

PEANUT CULTIVAR RESPONSE WHEN PLANTED IN EITHER TWIN OR SINGLE ROW PATTERNS BY STRIP-TILLAGE OR NO-TILLAGE METHODS

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Abstract. The object of this experiment was to determine the response of peanut when planting in single or twin row patterns by strip-tillage or no-tillage methods. During 1997 and 1998 the peanut cultivars 'Georgia Green' and 'Georgia Runner' or 'Georgia Green' and 'Georgia Bold' (*Arachis hypogaea* L.) were planted in 9.5 or 9.0 inch twin row patterns versus 36 inch single row at the same seeding rate (6 seed/foot single or 3 seed/foot twin). The peanuts were planted into mowed cotton stubble without a cover crop by either strip-tillage or no-tillage methods.

During 1997, there was no difference in grade (TSMK) or tomato spotted wilt incidence (TSWV) between strip tillage and no tillage. 'Georgia Green' had significantly less TSWV than 'Georgia Runner.' There was a significant yield increase for twin row over single row. In 1998, there was no response to tillage method or row pattern. 'Georgia Green' did have significantly less TSWV than 'Georgia Bold.' In both years, there was a trend toward higher yields with the twin row pattern and digging losses would attribute to the lack of response to the twin row patterns during 1998.

INTRODUCTION

Conservation tillage practices continue to increase for Georgia farmers who are looking for ways to reduce production costs through labor and time savings. They are also seeking erosion control, better water holding capacity and less runoff. There have been several studies that show that reduced tillage peanut production has had inconsistent results when compared to conventional peanuts (Cheshire et al. 1985, Colvin et al. 1988, Hartzog and Adams 1989, Williams et al. 1997). There have also been studies to show that there are fewer insect pests and less tomato spotted wilt virus (TSWV) when peanuts are planted by reduced tillage methods versus conventional planting (Brandenburg et al. 1998, Baldwin and Hook 1998).

Baldwin et al. (1997) demonstrated that six peanut cultivars had improved yield, grade, and TSWV when planted by twin row patterns compared to single row when planted by conventional methods.

The objective of this study was to compare the response of three peanut cultivars in yield, grade, and TSWV incidence when planted in twin or single row patterns by strip-tillage or no-tillage methods.

MATERIALS AND METHODS

The plot area for the study was a Greenville sandy loam soil type located at the South West Georgia Branch Experiment Station at Plains, Georgia. The objective was to establish a series of long term rotational and tillage studies primarily looking at the effects of tillage and rotational crops on the yield and grade of peanuts produced. In the fall of 1994, all plots were disked, subsoiled and planted to a wheat cover crop. In the spring of 1995, the entire area was planted to no-till corn with no irrigation. Yields over the plot area averaged 75 bushels/acre. In 1996, the area was divided into three two acre blocks to initiate a corn, cotton, peanut rotation with each crop planted by either strip-till or no-till methods with supplemental irrigation. Yields in 1996 were strip-till corn, 159 bushels/acre; no-till corn, 163 bushels; strip-till cotton, 2.5 bales/acre; no-till cotton, 2.28 bales/acre, strip-till peanuts, 4407 pounds/acre and no-till peanuts, 3463 pounds/acre.

During 1997, the peanut cultivars 'Georgia Green' or 'Georgia Runner' were planted by strip-till or no-till methods in either single 36 inch row or twin 9.5 inch row patterns following cotton stubble with no cover crop. The entire plot area was following cotton in 1996. The cotton stalks were mowed and the area left fallow with no cover crop during the fall and winter of 1996. One quart/acre of Roundup herbicide was sprayed prior to planting as a burndown. One pint of Starfire plus 1 quart/acre of Prowl was applied preplant and 300 pounds/acre of 3-18-9 analysis fertilizer was applied to the surface on March 4, 1997. A six row KMC strip-till unit was utilized to mark off rows prior to planting the strip-till plots. A two row Monosem planter was used to plant each cultivar in either 36 inch or 9.5 inch twin row following the in-row subsoil KMC unit. Temik (aldicarb) was applied at 4.3 pounds/acre rate in-furrow. The no-till plots were planted

with the Monosem planters fitted with a Yetter ripple coulters to cut through any existing residue. Each cultivar was planted at 6 seed/foot of row for single row or 3 seed/foot of row for the twin row to obtain the same seeding rate/acre. All plots were a randomized complete block design with three replications. Main plots were tillage and subplots were row patterns and cultivars. All plots were planted on May 8, 1997; dug with a UFT digger set up for twin row with a 30 inch blade and 30 degree frog on October 3, 1997; and harvested on October 7, 1997. Plot yields were corrected to 7% moisture and graded according to FSIS standards.

During 1998, the peanut cultivars 'Georgia Green' and 'Georgia Bold' were planted. One quart/acre of Roundup herbicide was sprayed prior to planting as a burndown. One pint of Starfire plus one quart/acre of Prowl was applied preplant and 300 pounds/acre of 3-18-9 analysis fertilizer was applied to the surface on March 7, 1998. A six row KMC strip-till unit was utilized to mark off rows prior to planting the strip-till plots. A two row Monosem planter was used to plant each cultivar in either 36 inch or 9 inch twin row following the in-row subsoil KMC unit. Temik (aldicarb) was applied at 4.3 pounds/acre rate in-furrow. The no-till plots were planted with the Monosem planters fitted with a Yetter ripple coulters and row cleaner to cut through any existing residue. Each cultivar was planted at 6 seed/foot of row for single row or 3 seed/foot of row for the twin row to obtain the same seeding rate/acre. All plots were a randomized split plot design with three replications. Main plots were tillage and subplots were row patterns and cultivars. All plots were planted on May 6, 1998; dug with a standard KMC two row digger on September 25, 1998; and harvested on September 28, 1998. Plot yields were corrected to 7% moisture and graded according to FSIS standards.

RESULTS AND DISCUSSION

Yield, grade, and TSWV incidence of peanut cultivars in response to tillage and row pattern are found in Table 1 for 1997. There was no difference in grade or TSWV incidence between strip tillage or no tillage. 'Georgia Green' had significantly less TSWV than 'Georgia Runner' at a sight which traditionally has had less TSWV than other areas of the state. There was a significant response to twin row over single row for yield (Table 1). The response of twin row over single would indicate that more studies need to be conducted. Even though not significant across cultivars and row patterns, there was a trend for increased yield and a reduction of TSWV of strip-till. Peanut yields averaged across the two varieties were 3960 lbs/acre and 3640 lbs/acre for strip-till versus no-till. The yields for twin row patterns were 4307 for strip-till and 3930 lbs/acre for no-tillage plots. Corn yields were 117 bu/acre for strip-till

and 104 bu/acre for no-till. Cotton produced 1.89 bales/acre regardless of tillage type.

1998 yield, grade, and TSWV incidence of cultivars in response to tillage and row pattern are found in Table 2. There was no difference in yield, grade, or TSWV incidence between strip tillage and no tillage. 'Georgia Green' had significantly less TSWV than 'Georgia Bold' at a sight which traditionally has had less TSWV than other areas of the state. There was no significant response due to row pattern during 1998 compared to 1997 (Table 2). The soil was slightly wet at digging and a standard set digger was used in place of the digger modified for twin row patterns. Nine inch or wider twin row on a 36 inch outside row pattern should be dug with 30 inch blades and a 30 degree frog to reduce digging and harvest losses. A Poast-tolerant variety of corn was planted during 1998 and even under irrigation it yielded only 57 bu/acre on strip-till and 79 bu/acre by no-tillage planting methods. During 1998 the strip-till cotton yielded 1.9 bales/acre compared to 1.85 bales/acre for the no-tillage planted cotton.

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LITERATURE CITED

- Baldwin, J.A. 1997. Yield, grade, TSWV incidence of several peanut cultivars when planted in twin versus single row patterns. Georgia Peanut Research Extension Report No. 98-2.
- Baldwin, J.A. and J. Hook. 1998. Reduced tillage systems for peanut production in Georgia. Peanut Sci. 30:48.
- Brandenburg, R.L., D.A. Herbert, Jr, G.A. Sullivan, G.C. Naderman, and S.F. Wright. 1998. The impact of tillage practices on thrips injury of peanut in North Carolina and Virginia. Peanut Sci. 25: 27-31.
- Cheshire, J.M., Jr., W. L. Hargrove, C.S. Rothrock, and M.E. Walker. 1985. Comparison of conventional and no-tillage peanut production practices in central Georgia, pp. 82-86. In W.L. Hargrove, F.C. Boswell, and G.W. Langdale (eds) The Rising Hope of Our Land. Proc. South. Region No-till Conf., 16-17 Jul, Griffin, GA.
- Colvin, D.L. and B.J. Brecke. 1988. Peanut cultivar response to tillage systems. Peanut Sci. 15:21-24.
- Hartzog, D.L. and J.E. Adams. 1989. Reduced tillage for peanut production. Soil Tillage Res. 14:85-90.
- Williams, E.J., J.L. Davidson Jr., and S. Hilton 1997. Effect of selected reduced tillage practices on peanut

yield, grade, and disease incidence. Georgia Peanut Research Extension Report No. 98-2.
Wright, F.S. and D.M. Porter. 1995. Conservational tillage

and cultivar influence on peanut production. Peanut Sci. 22:120-124.

Table 1. Yield and Grade Response of ‘Georgia Green’ and ‘Georgia Runner’ to Row Patterns and Tillage Method. SW Branch Station, Plains 1997.

	YIELD	TSMK	OK	TSWV
	lb/acre	-----%-----		
No-till	3640	75	2	16
Strip-till	3960	76	2	12
LSD	NS	NS	NS	NS
‘Georgia Green’	3860	76	2.5	8*
‘Georgia Runner’	3740	76	2.4	20
LSD	NS	NS	NS	3
Single	3580*	75	2.5	14
Twin	4020	76	2.4	14
LSD	381	NS	NS	NS

* Significant at $P \leq .05$

Table 2. Yield and Grade Response and ‘Georgia Green’ and ‘Georgia Bold’ to Row Patterns and Tillage Method. SW Branch Station, Plains 1998.

	YIELD	TSMK	OK	TSWV
	lb/acre	-----%-----		
No-till	3525	75.0	2.5	25
Strip-till	4015	75.2	2.3	31
LSD	NS	NS	NS	NS
‘Georgia Green’	3850	75.0	2.8	22*
‘Georgia Bold’	3690	75.0	2.0	34
LSD	NS	NS	NS	NS
Single	3860	74.7	2.5	30
Twin	3680	75.4	2.3	27
LSD	NS	NS	NS	NS

* Significant at $P \# .05$