GROWING COTTON WITH SUBSURFACE DRIP IRRIGATION ON COASTAL PLAIN SOILS AT THE WIREGRASS RESEARCH STATION

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Abstract

The crops chosen for our subsurface research were cotton and peanuts because of their popularity across the wiregrass. The test consisted of eight different blocks with 20 rows spaced 36 inches apart, 210 feet in length, in each block. Inside each one of these eight blocks were 5 sub plots consisting of 4 rows each. The two center rows being yield rows and the two outside being border rows. Of these 5 sub plots, two were subsurface drip irrigated at a flow rate of 0.25 gal/hr/emitter and two sub plots drip irrigated at 0.37 gal/hr/emitter replicated 12 times. The fifth subplot was not irrigated and replicated 6 times. The drip tape was buried at a consistent depth of 15 inches directly between the two yield rows. There were six different blocks devoted to growing cotton and two different blocks devoted to growing peanuts. All tillage was strip tillage. The irrigation amount was determined by a chart designed by Larry Curtis, Extension Engineer Auburn University that was based on crop canopy and pan evaporation, which was monitored daily during the growing season. The 0.25 gal/hr/emitter drip tape showed a 3% increase (1629 lbs lint/ A vs. 1582 lbs lint/ A) over the 0.37 gal/hr/emitter drip tape. More importantly we saw that a 22% (1605.5 avg. lbs lint / A vs. 1264.0 lbs lint / A) increase in production was shown over dry land cotton production.

Objectives

- To allow producers the opportunity to irrigate small, irregular shaped fields where pivots are not suitable while achieving yields greater than non-irrigated crops.
- Help farmers establish irrigation where drilling large wells for high water output was not economically feasible, reducing the investment risk of irrigating crops and increasing the sustainability of agriculture.
- Increase the efficiency and precision of water in the sandy soils of southeast Alabama.

"Dry Run" for subsurface drip tape

Methods

The test was originally installed in 1999 primarily as a cotton irrigation study. Beginning in 2006 this test was re-evaluated to include other crops in a rotational sequence. The crops chosen in 2006 were cotton and peanuts. The test consists of eight different blocks with 20 three foot rows, 210 feet in length, in each block. Inside each one of these eight blocks there are 5 sub plots which are 4 rows each. The two center rows are the yield rows and the two outside rows are border rows. Of these 5 sub plots, two are subsurface drip irrigated at a flow rate of .25 gal/hr/emitter and two sub plots are drip irrigated at .37 gal/hr/emitter. The fifth sub plot in each block is non irrigated. The two different flow rates of drip tape are for evaluation of these two different types of tape and the length of time the water is applied to the crops. Such irrigated plots will receive the same amount of water. The lower flow rate type will run longer than the higher flow rate tape to deliver the same amount of water. The drip tape has been buried at a consistent depth of 15 inches directly between the two yield rows.

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All five sub plots within each block of cotton was harvested independently for yield by a John Deere 9910 cotton picker with a bagging system. The peanuts were harvested with a Hustler Peanut combine and the yield was recorded with a weigh buggy.

2006 and 2007 Results

Emitter Size (per emitter)	Crop (per Acre)	Yields
0.25 gal/hr	Cotton	1519.5 lbs lint
	Peanut	6446.5 lbs
0.37 gal/hr	Cotton	1526.0 lbs lint
	Peanut	6663 lbs
Dryland	Cotton	929 lbs lint
	Peanut	4915 lbs

Conclusion

With the progress of precision agriculture and the increasing availability of RTK equipped tractors in Southeast Alabama, the adoption of subsurface drip could become a viable tool in row crop production. With the sandy soil type found throughout Southeast Alabama and the small field design, subsurface drip irrigation would help improve crop productivity. The need for a good chlorination and winterization program is important to the systems longevity and sustainability. Also proper installation and design of the system is vital to its success. The rotational work with cotton will continue at the Wiregrass Research Center in Headland to evaluate the long term results of subsurface drip irrigation and its impact on sustainable row crop production.