Optimizing irrigation and young tree management

By Davie Kadyampakeni and Sandra Guzmán

Young citrus trees require optimal irrigation management for vigorous vegetative growth, leaf flushing and the establishment of a dense canopy. Poor practices such as infrequent irrigation or not using irrigation scheduling tools could be costly. Young tree growth also could be impacted by excessive water and nutrient losses. Crop water stress in young trees directly affects yield and fruit quality. This article covers some strategies for optimizing young tree care and irrigation management for grove efficiency and productivity.

REFLECTIVE MULCH

In the past five to 10 years, the use of reflective mulch has been effective for improving the establishment and performance of young trees. Limited evaporation saves water, and the reflective mulch repels the Asian citrus psyllid (the pest that transmits the pathogen that causes citrus greening) and regulates soil temperature.

Additionally, since most of the water is delivered within 6 to 10 inches of the root zone, nutrient and water uptake are increased significantly, resulting in vigorous tree growth. This aids in the establishment of a promising citrus grove that can sustain retention of the first fruit load in the era of citrus greening.

PLASTIC-FABRIC MULCH COVERS

Plastic groundcover also appears to increase water storage in the soil and limit evaporation, thereby promoting water-use efficiency. In studies conducted on Ridge and Flatwoods soils, these covers achieved greater water retention and faster growth, compared to bare ground. Preliminary insights from plastic-fabric mulch ground-covers can be found on the Citrus Industry website (see citrusindustry.net/2020/04/14/fabric-mulch-ground-covers-save-water).

FREQUENT IRRIGATION WITH EXISTING TOOLS

Most importantly, frequent irrigation enhances the performance of young trees. Readily available tools include soil moisture sensors, weather stations (Florida Automated Weather Network stations available at fawn.ifas.ufl.edu/ or commercially available weather stations) and irrigation apps.

There are at least seven different operating principles of electronic soil water sensors used by various brands: time domain reflectometry (TDR), time domain transmission (TDT), frequency domain reflectometry, amplitude domain reflectometry, phase transmission, tensiometer, and resistance granular matrix sensors. For sandy Florida soils, using capacitance, TDT and TDR sensors is appropriate due to low maintenance requirements.

The installation processes for these sensors and interpretation of soil moisture are available and their advantages and suitability for irrigation scheduling on sandy soils have been discussed by several authors (see citrusindustry.net/2017/07/10 and citrusindustry.net/2018/07/10).


The use of weather stations and smartphone irrigation apps for proper irrigation scheduling and determination of water budgets is discussed by researchers at edis.ifas.ufl.edu/pdf/files/SS/SS66000.pdf. These tools are cost-effective ways of reducing water inputs and increasing water savings in citrus production operations by real-time monitoring of water use or crop evapotranspiration, rainfall and irrigation events.

PROPER FERTIGATION

Correct timing and placement of fertilizer in the root zone are important...
Fan-Jet® Single Microsprinklers

Superior Performance and Quality

Fan-Jet Single J4 - 14 Stream “Fill In”
- Better fill-in pattern
- More water in the first two feet
- Uniform distribution between streams
- Uniform stream lengths

Fan-Jet Single M - 330° Flat Mist
- 10° larger wetted area
- Uniform flat mist pattern

Serving Florida since 1977!

CONCLUDING SUMMARY

In summary, using irrigation-scheduling tools, weather stations and irrigation apps is important for managing young citrus groves and ensuring production efficiency. Some tools that growers have for establishing young citrus groves, such as reflective mulch and plastic-fabric covers, can also control pests and improve water savings and nutrient retention while promoting vigorous tree growth and potentially boosting early fruit yields.

Davie Kadyampakeni and Sandra Guzmán are University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) assistant professors at the Citrus Research and Education Center in Lake Alfred and the Indian River Research and Education Center in Fort Pierce, respectively.