Sample Collection Procedures

- Collect 3 replicate samples, usually within 3 minutes.
- Fill a new plastic bottle (100 ml or one-half cup) for each replicate sample.
- Cool samples, place on ice or refrigerate.
- Filter immediately to remove sand and particulates.
- Analyze within 48 hours unless filtered samples are frozen or acidified.

Well Water

- Collect from well water supplying production beds.

- Disconnect hose from spigot.
- Run water 5 minutes prior to sampling.
- Avoid sampling during air blast from spigot.
- Avoid sampling during times of extreme pressure fluctuation.
- Avoid sampling from spigot with reduced water flow due to clogging.
- Rinse bottle and cap.
- Collect full bottle.

Production Bed Runoff Water

- Find depression or water deep enough to submerge bottle and collect full bottle.
- Avoid old water already in depression or in place to be sampled.
- Avoid areas where soil movement was caused by equipment.
- Be careful not to bump pipes or disturb soil next to sample location.
- Avoid sampling runoff from just one side of production bed.
- Sample from lower end of one production bed where sample represents total bed area.
- Sample runoff from several production beds after runoff has flowed together.
- Avoid getting overhead irrigation water in sample.
- Collect sample near end of irrigation cycle.
- Avoid excess debris in sample.
- Injected fertilizer concentration could vary with sampling location.

Basin or Reservoir Water

- Gently move to one side the scum on water surface.

- Remove debris from water several minutes before sampling.
- Submerge bottle opening down, then turn upright under water.
- Collect full bottle 1-2 feet below surface.

Water from Irrigation Riser

- Avoid areas of poor irrigation uniformity.
- Run water 5 minutes prior to sampling.
- Rinse bottle and cap.
- Collect full bottle.
- Use pan to collect irrigation water if fertilizer is pulse injected.

Literature Cited

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