

TIMELY INFORMATION

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Removing Field Crop Soil Moisture Sensors At Irrigation Season End

General Description

Soil moisture sensors are used throughout the crop irrigation season to monitor moisture available in the soil for crop growth. As the field crop irrigation season ends, these soil moisture sensors must be removed from the field before harvesting to avoid damage and needless replacement expense.

This publication illustrates the need for timely end-of-season soil moisture sensor removal from Alabama field crops and suggests methods to make sensor removal easy even in dry soil conditions.

Field Sensor Assemblies and Sensor Station Installations

There are a number of soil moisture sensors on the market, but probably the most common used in Alabama row crop irrigation is the WaterMark granular matrix sensor. Sensor removal suggestions for this sensor should apply generally for other sensors as well.

The WaterMark, when read by the manufacturer's meter, indicates per cent (%) available moisture present at sensor depth. Sensors are typically glued into 12", 24", or 36" sections of ½" SCH 315 PVC with ABS/PVC glue. Before gluing the sensor, sensors leads are threaded thru the PVC pipe to the end opposite the sensor. The open end of the ½" PVC is closed with either duct tape or a ½" PVC cap, with leads sticking out for connection with the sensor meter during reading. This PVC pipe allows easy sensor setting and removal, although either operation can be difficult in dry soil.

Typically a soil sensor station is made up of two sensors for field corn in shallow Alabama root zones, one at 9" depth and one at 18" depth, about 6" apart and in the row drill to avoid vehicle traffic throughout the season. For Alabama field crops like cotton and peanuts, with deeper rooting zones, in addition to a 9" sensor and 18" sensor, sometimes a 30" sensor is also used to check deep moisture status.

Regardless of the number of sensors installed in a sensor station, when the growing season begins to wind down and the need for irrigation is over, sensors should be removed to prevent damage during harvest, cleaned and stored for use next year.

Cost of Damage and Replacement

Figure 1 shows a two-sensor station in corn that was not removed before harvest. Even though the sensors were set in the row drill in line with the corn plants, harvesting equipment damaged both sensors. The sensors themselves were not damaged but the severely bent PVC pipe cannot be re-used. Unless it can be “un-glued” from the sensor without damaging the sensor or sensor wiring and replaced with new PVC, the whole sensor assembly must be replaced. New sensor and PVC pipe and labor to assemble could run as much as \$75 per sensor (2010 prices). Replacement cost for this two-sensor station could run as much as \$150.



Figure 1- Sensors damaged by corn harvester. Note orange flags marking location.

Suggested Removal Tools

The most important soil sensor removal tool is high soil moisture in the soil surrounding the sensor. If possible, select the day after the last irrigation to remove the sensors. Even with sprinkler irrigation you should still carry water to soak the ground surrounding the sensors if necessary. A trenching shovel or a pair of hole diggers and diligent care to keep tool blades away from the thin-wall SCH315 PVC pipe used on the sensors are also suggested.

Figure 2 shows a two-sensor station in cotton where water is being used to soften the Dothan fine sandy loam soil surrounding the sensors. The hole diggers are being used to remove the softened soil down to the depth of the adjacent sensor. Note the PVC cap on the top sensor pipe and the missing cap (broken by hole diggers) on the sensor in the bottom of the picture. The broken cap can be replaced at minimal cost and this sensor reused. Note also the yellow flag marking sensor location.



Figure 2 - Soaking hole digger holes with water to soften soil surrounding sensors.

Figure 3 shows sensors removed from the cotton field laying on the large hole dug by hole diggers for removal. Once sensors are removed, the remaining holes should be filled with soil to prevent damage to field personnel and equipment that will be used in crop harvesting and soil preparation for the following crop.



Figure 3 - Removed sensors laying on the large hole dug by hole diggers for removal.

Figure 4 shows a long sensor (24”) that was easily removed by hand after water soaking over lunch. This is a Paxville loam soil, very poorly drained, in the Wiregrass area of Alabama and is found in lower, wetter parts of fields.



Figure 4 - Soil sensor easily pulled out by hand after water soaking in a peanut field.

Summary

Irrigators should use timeliness, water soaking, a trenching shovel or pair of hole diggers, and care to remove soil moisture sensors from irrigated row crops at the end of irrigation and before harvest to avoid damage by harvesting equipment and the high cost of sensor replacement. Once removed, sensors should be cleaned and stored in a dry environment for re-use the following irrigation season.

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