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2014

Strip Tillage Systems for Single and Twin-Row Peanut Production with and without a Cover Crop

Principal Investigators

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Locations

Headland, AL; Tifton, GA

Summary

This report describes third and final year results of a study to compare three strip tillage implements across single and twin row patterns with and without a cover crop during the 2014 crop year in Headland, AL. The KMC and Orthman tillage implement maintained the highest surface residue levels, regardless of cover crop level, while twin rows produced numerically more surface cover compared to single rows, although the differences were not significant. When averaged over all treatments, twin rows were superior to single rows, but the cover crop did appear to depress yields compared to fallow plots, particularly in twin rows.

Methods

This experiment was designed to compare three strip tillage implements (KMC, Orthman, Unverferth) in single and twin row patterns with and without a cover crop. To date, the study has been conducted at two locations during the 2012, 2013, and 2014 growing seasons. The following report will focus on the results at Headland, AL in 2014.

Surface Residue

The average rye biomass production at termination was 4193 lb/ac across the experimental area at Headland, AL. Surface residue remaining following planting was different ($p = <0.0001$) between fallow (41.0%) and rye (64.9%) plots. The surface residue that remained where there was no cover crop present was old cotton stalks and additional weeds that were not controlled adequately, although weeds were terminated prior to planting. Row pattern had a very slight effect ($p = 0.0994$) on the surface residue remaining following planting. Surface residue cover averaged 49.5% across all single row treatments compared to 56.4% across all twin row treatments. Surface residue counts appear lower in 2014 compared to the previous two years.

Residue measured in 2014 was approximately 950 lb/ac less compared to 2012 and 3000 lb/ac less compared to 2013. Despite the production of less biomass in 2014, it is surprising that fallow plots produced residue levels higher than normal. In 2012, surface residue levels for the fallow plots were 15.7%, but amounts were similar for 2013 (39.2%) and 2014 (41.0%).

Peanut Yields and TSMKs

Peanut yields measured at the Headland location during the 2014 growing season were very good, but there were no differences observed among any of the variables examined. The variability of peanut yields observed across all the factors examined is illustrated in Table 1 for the 2014 crop year. A three-way interaction ($p=0.0168$) was observed between cover crops, tillage implements, and row patterns for total sound mature kernels. Total sound mature kernels, a measure of peanut quality, averaged in the mid-70s, but slight differences were detected between some treatments. Peanut grades for fallow plots in twin rows were higher than single rows, except for the KMC implement (Table 2). However, peanut grades for rye plots in twin rows were higher than single rows in the rye plots, regardless of tillage implement (Table 2).

Table 1. Peanut yields measured across cover crop treatments, row patterns, and tillage implements during the 2014 growing season at the Wiregrass Research and Extension Center in Headland, AL.

Tillage implement	Fallow		Rye	
	Single	Twin	Single	Twin
	-----lb/ac-----			
KMC	5473	6216	6458	6049
Orthman	5891	5984	5975	5780
Unverferth	5547	5817	5714	6263

Table 2. Total sound mature kernels measured across cover crop treatments, row patterns, and tillage implements during the 2014 growing season at the Wiregrass Research and Extension Center in Headland, AL.

Tillage implement	Fallow		Rye	
	Single	Twin	Single	Twin
	-----%-----			
KMC	76	74	75	77
Orthman	74	75	76	77
Unverferth	76	77	74	77

Conclusions

These results represent the third and final year of data collection at Headland. Overall, yields were good, but there was not as much effect of treatments on the variables examined compared to the first two years of the study. No one tillage implement performed consistently better than the other implements throughout this three year experimental period with the possible exception of lower surface residue cover remaining following operation of the Unverferth. This can likely be attributed to the type of coulters used behind the shank on this implement. All data will be consolidated across years to determine if one tillage implement may perform better than another across cover crops and/or row patterns.