

TIMELY INFORMATION

Agriculture & Natural Resources

February 10, 2009

PP-668

2008 Peanut Cultivar Evaluations for Southeast Alabama

Yields and reaction of commercial runner peanut cultivars to diseases

A. K. Hagan, H. L. Campbell, J. R. Weeks, K. L. Bowen, and L. Wells

Disease resistance remains among the most effective methods of minimizing yield loss to damaging diseases such as tomato spotted wilt (TSWV), early and late leaf spot, and white mold in peanut. While the level of resistance in newly released peanut cultivars is not sufficient to greatly reduce the number of costly fungicide applications needed to control early and late leaf spot and rust, it's good enough to greatly reduce the risk of catastrophic yield losses when protective fungicide applications are delayed by weather or other factors. The level of white mold resistance may be high enough in some newly released cultivars that fungicide treatments target for the control of this disease may be eliminated. In addition, great strides have been made in selecting peanut cultivars that have high levels of resistance to TSWV. Finally, the cultivar Tifguard not only has a good foliar and soil disease resistance package but is also resistant to the peanut root knot nematode.

The objectives of this series of studies at the Wiregrass Research and Extension Center is to determine the reaction of commercial peanut cultivars to leaf spot diseases, rust, white mold, and TSWV as well as the impact of soil insecticide and fungicide inputs on peanut yield.

Title: Effect of soil insecticide treatments on the yield of commercial and experimental peanut cultivars as well as their reaction of leaf spot diseases and white mold.

Objective: Assess the susceptibility of commercial and experimental peanut cultivars to leaf spot diseases, white mold, and tomato spotted wilt (TSWV) as well as the impact of at-plant soil insecticide treatments on the occurrence of tomato spotted wilt, other diseases, and peanut yield.

Production Methods: On May 22, commercial runner-market type peanut cultivars were planted using conventional tillage practices at a rate of 6 seed/ft of row using conventional tillage practices in a Dothan fine sandy loam ($OM \leq 1\%$) soil in a field cropped to peanut every third year at the Wiregrass Research and Extension Center. A tank mixture of Strongarm at 0.45 oz/A + Sonalan at 1 qt/A was broadcast and lightly incorporated with a disk harrow. The test area was irrigated as needed. A split plot design with cultivars as whole plots and at-plant soil insecticides as sub-plots was used. Whole plots were randomized in four complete blocks. Individual sub-plot treatments of 4 lb/A Thimet 20G, 6.5 lb/A Temik 15G, and non-treated control consisted of four 40-foot rows spaced 3-feet apart. The fungicide spray program was designed to control leaf spot diseases and white mold. Fungicides were applied with a boom sprayer with three TX-8 nozzles per row calibrated to deliver 15 gal/A at 45 psi. Tomato spotted wilt virus (TSWV) hit counts (1 hit was ≤ 1 foot of consecutive severely TSWV-damaged plants per row)

were made on October 3. Early and late leaf spot were rated on October 2 using the 1-10 Florida peanut leaf spot scoring system where 1 = no disease, 2 = very spotted leaves, 3 = few spotted leaves in lower and upper canopy, 4 = some leaf spotting and $\leq 10\%$ defoliation, 5 = leaf spotting noticeable and $\leq 25\%$ defoliation, 6 = spotted leaves numerous and $\leq 50\%$ defoliation, 7 = spotted leaves very numerous and $\leq 75\%$ defoliation, 8 = numerous leaf spots on few remaining leaves and $\leq 90\%$ defoliation, 9 = very few remaining leaves covered with leaf spots and $\leq 95\%$ defoliation, and 10 = plants defoliated or dead. White mold hit counts (1 hit was ≤ 1 foot of consecutive white mold-damaged plants per row) were made immediately after digging on October 5 for all cultivars except for York, which were dug on October 23. Significance of treatment effects were tested by analysis of variance and Fisher's protected least significant difference (LSD) test ($P=0.05$).

Results: While TSWV pressure was lower in 2008 than had been seen in previous years, significant differences in the disease levels were found between cultivars (Table 1). Georgia Green and McCloud had higher TSWV hit counts than all other peanut cultivars except GA03L. Fewest TSWV hits were recorded on Tifguard and York. Significant differences in the level of leaf spotting and premature defoliation were noted between peanut cultivars with Georgia Green suffering the heaviest leaf spotting and over 40% premature leaf loss (Table 1). In addition, AT3085RO had a higher leaf spot rating than the remaining peanut cultivars. In contrast, a low level of leaf spotting with little or no leaf loss was seen on Tifguard and York. Georgia Green had the highest white mold hits counts. McCloud and AT3085RO also were sensitive to white mold. Lowest white mold incidence was seen on York. Equally high yields were recorded for Tifguard, York, FL07, and GA03L. Georgia Green, McCloud, and AT3085RO, all of which had among the highest disease ratings, had among the lowest yields.

Table 1. Average yield and disease response for commercial runner peanut cultivars.

Peanut cultivar	Disease ratings			Yield lb/A	Grade
	TSWV	Leaf spot	White mold		
Mid-season (mature 130-145 DAP)					
AP-3	4.4 b	4.1 c	3.9 d	4883 bc	70.0 c
AT3085RO	3.9 b	5.0 b	6.8 bc	4673 c	70.9 c
FL07	3.6 bc	3.9 c	5.6 cd	5039 ab	70.3 c
GA03L	5.1 ab	4.2 c	4.6 d	5019 ab	70.8 c
Georgia Green	5.8 a	5.7 a	10.0 a	4114 d	73.3 ab
McCloud	5.9 a	4.2 c	7.9 b	4590 c	72.8 b
Tifguard	1.2 d	3.3 d	4.1 d	5216 a	73.9 a
Late (mature 140-165 DAP)					
York	2.1 cd	3.2 d	1.3 e	5202 ab	68.8 d

^aWhite mold (WM) and TSWV incidence is expressed as the number of hits per 80 ft of row.

^bLeaf spot was rated using the Florida 1 to 10 rating scale.

^cMeans in each column that are followed by the same letter are not significantly different according to Fisher's protected least significant difference (LSD) test ($P\leq 0.05$).

Since the soil insecticide treatment x cultivar interaction for TSWV, leaf spot diseases, white mold, yield and grade were not significant ($P\leq 0.05$), data for these variables that is presented in Table 2 was pooled across peanut cultivars. Overall, TSWV incidence was lower for the Temik 15-treated peanuts than for the non-treated control, while the disease rating for the Thimet 20G-treated peanuts was intermediate between the latter treatments. In contrast, leaf spot ratings were lower for the Thimet 20G- compared with the Temik 15G-treated peanuts and the non-treated controls. Soil insecticide treatment did not significantly influence the incidence of white mold, peanut yield or grade.

Table 2. Impact of soil insecticide treatments on peanut yield and disease intensity averaged across peanut cultivars.

Soil insecticide and rate/A	Disease Ratings			Yield	
	TSWV ^z	Leaf spot ^y	WM ^z	Lb/A	Grade
Temik 15G 6.5 lb/A	3.3 b	4.3 a	5.8 a	4826 a	71.6 a
Thimet 20G 4 lb/A	3.8 ab	4.0 b	5.6 a	4843 a	71.2 a
Non-treated control	4.8 a	4.8 a	5.1 a	4853 a	71.3 a

^zWhite mold (WM) and TSWV severity is expressed as the number of hits per 60 ft of row.

^yLeaf spot was rated using the Florida 1 to 10 rating scale.

^xMeans in each column that are followed by the same letter are not significantly different according to Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

For AT3085RO, FL07, Tifguard, and York, TSWV, leaf spot, and white mold ratings as well as yields were similar for all soil treatments (Table 3). On AP-3, TSWV ratings were lower for both the Thimet 20G and Temik 15G treatments than for the non-treated control. The Temik 15G-treated GA03L had fewer TSWV hit counts compared with the Thimet 20G and the non-treated control. Incidence of TSWV on Georgia Green and McCloud was not influenced by soil insecticide treatment. Leaf spot ratings were lower for the Thimet 20G- than the Temik 15G-treated GA03L and non-treated Georgia Green. Leaf spot ratings were similar for AP-3 and McCloud across all soil treatments. On Georgia Green, white mold incidence was higher with the Temik 15G compared with the Thimet 20G and non-treated control. Similar white mold hit counts were recorded across all soil treatments for AP-3, GA03L, and McCloud. On Georgia Green, the non-treated control had higher yield than the Temik 15G-treated peanuts.

Table 3. Impact of soil insecticide treatments on disease intensity and yield by peanut cultivar.

Peanut cultivar Soil insecticide and rate/A	Disease Ratings			Yield lb/A
	TSWV ^z	Leaf spot ^y	White Mold ^z	
AP-3				
Temik 15G 6.5 lb/A	3.0	4.0	2.3	5112
Thimet 20G 4 lb/A	2.8	4.2	4.8	4707
Non-treated control	6.3	4.0	4.7	4831
AT3085RO				
Temik 15G 6.5 lb/A	3.7	5.2	7.5	4550
Thimet 20G 4 lb/A	4.5	4.7	6.5	4890
Non-treated control	3.7	5.2	6.3	4616
FL07				
Temik 15G 6.5 lb/A	3.0	4.0	5.0	4928
Thimet 20G 4 lb/A	3.2	3.8	7.0	5031
Non-treated control	4.7	3.8	4.8	5158
GA03L				
Temik 15G 6.5 lb/A	2.7	4.8	5.0	5058
Thimet 20G 4 lb/A	6.2	3.5	3.3	5251
Non-treated control	6.5	4.3	5.3	4746
Georgia Green				
Temik 15G 6.5 lb/A	5.8	5.8	13.5	3687
Thimet 20G 4 lb/A	5.5	5.2	8.8	4165
Non-treated control	6.2	6.0	7.7	4489

McCloud				
Temik 15G 6.5 lb/A	3.2	4.2	7.3	4976
Thimet 20G 4 lb/A	3.7	4.0	8.3	4338
Non-treated control	2.5	4.5	8.0	4456
Tifguard				
Temik 15G 6.5 lb/A	1.2	3.5	5.7	5109
Thimet 20G 4 lb/A	1.0	3.3	3.7	5197
Non-treated control	1.5	3.2	3.0	5342
York				
Temik 15G 6.5 lb/A	2.2	3.2	0.5	5185
Thimet 20G 4 lb/A	2.2	3.3	2.5	5173
Non-treated control	1.8	3.2	1.0	5256

^zWhite mold (WM) and TSWV severity is expressed as the number of hits per 60 ft of row.

^yLeaf spot was rated using the Florida 1 to 10 rating scale.

Summary: Peanut cultivars varied considerable in their reaction to TSWV, leaf spot diseases, and white mold. On the eight cultivars, Tifguard and York had among the lowest ratings for all of the above diseases. Other cultivars that may have partial resistance to TSWV, leaf spot, and white mold were GA03L and FL07. Generally, cultivars that displayed good disease resistance had the highest yields. However, peanut grade did not appear to be associated with reduced disease damage. Georgia Green, which suffered considerable TSWV, leaf spot, and white mold damage, was the lowest yielding peanut cultivar. Due to low TSWV pressure, the Thimet 20G soil treatment had little impact on the incidence of this disease and on peanut yield. Reductions in TSWV incidence obtained with Temik 15G and leaf spot ratings with Thimet 20G had no influence on peanut yield or grade.

Title: 2008 Standard Peanut Variety Trial (PVT) at the WGREC

Objective: Yields and reaction of commercial peanut cultivars and advanced breeding lines to tomato spotted wilt (TSWV), leaf spot diseases, and white mold were compared at the Wiregrass Research and Extension Center.

Production Methods: On May 8, commercial peanut cultivars and advanced breeding lines were planted at a rate of 6 seed/ft of row in a field that was cropped to peanut after two years of cotton using conventional tillage practices in a fine Dothan sandy loam (OM<1%). Gypsum at a rate of 600 lb/treated acre was applied on a 14-in. band over the row middle on June 20. Weed, disease, and insect control were according to Alabama Cooperative Extension System recommendations. The test was irrigated as needed. Plots that consisted of two 20-foot rows spaced 3 feet apart were arranged in a randomized complete block. TSWV hit counts (1 hit was \leq 1 foot of consecutive TSWV-damaged plants per row) were made on September 8, September 15, and September 28 for the early, mid-season, and late maturing peanut cultivars, respectively. Leaf spot diseases were rated together on September 8, September 15, and September 28 for the early, mid-season, and late maturing, respectively, using the 1-10 Florida peanut leaf spot scoring system. White mold hit counts (1 hit was \leq 1 foot of consecutive diseased plants per row) were made after digging on September 15, September 26, and October 3 for the early, mid-, and late maturing cultivars, respectively. Yields are reported at 7% moisture. Significance of treatment effects were tested by analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

Table 4. Yields and reaction of peanut cultivars and advanced breeding lines to several diseases.

Peanut cultivar	Maturity	TSWV hits/40 ft ^z	Leaf spot rating ^y	White mold loci/40 ft ^z	Yield lb/A
-----------------	----------	---------------------------------	----------------------------------	---------------------------------------	---------------

Andru II	Early	9.8 efghi ^x	3.1 efgh	1.8 def	4922 efghij
AP-3	Mid	10.8 efgh	4.6 a	3.3 def	6118 a
AP-4	Mid	11.3 efgh	3.3 defg	1.5 ef	5078 defghi
AT 3-1114	Mid	30.0 af	4.0 abc	3.0 def	4226 j
AT 215	Early	8.5 gh	2.9 fgh	7.5 ab	4653 fghij
AT3085RO	Mid	17.5 bcd	3.5 cdef	6.8 abc	4535 hij
C-724-19-25	Mid	8.0 ghi	2.6 h	2.8 def	5667 abcde
C-99R	Late	12.5 defgh	3.6 cde	3.0 def	5855 abc
CRSP 702	Late	14.5 cdef	3.3 defg	1.5 ef	5273 bcdefghi
CRSP 895	Late	12.3 defgh	4.1 abc	2.8 def	5409 abcdef
EXP 27-1516	Mid	13.5 defg	3.3 defg	7.8 a	4468 ij
Florida 07	Late	10.3 efghi	4.3 ab	2.5 def	5634 abcde
Florida Fancy ^w	Mid	10.0 efghi	3.0 efgh	5.0 abcd	4896 efghij
GA02C	Late	7.8 hi	4.5 a	0.3 f	6094 ab
GA03L	Mid	9.5 efghi	3.0 efgh	2.0 def	5559 abcde
GA05E	Late	11.8 efgh	3.6 cde	3.3 def	6145 a
GA06G	Mid	9.3 fghi	3.0 efgh	0.3 f	5741 abcd
GA07W	Mid	10.3 efghi	2.9 fgh	2.8 def	5885 abc
Georgia Green	Mid	20.7 b	3.8 bcd	3.5 def	4566 hij
Georgia Greener	Mid	11.3 efgh	2.8 gh	4.3 bcde	5335 bcdefg
GPS 08-1	Late	11.0 efgh	2.9 fgh	1.5 ef	5751 abcd
GPS 08-2	Late	15.0 cde	3.0 efgh	3.8 cde	4947 efghij
GPS 1104	Late	11.5 efgh	4.3 ab	1.5 ef	4724 fghij
McCloud	Mid	19.8 bc	3.0 efgh	2.5 def	4612 ghij
Tifguard	Mid	4.8 i	2.9 fgh	3.8 cde	5165 cdefghi
York	Late	9.0 fghi	3.8 bcd	0.3 f	5794 abcd

^zTSWV and white mold severity is expressed as the number of hits per 40 ft of row.

^yLeaf spot was rated using the Florida 1 to 10 leaf spot rating scale.

^xMeans followed by the same letter in each column are not significantly different according to analysis of variance and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

^wAll cultivars are a runner-market type except for Florida Fancy, which is a Virginia-market type.

While the highest incidence of TSWV was noted in the breeding line AT 3-1114, the current industry standard Georgia Green, McCloud, and AT3085RO also had high TSWV ratings. Disease incidence in nine other cultivars and breeding lines was similar to the low TSWV loci counts found in Tifguard. While a low level of early leaf spot was present on some cultivars, late leaf spot dominated. Highest leaf spot ratings were recorded for AP-3, AT 3-1114, CRSP 895, GA02C, and GPS 1104. Leaf spot ratings for the industry standard Georgia Green was similar to all of the latter peanut lines except for GA02C and AP-3, which suffered heavier damage. Georgia Greener and C-99R had the lowest leaf spot ratings. While white mold pressure was relatively low, noticeable disease development was observed on several peanut lines. Hit counts were higher on Florida 07, AT3085RO and C-724-19-25 than on the majority of peanut cultivars and breeding lines, while York, GA06G, and GA02C had the lowest hit counts. Yield for AP-3 and GA05E was higher than those for all cultivars except GA02C, GA06G, C-99R, GA07W, GPS 08-1, C-725-19-25, CRSP 895, and York. Cultivars that had the highest TSWV loci counts particularly AT 3-1114, AT3085RO, McCloud, and Georgia Green had among the lowest yields.