



# EXTENSION CONNECTION

By Juanita Popenoe



A soil sensor with a solar panel and rain gauge is installed in a row with 12 tons per acre of compost applied.

## Tools for measuring water use

Innovative citrus growers in the north-central area of Florida are starting to adopt soil moisture capacitance sensors. These sensors, available with various cost-share programs, can help the grower understand what is going on under the soil surface. The enormous amount of data provided can be a little intimidating at first, but you can soon learn to read the lines, and Extension can help if needed.

### SOIL SENSOR DATA

Not sure when to irrigate? Not sure how deep your roots are? The graphs

from soil sensor data show you the answers to these questions. Figure 1 (page 7) is a graph of the rainfall and soil moisture data from Jan. 14 to Feb. 9 at a Groveland citrus grove.

The sensor readings from this young citrus grove of two-year-old trees show that the roots are extracting water from 16 inches down. Soil moisture lines for 20 and 24 inches are pretty much steady horizontal lines. However, from 4 to 16 inches, you can see the stepwise uptake of soil water into the trees after rainfall or irrigation events. The steps are created as the

roots take up moisture during the day and then rest at night.

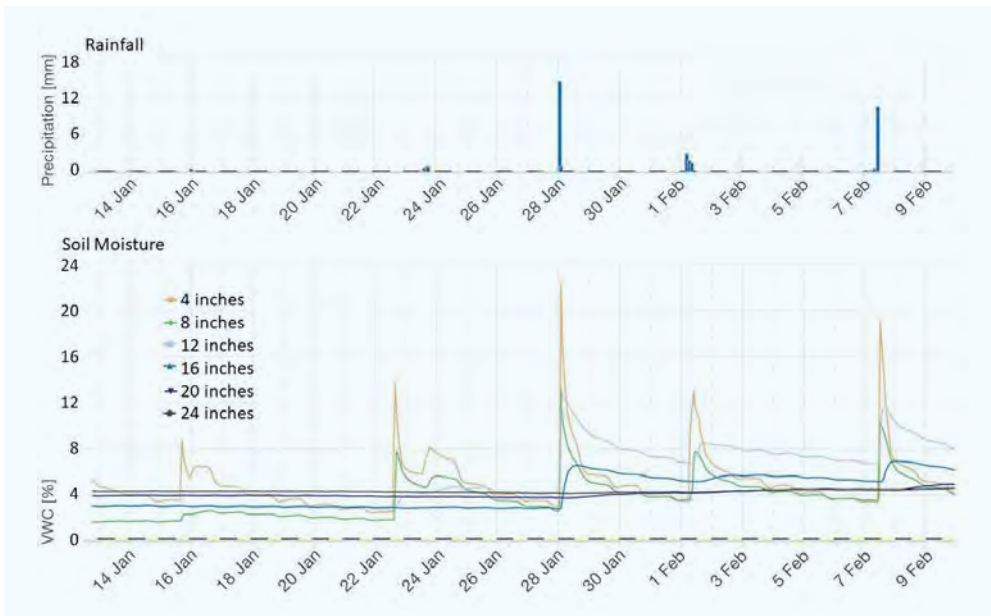
Roots will continue to take up water in this daily pattern until there is little water left in the soil. You can see that when the lines start to smooth out, like the period at the very beginning of the graph from Jan. 14 to 16. During that period, the upper 4 inches were still providing some water. But 8 inches down, there was not that much to provide. You will want to irrigate before the lines in the upper layers become too flat, which is what this grower did. He irrigated on Jan. 16 and again on Jan. 23 to get that moisture level back up.

Each time he irrigates, he does not get the water down much further than 12 inches. This ensures he is not washing his fertilizer away from the roots. Heavy rainfall may get water pushing fertilizer down below the root zone, but with the rainfall illustrated here on Jan. 28, the moisture did not go below 16 inches and was taken up by the roots in a few days.

### PROBE PLACEMENT AND COMPOST USE

The probes in this grove were set between the young trees rather than inside the dripline where probes would be placed for mature trees. The probes were also placed at the top of the hill rather than the bottom. The soil at the bottom would be wetter, and if used to decide irrigation events, would not indicate enough water application to the dryer soil at the top of the hill. The placement of the probe is critical to success, and you may want to have more than one depending on your site.

The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) is using these probes to look at differences in soil moisture with various levels of compost application. Compost applications of 0, 4, 8 and 12 tons per acre may create differences in water-holding capacity, which the probes would show. The project was just started in December, but hopefully a field day will take place later this year or early next year. This is a program that will be turned over to another Extension agent, since I wrote this article just prior to my retirement in April. It is difficult to leave in the middle of something so interesting!



**Figure 1.** A soil sensor graph shows rainfall and soil moisture data from Jan. 14 to Feb. 9 at a Groveland citrus grove.

### OTHER OPTIONS

Not quite ready to try this technology? There are other types of soil probes and ways to schedule irrigation that use indirect measurements of plant water use with weather station calculations of evapotranspiration. One example is the Florida Automated Weather Network Citrus Irrigation

Tools (see [fawn.ifas.ufl.edu/tools/irrigation/citrus](http://fawn.ifas.ufl.edu/tools/irrigation/citrus)). Every tool uses some way to measure or calculate the amount of water used by the plants so that you can replace that water and keep your plants stress-free. Using a weather station to calculate evapotranspiration will be more accurate the closer the station is to your grove.

No matter how you decide to measure water use, using some tool to help you reduce water use while keeping your trees happy is a good thing for the environment. 🍊

*Juanita Popenoe is a retired UF/IFAS multi-county commercial fruit Extension agent.*



**NANO CARBON BIOSTIMULANT**

Apply CarbonGrow with foliar, drip, or irrigation methods for:

- Increased tank-mix delivery
- Increased nutrient uptake
- Increased root development
- Increased micronutrient delivery

WE HAVE COMBINED NANOTECHNOLOGY WITH CARBON TECHNOLOGY, AND THE RESULTS ARE **IMPRESSIVE.**

**ADVANCED TANK MIX DELIVERY.**



**"I believe in your product and I am in full confidence regarding the benefits from using it."**

James Gravley, Director Citrus Operations  
Old Florida Citrus LLC.



For more information, contact your local Howard sales representative.



HOWARD FERTILIZER AND CHEMICAL CO., INC.

**407-855-1841**

8306 S. Orange Ave Orlando, FL 32809