Tillage, Cultivar, and Row Pattern Comparisons for Peanut Yield and Tomato Spotted Wilt Virus Incidence. R.S. TUBBS and J.P. BEASLEY, JR, Dept. of Crop and Soil Sciences, University of Georgia – Tifton Campus, P.O. Box 748, Tifton, GA 31793.

Three of the most influential agronomic factors on peanut yield and tomato spotted wilt virus (TSWV) incidence are tillage practice, cultivar selection, and row pattern. Literature shows varying results when comparing conventional tillage systems with strip-till planting into a cover crop. Equivalent yields have been reported for strip-till systems in relation to conventional tillage for peanut. However, lower pod yields have also been reported in reduced tillage systems when comparing to conventional tillage. Climatic conditions, the types of weeds in a field, and density of those weeds all play important roles in determining the effectiveness of conservation tillage systems.

The most devastating problem facing peanut growers in the southeast during the last 15 years has been TSWV. Reports have shown that conservation tillage systems can reduce the severity of TSWV when compared to conventional tillage systems. In addition, twin row patterns have been documented as reducing levels of TSWV and improving yields in peanut. The release of new disease resistant cultivars with exceptional genetic defense against disease threat can further minimize the impact of major peanut diseases.

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Materials and Methods

The experiment took place in 2007 at the RDC Pivot on the University of Georgia's Tifton Campus in Tifton, GA. A cover crop of rye was killed with a burndown application of glyphosate in mid-April. Peanuts were planted in mid-May. A split-split plot design was used with tillage system as the main plot factor - conventional tillage (disk harrow, moldboard plow, bedding) and strip-till into standing rye. The first sub-plot factor included eight cultivars ('GA Green', 'GA 03L', 'AT 3081R', 'AT 3085RO', 'GA 02C', 'AP-3', 'AP-4', and 'GA 06G') which were planted in either single or twin row pattern (sub-sub plot factor) at 87,120 seed per acre. Plots were 6 ft wide and 50 ft long. Preplant herbicide application of labeled rates of pendimethalin followed by diclosulam and flumioxazin watered in within 24 hours after planting was used for weed control.

Results and Discussion

Significant differences were observed for tillage, cultivar, and row pattern for pod yield and % TSWV incidence, but no interactions occurred. Conventional tillage yielded more than strip-till in 2007, however strip-till had less TSWV. The twin row pattern had higher yields and reduced TSWV compared to single row planting. When comparing cultivars, GA 06G had the highest yield and among the lowest TSWV, while GA Green had among the lowest yields and the highest TSWV incidence. The only other cultivar with over 10% TSWV incidence was

AP-4, which was more susceptible to the virus than all cultivars except GA Green, although AP-4 yielded more than GA 02C. Both AT 3081R and AT 3085RO cultivars yielded well, although AT 3081R was not as resistant to TSWV in relation to GA 06G in this trial. The cultivars GA 03L and AP-3 did not yield as much as GA 06G, AT 3081R, or AT 3085RO, but were among the lowest in TSWV incidence.

Cultivar	lb/ac		Tillage	lb/ac	
GA Green	5036	DE	Conventional	5766	A
GA 03L	5080	DE	Strip-Till	4944	B
AT 3081R	5537	BC			
AT 3085RO	5684	B			
GA 02C	4684	E	Row Pattern	lb/ac	
AP-3	5096	DE	Single	5286	B
AP-4	5208	CD	Twin	5423	A
GA 06G	6512	A			

Cultivar	% TSWV		Tillage	% TSWV	
GA Green	17.8	A	Conventional	6.6	A
GA 03L	2.7	CD	Strip-Till	5.6	B
AT 3081R	5.8	C			
AT 3085RO	3.4	CD			
GA 02C	2.7	CD	Row Pattern	% TSWV	
AP-3	3.9	CD	Single	6.7	A
AP-4	10.5	B	Twin	5.5	B
GA 06G	2.0	D			

Conclusions

Because of mixed results when comparing conventional deep tillage to strip-till for peanut, it is difficult to make a universal recommendation on which tillage system is best. Data from this experiment suggests maximized yields are achieved with conventional tillage, yet 2006 data had higher yields in strip-till and there was no difference between tillage methods in 2005 (data not shown). Literature shows similar discrepancies with conventional tillage having higher yields in some experiments and no yield differences observed in other experiments. However, the documented benefits of conservation tillage systems should still be taken into consideration including reduced fuel, labor, and equipment costs, plus decreased soil erosion.

Differences in row patterns have been more definitive. Twin rows provided better results than single rows in terms of yield and % TSWV. In 2005, twin rows again had reduced incidence of TSWV compared to the single row pattern. Although it was not measured in this study, there have also been reports of reduced white mold in twin row patterns.

The most significant technology in battling TSWV over the last 15 years is undoubtedly disease resistant cultivars. Georgia Green has been the standard over this span, with over 90% of acreage planted in the southeast for much of this time frame. The release of cultivars with even greater disease resistance packages and higher yield potential have caused a decline in GA Green acreage, although this variety will still be a factor in southeastern peanut production for several more years because of its lower water requirements compared to many cultivars and also seed availability. Nonetheless, results from this experiment show the strong yield and TSWV resistance potential of several cultivars recently released including GA 06G, AT 3081R, and AT 3085RO.