

Efficiency Below the Surface

Subsurface drip tape irrigation crosses over to row crops **BY MARGY FISCHER**

The master of micromanaging crops is Kip Cullers. The world-record holder for soybean yield is always trying something new. In 2011, Cullers partnered with John Deere to run a trial with a subsurface drip irrigation (SDI) system on five acres of soybeans.

SDI technology is gaining traction in farm country, thanks to companies such as John Deere, Netafim, Toro and others that have developed systems specifically designed for row crops, including corn and soybeans.

“For more than 10 years, we’ve been conducting on-farm SDI studies across the Midwest in row crops,” says Claude Corcos, marketing manager of Toro Agricultural Irrigation. “Compared with other irrigation methods, we’ve seen yields increase 30% when SDI is used. With \$7 corn, farmers can see a return on investment in two years.”

Corcos says SDI systems can range from \$1,200 to \$1,500 per acre, and approximately 80% of installations have been financed using the cost-sharing provisions of the Environmental Quality Incentives Program.

Right on target. While SDI can be more expensive to install compared with other irrigation methods, over time it can improve watering efficiencies up to 99% in water used as applied.

Cullers has used an aggressive daily watering schedule with center pivots to achieve his award-winning soybean yields. So the idea of watering less but more efficiently was appealing.

“My theory is, if you have plenty of moisture and the plant isn’t stressed, then the plants have the capability to cool themselves,” Cullers says.

To conduct the study, John Deere installed drip tape 4" deep on 30" centers directly over his twin-row soybeans. The test was designed for one year, whereas a permanent system might be installed 12" to 20" deep with a 15- to 25-year lifespan.

“Design of a subsurface system will vary by soil condition, plastic thickness, quality of the water and more,” says Jim Chambers, technology solutions manager for John Deere Water.

The John Deere SDI system was integrated with Field Connect, a remote data system that networks soil moisture sensors to wirelessly transmit data via cellular and satellite service to an online account for data in real time. The soil moisture sensors are placed at 4", 8", 12", 24" and 36".

“At the varying depths, the sensors can show you an immediate response to a watering event or rainfall, and you can see how soil moisture changes over time,” Chambers says.

Cullers calculates that the SDI area of the field required one-third as much water as was used with the overhead irrigation to maintain his field capacity goal. In drought conditions, the soybeans watered with SDI yielded 9 bu. more than those under the center pivot.

“From the middle of June up until the soybeans were at full maturity, we got zero rainfall,” Cullers says. “I’d run the drip every three days and it kept up, whereas I ran the overhead sprinklers every day and those did not.”



PHOTO BY THE AUTHOR

With a small-scale in-field plot, Missouri farmer Kip Cullers says he already sees advantages to subsurface drip tape irrigation.

Additional benefits that Cullers observed include reduced disease pressure and the ability to run fertilizer through the SDI tape to spoon-feed his crops.

Cullers also tested the SDI system in corn this past year, but due to back-to-back extreme drought conditions, the test wasn’t taken to yield.

As systems are tested in more geographies and with corn and soybeans, the possibilities of SDI in row crop production increase.

“We have a large tape that is 1⅜" diameter, and with low flow rates and a wide-set emitter, we can have up to ½" mile-length runs across a field,” Corcos says. “Also, for hilly terrain there is pressure-compensating tape to ensure accurate delivery of irrigation.”

With an increased focus on water management, SDI is posing interesting possibilities for many growers. **F**

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