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## Automated Irrigation May Help High Plains

By SHANNON HOLMAN

Computers have changed the way we send letters, buy cars and now may influence the way farmers irrigate their crops. For the past five years, cotton plants on a test site in Lubbock, Texas, have been irrigated by a computerized irrigation system which helps conserve water while maintaining maximum yield.

“We have two problems on the Texas High Plains,” says Robert Lascano, Texas A&M Agricultural Experiment Station (TAES) soil physicist. “One is that we have a high evaporative demand on the crop, which means the environment determines how much water a crop will need. The other problem is that we are running out of water.”

Because of the limited water supply for irrigation, TAES researchers developed an automated system designed to measure the water requirements of a crop and then irrigate accordingly.

Lascano explains that the technologies involved are the measurement of plant water use with electronic stem flow gauges, measurement of soil water using time domain reflectometry (TDR) and the use of environmental variables obtained from a standard weather station.

An important component of the new system is the soil water content measurements taken using TDR equipment developed by Steven Evett, a soil scientist with USDA-ARS in Bushland, Texas.

Evett says TDR involves stainless steel probes inserted into the ground at varying depths that provide a good measurement of soil moisture when queried by the TDR system.

The computer-controlled TDR instrument measures soil moisture by sending an electronic pulse through a buried cable in the field to each probe. Then, the computer turns the water pumps on and off at pre-determined soil moisture levels.

### **Limited Water**

Faced with a limited water supply, many producers practice what is known as deficit irrigation, where the water applied is less than the water requirements of the crop.

Fortunately, cotton responds well to deficit irrigation. In fact, sometimes supplying water on demand increases vegetative growth but reduces lint yield, Lascano says.

Findings from the five-year study confirmed that High Plains producers benefit from watering every other row instead of every row. This reduces the amount of water loss brought about by evaporation.

Lascano says that cotton in the High Plains responds well to very frequent irrigation in small quantities. For example, he says irrigating every one to three days with a tenth of an inch of water does extremely well compared to using higher amounts.

Finally, the study was used to determine when irrigation should end based on cumulative heat units from emergence. Researchers are hopeful that these findings will allow producers in the High Plains to better use the limited water supplies.

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