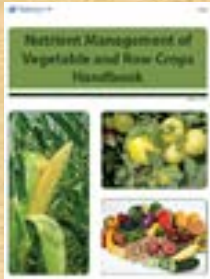




## SP500 - Nutrient Management of Vegetable and Agronomic Row Crops



The Florida Department of Agriculture and Consumer Services released an updated version of the Vegetable and Row Crops BMP manual in the spring of 2015. Copies of the new manual can be downloaded from the FDACS, Office of Agricultural Water Policy web site at

<http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents>

The updated manual references nutrient management practices documented in a new EDIS document. The document was developed by compiling several existing EDIS documents on vegetable and row crop nutrition in cooperation with their authors. Electronic copies of SP500 are available at

[https://edis.ifas.ufl.edu/topic\\_sp500](https://edis.ifas.ufl.edu/topic_sp500) and printed versions are available from the BMP Program by contacting Kelly Morgan ([conserv@ufl.edu](mailto:conserv@ufl.edu)).



June 1, 2017

### CEU Day for Pesticide Applicators:

Private Ag Pesticide Applicator License – review and exam. Exams administered after lunch. Lake County Extension Services.

On-line registration:

[http://lake.ifas.ufl.edu/agriculture/pesticide\\_training/index.shtml](http://lake.ifas.ufl.edu/agriculture/pesticide_training/index.shtml)



A production of the University of Florida,  
Institute of Food and Agricultural Sciences,  
Agricultural Best Management Practices Program

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## What Are Agricultural Best Management Practices?

Agricultural **Best Management Practices** (BMPs) are practical measures that producers can take to reduce the amount of fertilizers, pesticides, animal waste, and other pollutants entering our water resources. They are designed to improve water quality while maintaining agricultural production. The Florida Department of Agriculture and Consumer Services (FDACS) has adopted BMPs for most commodities in the state. Each BMP manual covers key aspects of water quality and water conservation. Typical practices include:

**Nutrient Management** to determine nutrient needs and sources, and manage nutrient applications (including manure) to minimize impacts to water resources.

**Irrigation Management** to address the method and scheduling of irrigation to reduce water and nutrient losses to the environment.

**Water Resource Protection** using buffers, setbacks, and swales to reduce or prevent the transport of sediments and nutrients from production areas to waterbodies.

### Removing the guesswork from irrigation: Using PeanutFARM and soil moisture sensors in the western Panhandle

Libbie Johnson, Agriculture Extension Agent, Escambia County  
Dr. Michael J. Mulvaney, Cropping Systems Specialist, WFREC,  
Jay, FL

Dr. Diane Rowland, Professor, Crop Physiology, Agronomy  
Department, Gainesville, FL

Installation of irrigation systems is typically increasing in Escambia County, but growers guess on application timing, amount, and frequency. This region has one Florida Automated Weather Network (FAWN) station in the neighboring county, but often it is not representative of the rainfall in Escambia County. We have a few growers who are using data-based decision support tools, such as the SmartIrrigation (SI) Cotton app and PeanutFARM, but without farm-based weather stations the information from FAWN needs tweaking.

In an effort to better serve our clientele, one of the early adopters of technology who has installed several pivot irrigation



systems was contacted to see if he and his son would be willing to partner with UF/IFAS to install soil moisture sensors and work with the data to help guide irrigation decisions on farm and to test the SI Cotton and PeanutFARM software. The father and son team, based out of Oak Grove, Florida, agreed to help us with this work to better their own management of crops and to assist other growers in our region.

Our first irrigation management meeting was held on March 7, at the Walnut Hill Community Center in conjunction with our local

irrigation system installer, which installed the majority of the systems in this region. He brought in a representative from a mid-west based company that focuses on remote irrigation management products that use digital cellular technology to remotely monitor, start, and stop a pivot. This opened the eyes of many of the growers that there are better ways to manage irrigation and crops. Our second speaker was David Cambron, our FDACS representative for Ag Water Policy who is working with local farmers for BMP sign-up. He shared with the growers the background of FDACS BMPs, how farmers are already



implementing BMPs, and the benefits for signing up with his office. Our third presenter, from Farm Credit Express; she covered loan programs related to installation of irrigation systems. Our final presenter, covered details pertaining to drilling wells in our area and what needs to be done prior to purchasing an irrigation system in terms of well drilling.

Before closing the meeting, I invited everyone to join us for the late summer On Farm Field Day to cover the preliminary results of the project. We had 27 people in attendance, 11 were Florida growers, and 6 were Alabama growers.

Dr. Mike Mulvaney has been the key to this project to getting off the ground. He consulted with UGA Precision Ag and Irrigation Specialist, Dr. Wes Porter to narrow down the type of soil moisture monitoring equipment that would be purchased, met with us several times in the field to determine the placement and how many probes to purchase, and has reviewed research publications to validate his methodology. He ordered enough equipment to fully cover the demo on the Farm with three different locations placed strategically in the field and for a similar trial at the West Florida Research and Education Center in Jay, Florida.

# Best management practices (BMPs) for water and nutrients on small greenhouse hydroponic vegetable farms in Florida

Robert Hochmuth, Multi-county Extension Agent (SVAEC)

The greenhouse hydroponic industry in Florida has seen substantial growth. In terms of the largest increase of the number of growers, the development has been in the very small acreage category. Small farmers often face challenges with affording available technology. This publication will focus on relatively inexpensive strategies to help small growers know when to start irrigation events and how long to run a single event when growing in soilless media such as: perlite, coconut fiber, composted pine bark, rockwool, or other soilless blends.

## Know the properties of your media

The general plan for managing the nutrient solution delivery to a soilless media in some type of container is to apply the proper amount frequently enough to maintain optimum moisture level for plant growth, simultaneously providing for a small amount of leaching during these irrigation events. One simple test every grower should conduct is the water-holding capacity test. To conduct this test, first measure and record the weight of a fully dried sample of the media in the container or bag to be used. Then, fully saturate the media several times with water allowing any drainage (leachate) to occur until it stops. Next, measure the weight of the saturated media after all leaching has ended. The difference between the wet and dry media is the weight of water each container can hold. Divide the



weight of the water by 8.34 (one gallon of water weighs 8.34 pounds). The resulting number provides the volume of water in gallons. This is an important first step so growers know how much solution each container can actually hold

## When to irrigate

Most soilless media will need to be irrigated several times per day. The number of watering events will increase as the plants grow. Plants pick up the solution in response to sunlight, driving the evapotranspiration process. Irrigation events should be reduced at the end of the day before darkness, to reduce the risk of high night time internal plant turgor pressure.

## Duration of an irrigation event

A small amount of leaching is needed to: 1) assure salt concentrations in the media do not increase to damaging levels, and 2) assure all plants receive adequate nutrient solution. Excessive amounts of fertilizer in the media can lead to soluble salt burn, especially on young plants or seedlings

## Concentration of nutrient solution

Control of soluble salt damage begins with correct formulation of the nutrient solution. In soilless media system, the EC in the slabs or bags should not vary more than 1.0 EC units (dS m<sup>-1</sup>) above or below the EC of the applied nutrient solution. A good management practice of any farm would be to collect any leachate coming out of a media and use it for other environmentally sound purposes such as fertilizing other crops on the farm.

## Simple leachate collection systems

Every grower should have two basic monitoring devices: one to measure the volume delivered to the crop, and one to measure the volume of the leachate collected. Without the data provided by these two measurements, growers



are not able to develop an irrigation plan based on actual water use. The collection system does not have to be fancy nor expensive. It just has to supply the grower with a means to collect the leachate in order to: 1) measure the amount from each irrigation event, 2) inform the grower of the time required for the irrigation cycle, and 3) gauge the daily adjustments once an initial baseline is determined. The optimum volume of leachate collected should be 10-20% of the total volume, as measured in the gallon container daily.

## Automated irrigation controllers

Soilless media farmers also can automate irrigation schedules to varying degrees. The simplest system is one consisting of a time clock that controls a solenoid to a nutrient solution on preset intervals. More sophisticated irrigation controllers are available, including various digital controllers or computers to control fertigation time, frequency, and other parameters (e.g., accumulated sunlight, temperature, scales measuring weight changes of media, etc.).

## Media moisture sensors

Recent research has been conducted at the UF/IFAS Suwannee Valley Agricultural Extension Center near Live Oak on the potential use of inexpensive, soilless media moisture sensors. These sensors measure volumetric water content of the soilless media. While further testing should be performed for various soilless media, initial research suggests these sensors are compatible with a fine coconut fiber media, but not coarse media materials such as perlite or composted pine bark. These economical moisture sensors would be another tool along with leachate collection systems helping to provide the smaller grower valuable information – saving the costly resources of crop nutrients, water, time and human endeavors.

## Fancy Farms Hosts Field Day

The development and implementation of agricultural Best Management Practices (BMPs) are ongoing processes that involve growers, regulators and researchers across Florida. The Florida Watershed Restoration Act of 1999 directed the Florida Department of Environmental Protection (FDEP), Department of Agriculture and Consumer Services (FDACS) and Water Management Districts to work together to reduce pollution of Florida's waters, specifically citing BMPs as the best way to accomplish this task.

BMPs are practical and cost-effective guidelines advising producers how to manage the water, nutrients and pesticides they use in order to minimize agriculture's impact on the state's natural resources. Most participation is voluntary, but participating growers are required to maintain records of their ongoing compliance with BMP standards.

BMPs typically cover four major areas: the use of fertilizers by producers; pest management; water use and discharge; and the management of sediments on and around a producer's property. Each is research-based and developed by FDACS and adopted by rule for different types of agricultural operations. Grower assistance in implementing BMPs on their operations is broad from the provision of manuals and on-site assistance to various cost-sharing programs.

Researchers from the University of Florida/Institute of Food and Agricultural Sciences recently met with growers for an update on a series of research projects associated with BMPs. The field day was hosted by Fancy Farms with support from the Mosaic Co. and Highland Precision Ag.

Soil and Water Scientist Dr. Kelly Morgan of University of Florida, Southwest Florida Research and Education Center at Immokalee told attendees "the next round of BMPs are focused more on precision ag types of products and services" utilizing technology to assist in with the implementation of practices. He noted a number of the applications for cell telephones are available at no cost.

Dr. Morgan detailed effective irrigation management for area strawberry growers noting "the need for water requirements of the crop throughout the season and water-holding characteristics of the soil." Such requirements vary from field to field and effective management plans should be developed for individual farms to optimize effectiveness. Morgan described tools available for such management activities and gave examples of how to use and these tools and outputs available to grower through their use. Some Water Management District cost-sharing programs support such management plans.

The findings of three-year trials at Fancy Farms designed to study control of Botrytis fruit rot on strawberry plans were presented by Dr. Natalia Peres, a plant pathologist at the University of Florida Institute of Food and Agricultural Sciences Gulf Coast Research and Education Center (GCREC). She noted the variables in weather conditions in each of the seasons and how "the available advisory system was helpful in guiding pesticide applications, advising growers to follow the alerts to choose products since it may not be necessary to use more costly silver bullet type products" thereby saving the grower money. While the most recent trials have not been completed, nor analyzed "specific grower recommendations will be forthcoming and based upon the replicated trials at Fancy Farms."

Dr. Amr Abd-Elrahman and Program Specialist Katie Britt presented information on the use of geomatics to identify and apply fertilizer BMPs on strawberry fields. They also demonstrated the ground-based, two-camera-equipped equipment developed and used to provide a photo mosaic of the fields over a period of time "allowing us to detect plant stress and water content." The use of drone imagery of the same fields enabled researchers to compare and confirm findings derived through the use of drone and ground-based imagery. Both Dr. Abd-Elrahman and Britt are based at the University of Florida Plant City Center and involved in the geomatics program offered there.

Nematologist Dr. Johan Desaegeer, a member of the GCREC faculty, reported on an emerging problem for strawberry growers, a foliar nematode that severely minimizes plant production, found on the inside of strawberry plant crowns. "The species is particularly hard to identify and must be confirmed by DNA analysis," he said. While the species is very rare, it has been detected in crops around the world, particularly in rice fields. Dr. Desaegeer told attendees the nematode had been reported in the Plant City area nearly a century ago and document in a 1929 article authored by Dr. Brooks. "At present, there is no product available to fully eliminate this nematode," Dr. Desaegeer said.

Dr. Joe Noling, a nematologist at the UF Citrus Research and Education Center, echoed Dr. Morgan's initial comments on the emerging importance of technological advances helping to provide growers with an assessment of their crop conditions and treatments in a manner that "does not require harvesting on a continuing basis."

More information on the field day updates is available at <http://bmp.ifas.ufl.edu/>