

TIMELY INFORMATION

Agriculture & Natural Resources

January 14, 2009

PP-663

YIELD AND REACTION OF COMMERCIAL RUNNER PEANUT CULTIVARS TO DISEASES AS INFLUENCED BY SOIL INSECTICIDE TREATMENT IN FAIRHOPE IN 2008

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

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 as well as 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. Resistance to white mold may be high enough in some newly released cultivars that fungicide treatments can be eliminated. In addition, great strides have been made in selecting for peanut cultivars that have high levels of resistance to TSWV.

The soil insecticides Temik 15G and Thimet 20G are widely used on peanut for the control of thrips. In addition, Thimet 20G insecticide has shown to reduced the incidence of TSWV in peanut, particularly in situations where virus pressure is very high on TSWV-susceptible peanut cultivars. The impact of Temik 15G on TSWV incidence in peanut has been mixed.

The objective of this study 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 insecticides on the occurrence of TSWV and peanut yield.

Production Methods: On May 22 2008, commercial runner-market type peanut cultivars were sown in a field cropped to peanut every third year at the Gulf Coast Research and Extension Center in Fairhope, AL. Weed and leaf spot control as well as soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was not irrigated. A split plot design with cultivars as whole plots and an soil insecticide treatment as sub-plots was used. Whole plots were randomized in four complete blocks. Individual sub-plots consisted of four 30-foot rows spaced 3.2-feet apart. Sub-plot soil insecticide treatments were 4 lb/A of Thimet 20G, 6.5 lb/A of Temik 15G, and a non-treated control.

Disease Assessment: Final TSWV hit counts (1 hit was defined as \leq 1 foot of consecutive TSWV-damaged plants per row) were made on October 10. Early and late leaf spot were rated on September 30 using the 1-10 Florida peanut leaf spot scoring system where 1 = no disease, 2 = very few spotted leaves in canopy, 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. Rust severity was rated using the ICRISAT 1-9 rating scale where 1 = no disease and 9 = 80 to 100% of leaves withered on September 30. White mold hit

counts (1 hit was defined as ≤ 1 ft of consecutive white mold damaged plants per row) were made immediately after the plots were dug on October 14. Yields are reported at 10% moisture. Significance of treatment effects were tested and Fisher's protected least significant difference (LSD) test ($P \leq 0.05$).

Weather Conditions: Rainfall totals for May, August, and September were above the 30-year average but totals for June and July were below that average.

Results: While significant differences in TSWV incidence were noted between cultivars, disease incidence was considerably lower than had been seen in previous years. Highest TSWV incidence was noted on Georgia Green. In contrast, TSWV levels in AP-3 and AT3085RO were very low. The least leaf spotting with no premature defoliation was noted on GA03L, GA02C, and York. Highest leaf spot and rust ratings were recorded for AT3085RO. Peanut cultivars with the lowest rust ratings were AP-3, GA02C, GA03L, Georgia Green, and York. In addition, all of the latter cultivars suffered little white mold damage. White mold levels were much higher on AT3085RO than all of the other peanut cultivars. Highest yields were recorded for Georgia Green, FL07, GA02C, and McCloud. Despite generally low disease ratings, AP-3 and GA03L yielded significantly less than the above peanut cultivars. Low yields are a reflection of the susceptibility of AT3085RO to leaf spot diseases, rust, and white mold.

Table 1. Yield and disease response for commercial runner peanut cultivars when averaged across soil insecticide treatments.

Peanut cultivar	TSWV ^z	Leaf spot ^y	Rust ^x	WM ^z	Yield lb/A
Mid-season (mature 130-145 DAP)					
AP-3	0.4 d ^w	4.1 b	2.7 cd	2.2 bc	4634 c
AT3085RO	0.2 d	5.5 a	3.7 a	17.6 a	2631 d
FL 07	1.7 bc	3.8 c	2.8 c	2.7 b	5006 a
GA03L	1.6 bc	2.9 e	2.4 d	0.4 d	4642 c
Georgia Green	4.4 a	3.4 d	2.5 cd	1.5 bd	5116 a
McCloud	2.3 b	3.6 cd	3.3 b	2.3 b	4914 ab
Late (mature 140-165 DAP)					
GA02C	2.2 b	2.9 e	2.7 cd	0.7 d	4950 a
York	1.1 cd	2.9 e	2.4 d	0.8 cd	4853 bc

^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.

^xRust severity was assessed using the ICRISAT 1 to 9 rating scale.

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

Soil insecticide treatment had a significant impact on the occurrence of several diseases and on peanut yield (Table 2). The Thimet 20G-treated peanuts had lower TSWV and leaf spot ratings compared with the Temik 15G-treated peanuts and the non-treated control. Ratings for white mold and rust were similar for all soil insecticide treatments. Despite the very low TSWV pressure, yields were also higher for the Thimet 20G-treated peanuts compared with Temik 15G or the non-treated control.

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

Soil insecticide and rate/A	Disease Ratings			WM ^z	Yield Lb/A
	TSWV ^z	Leaf spot ^y	Rust ^x		
Temik 15G 6.5 lb/A	2.1 a	3.7 a	2.9 a	3.8 a	4502 b
Thimet 20G 4 lb/A	1.1 b	3.5 b	2.7 a	3.2 a	4759 a
Non-treated control	2.0 a	3.7 a	2.9 a	3.5 a	4518 b

^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.

^xRust severity was assessed using the ICRISAT 1 to 9 rating scale.

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

On the individual cultivars, a reduction in TSWV incidence with Thimet 15G was noted only on Georgia Green when compared with both Temik 15G and non-treated control (Table 3). Yield gains with Thimet 15G were noted only on GA03L. Ratings for leaf spot, rust, and white mold on the individual cultivars were not influenced by soil treatments.

Summary: The unusually low yield of AT3085RO is directly attributed to heavy white mold damage as well as noticeable leaf spot and rust activity. Peanut cultivars that had partial resistance to TSWV, leaf spot, rust, and white mold were GA02C, York, GA03L, and FL07. Highest yields were recorded for FL07, Georgia Green, GA02C, and McCloud. Despite low TSWV pressure, significant yield gains and reductions in TSWV incidence was obtained with Thimet 20G soil insecticide.

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	Rust ^x	WM ^z	
AP-3					
Temik 15G 6.5 lb/A	0.7	4.2	2.8	2.5	4504
Thimet 20G 4 lb/A	0.3	3.8	2.3	1.3	4726
Non-treated control	0.3	4.2	2.8	2.7	4672
AT3085RO					
Temik 15G 6.5 lb/A	0.2	6.0	4.2	19.2	2447
Thimet 20G 4 lb/A	0.0	5.0	3.3	16.7	2913
Non-treated control	0.5	5.5	3.5	16.8	2531
FL07					
Temik 15G 6.5 lb/A	1.8	4.2	2.8	2.5	4909
Thimet 20G 4 lb/A	1.2	3.7	3.2	2.8	5169
Non-treated control	2.2	3.7	2.5	2.8	4940
GA02C					
Temik 15G 6.5 lb/A	2.7	2.9	2.7	1.0	4917
Thimet 20G 4 lb/A	1.0	3.0	2.7	0.2	4947
Non-treated control	2.8	3.0	2.8	0.8	4986
GA03L					
Temik 15G 6.5 lb/A	1.3	2.7	2.2	0.7	4420
Thimet 20G 4 lb/A	1.2	2.9	2.5	0.5	5016
Non-treated control	2.1	3.0	2.5	0.2	4489
Georgia Green					
Temik 15G 6.5 lb/A	5.8	3.2	2.8	1.2	5039
Thimet 20G 4 lb/A	2.7	3.3	2.3	2.0	5406
Non-treated control	4.7	3.7	2.3	1.2	4902
McCloud					
Temik 15G 6.5 lb/A	2.8	3.7	3.2	2.3	5032
Thimet 20G 4 lb/A	2.2	3.7	3.2	2.0	5016
Non-treated control	2.0	3.5	3.7	2.5	4695
York					
Temik 15G 6.5 lb/A	1.3	2.8	2.5	1.2	4749
Thimet 20G 4 lb/A	0.5	2.7	2.2	0.5	4879
Non-treated control	1.5	3.2	2.7	0.8	4932

^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.

^xRust severity was assessed using the ICRISAT 1 to 9 rating scale.