

Using Ground Covered Beds and Soil Moisture Sensor Based Irrigation as a Best Management Practice for Citrus Water Management

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A citrus grove equipped by microsprinkler irrigation system, soil moisture, sensors, fabric mulch ground cover, weather station, smartphone application, and computer software.

Summary: In Florida citrus, black fabric mulch groundcovers have been used to manage the invasive insect, *Diaprepes abbreviatus* (root weevil). These groundcovers not only control pests but also have the potential to enhance water uptake by trees and retain nutrients around the root system, making them a beneficial practice. Over a five-year period from 2019 to 2023, we conducted a study in a commercial lemon grove to assess the impacts of fabric mulch groundcovers on water management, plant root growth, and yield. Our results show that using groundcovers led to a 30% increase in fruit weight compared to uncovered treatments over three consecutive years, with smaller differences

between treatments observed in 2023. Canopy growth and trunk diameter also showed improvements with the groundcover. In terms of water and nutrient management, combining soil moisture sensor-based irrigation with groundcovers resulted in potential water savings of up to 20%, with greater savings observed during the first year after planting. Additionally, irrigating more frequently with shorter durations, preferably in the early morning (before 8:00 am), contributed to increased fruit weight. Our team collected real-time data from soil moisture sensors and monitored environmental factors such as rainfall, soil temperature, solar radiation, and wind velocity. Using this information, we provided daily

irrigation recommendations for both the covered and uncovered ground areas. We compared the total water applied in each treatment with various physiological variables, including root and canopy growth, trunk diameter, and fruit yield, to evaluate the effects of these groundcovers.

Take Home Message:

- Using groundcovers led to a 30% increase in fruit weight.
- Irrigating more frequently with shorter durations, preferably in the early morning (before 8:00 am), contributed to increased fruit weight.
- Non-statistical differences in percent °Brix or percent total acid between the covered and uncovered treatments.

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