

4. Why soil moisture sensing makes sense.

Jones (2007) concluded that monitoring of soil water content is the most valuable measure of plant or soil water status for the purpose of irrigation scheduling, as soil moisture monitoring consolidates all environmental conditions (e.g. temperature, light levels, humidity) into one measurement. For this reason, researchers over the last decade have initiated studies on the plausibility of utilizing soil-moisture based irrigation control to improve irrigation efficiency. Many studies have indicated that using on-site, real-time sensing technology to monitor and control irrigation events serves three valuable purposes: 1) it reduces the number of environmental measures required to control irrigation to one, the volumetric water content of the soil or substrate; 2) it reduces the maintenance and calibration of sensors required to calculate an irrigation event to one, the capacitance-based soil moisture probe; 3) it utilizes on-farm data to determine soil moisture and therefore increases the precision and accuracy of environmental measurements compared to using measurements from off-site locations. Additionally, these data are easily integrated into existing, timer-based, irrigation systems and allows for easy automation. Despite a great deal of scientific work, no automated irrigation control system based on soil moisture has been widely adopted by specialty crop industries.

One reason for a lack of adoption of soil moisture-based sensor irrigation systems by commercial specialty crop industries has been a reluctance to implement any new irrigation technology without significant research, testing, and economic analysis; first in a controlled research setting and subsequently in on-farm settings. However, many soil moisture sensors have been developed in the last two decades that can be utilized in specialty crop agriculture systems. This includes the widely adopted Acclima TDT control system (Acclima Inc., Meridian, ID) developed for turfgrass applications. Yet, until recently, no soil moisture sensor-based control system (hardware) has been matched with a software package targeted to specialty crop producers. We have accomplished this goal, with the help of 2009 USDA-NIFA Specialty Crops Research Initiative funding and commercial partners Decagon Devices, Inc. and Mayim, LLC. The PlantPoint™ system, being released in 2015, should give growers a set of tools that affords them the ability to better monitor and manage not only irrigation; but also a host of other soil and environmental parameters.

Jones, H.G. 2007. Monitoring plant and soil water status: Established and novel methods revisited and their relevance to studies of drought tolerance. J. Exp. Bot. 58:119-130.

