Citrus best management practices – water and nutrient management

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Best Management Practices or BMPs are production management strategies that are shown to minimize adverse water quality and other environmental impacts of agricultural production. They are designed to improve efficiency in citrus production and maintain an economically viable farming operation, while limiting the off-site effects on the environment.

In cases where the economic cost of implementing certain BMPs places a financial burden on the grower, cost sharing is available to ensure that future financial profitability of the farm will be preserved. Not all BMPs are applicable for every citrus operation. The BMPs that are most applicable to the overall citrus operation can be chosen from a checklist of BMPs. Currently, three manuals have been written containing checklists of BMPs for the Indian River Area, Peace and Manasota Basins, and the Southwest Florida or Gulf region.

BMPs are based on research results and focus on solutions to potential problems. Adequate records are very important for documentation of BMP implementation. Landowners must complete a checklist of BMPs to be implemented and submit a notice of intent to implement BMPs.

Education is key to ensuring the success of the BMP program. Programs providing information on selection and implementation of BMPs are scheduled at the Indian River Research and Education Center in Fort Pierce, the DeSoto County Extension Office in Arcadia, and Southwest Florida Research and Education Center in Immokalee. Training dates and topics may be obtained at the Citrus BMP Web site (http://citrusbmp.ifas.ufl.edu/).

Each BMP manual provides information on implementing BMPs in four categories:

1) water resource management,
2) erosion control and sediment management,
3) pest management, and
4) nutrient management.

COST SHARING

Cost sharing (typically 60 percent to 80 percent) for implementation of some BMPs is available. Eligible practices include aquatic weed control, water control structures, conversion to low-volume irrigation, building of mixing stations, and installation of water table wells and soil moisture sensors.

BMP manuals and information on cost sharing can be obtained by contacting Holly Chamberlain (863) 993-4846) or Ward Gunter (772) 468-3922 ext. 172). Information is also available from the Citrus BMP Web site (http://citrusbmp.ifas.ufl.edu/).

The remainder of this article will outline BMPs for water and nutrient management.

WATER AND NUTRIENT MANAGEMENT

The management of water and nutrients are closely linked. Nitrogen and phosphorus are essential to citrus growth and productivity. However, over-irrigation, mismanagement or spills can cause leaching or runoff of these nutrients, which can stimulate algal blooms or growth of aquatic weeds in surface waters. Water quality can be severely impacted if these elements are allowed to pass to water used for municipal water supply or game fishing. Salinity due to agricultural runoff can also reduce irrigation and surface water quality. Therefore, the following BMPs are designed to improve fertilizer efficiency and reduce the impact of agricultural activities on local environments.

Effective water management of flatwoods soils is required to minimize pumping for both irrigation and drainage. Surface water management strategies can range from water table management, irrigation scheduling, and improved ditch maintenance to additional on-site water storage in canals or detention reservoirs. Knowledge of the water table depth is essential to ensure that adequate drainage can be provided. Depth indicators in shallow observation wells provide a quick visual indication of water table depth. Irrigation schedules and drainage pumping can be altered to maintain the water table within a relatively narrow range of depths and reduce runoff.

Evapotranspiration is the amount of water taken from the soil on a daily basis and varies throughout the year depending on light intensity, temperature, wind, humidity and other weather conditions. In addition to observation wells, the use of evapotranspiration measurements provided by weather networks such as the Florida Automated Weather Network (FAWN) should be used to determine irrigation schedules. Tables in the BMP manuals and a user tool available at the FAWN site (http://fawn.ifas.ufl.edu) will assist the grower in scheduling irrigation using evapotranspiration measurements.

Soil moisture sensors such as tensiometers, TDR and capacitance sensors that monitor the soil water content can also be used for irrigation scheduling. Use of these sensors are described in the BMP manuals and can be maintained by the grower or consultants. Irrigation systems should be evaluated by the Mobile Irrigation Lab and maintained periodically to ensure proper function. BMPs to manage irrigation water salinity such as periodic laboratory analysis of irrigation water and management strategies are also outlined in each manual.

The development of a nutrient management plan is a key BMP in overall nutrient management. Management plans should include identification of soil types within grove blocks, realistic yield estimates, use of yearly soil and leaf sample analyses, and appropriate application rates and methods. Realistic crop yield estimates and soil and leaf analyses are key to determining appropriate application rates and methods. The soil type and grove history are two important considerations in determining realistic yield estimates. Local USDA-NRCS and county Extension personnel can assist in these determinations.

Proper collection and analysis of these samples can assist the citrus grower in determining how effective the current fertilizer program is, and the appropriate amount of fertilizer to be applied the next year. Guidelines for sample timing and collection, as well as interpreting sample analyses, are discussed in the BMP manuals and other Extension publications (such as SP 169, "Nutrition of Florida Citrus Trees").

No matter the fertilizer application method used (including fertigation), choice of equipment, equipment calibration, and cleanup of spills are key

to accurate delivery of fertilizer to the tree and not to areas that will lead to leaching or runoff of nutrient to the environment. Precision application methods (such as "Tree See" sensors or variable rate techniques) can apply fertilizer to the intended target area and not empty spaces, thus saving money and minimizing potential for leaching and runoff. The BMP manuals discuss appropriate equipment calibration and spill cleanup procedures. Some application and chemical loading facility equipment are eligible for cost sharing.

The use of water and nutrient management BMPs outlined in this article are good for both citrus production and the environment.