

On-Farm Irrigation Scheduling Tools to Improve Water Use Efficiency

Dr. Girisha Ganjunte and John Clark, Texas A&M AgriLife Research

Support provided by: US Bureau of Reclamation, USDOJ; USDA-NIFA, Rio Grande Basin Initiative through Texas Water Resources Institute and Texas A&M Agrilife Research in collaboration with the local growers



Flood irrigation is common in the region due to soil salinity

BACKGROUND

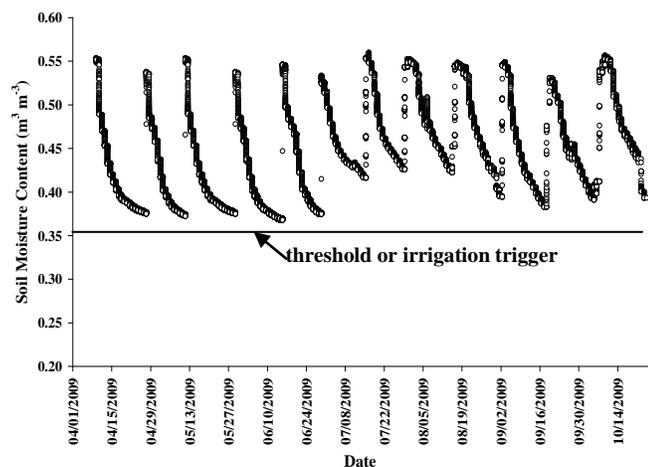
Pecan (*Carya illinoensis*) is one of the major irrigated crops in the El Paso region and water use of pecan trees is greater than that of most row crops. Irrigation efficiency and crop water use efficiency can be improved by scheduling irrigation based on soil moisture content. In recent years, new inexpensive sensors have been developed to monitor real-time soil moisture conditions. In addition to soil moisture content, some sensors can measure soil salinity. High soil salinity has long been recognized as a major concern for irrigated agriculture in Far West Texas. Therefore, sensor needs to be able to provide accurate data on soil moisture conditions across a wide range of soil salinity. In this project, we examine the accuracy of different sensors (ECH₂O 5TE, Tensiometer, Water Mark) to provide real time soil moisture for the development of improved irrigation scheduling for pecan orchards in the region. The results of this

research have the potential to reduce irrigation costs, conserve water and increase farm profits.

OBJECTIVES

- Evaluate the accuracy of three different soil moisture sensors to provide real time soil moisture measurements over a range of soil types and salinity conditions.
- Develop improved irrigation scheduling based on sensor soil moisture data to improve on-farm water use efficiency and conserve freshwater resources.
- Estimate water savings due to improved irrigation scheduling.

FINDINGS AND BENEFITS



Real time sensor data on volumetric soil moisture at each irrigation event



Example of a soil moisture sensor installed in the field

Results indicated that while all three sensors were successful in following the general trends of soil moisture conditions during the growing season. Accuracy of measurements by tensiometer was relatively greater than that of ECH₂O 5TE and Watermark. Sensors data showed that in all irrigation events the soil moisture content was well above the threshold level, indicating that excess water was applied by conventional method. Preliminary results indicate that at least one-irrigation could be saved per season by irrigating fields based on soil moisture data. With an estimated 9,000 acres under irrigated pecan production in El Paso County Water Improvement District #1, about 3,000 acre feet of freshwater can be saved. The results of this study can help in improving water use efficiency in pecan orchards, conserve precious freshwater resources and increase farm profits.