

TIMELY INFORMATION

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Performance Comparison of Peanut Cultivars for 2003 – 2005 at the Gulf Coast Research and Extension Center

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Introduction: Resistance remains among the most effective methods for minimizing loss to damaging diseases in field crops and reducing the dependence on costly fungicide inputs needed for their control. Until the last decade or two little emphasis was placed on developing peanut lines with multiple disease resistance. The appearance of tomato spotted wilt virus (TSWV) however, spurred interest in identifying peanut lines that have resistance to this destructive disease. While screening of virus resistant breeding lines, resistance or tolerance to other diseases such as late leaf spot, rust, white mold. Currently, several newly released peanut lines have not only shown good resistance to the above diseases but have excellent yield potential as well.

The object of this series of studies was to assess the yield potential of commercial runner-type peanut cultivars and their reactions to TSWV, late leaf spot, rust, and white mold in a cotton-corn-peanut rotation at the Gulf Coast Research and Extension Center in Fairhope, AL.

Production Methods: Peanut cultivars were planted at a rate of 6 seed per foot of row using conventional tillage practices in a Malbis fine sandy loam (OM<1%) soil in a field historically cropped to peanut once every three years. Weed control and soil fertility recommendations of the Alabama Cooperative Extension System were followed. The test area was not irrigated. A randomized complete block design with four replications was used. Plots consisted of four 30-foot rows spaced 3.2-feet apart. Seven full canopy fungicide applications were made for the control of late leaf spot and rust at approximately 2-week intervals with a four row ATV-mounted boom sprayer with three TX-8 nozzles per row that delivered approximately 10 gallons per acre spray volume.

Disease Assessment: Incidence of TSWV was determined a week before digging by counting the number of TSWV hits where 1 hit equals ≤ 1 ft of consecutive diseased plants. Early and late leaf spot were rated using the Florida peanut leaf spot scoring system where 1 = no disease, 2 = very few leaf spots in canopy, 3 = few leaf spots in lower and upper leaf

canopy, 4 = some leaf spotting in lower and upper canopy with light defoliation ($\leq 10\%$), 5 = leaf spots noticeable in upper canopy with some defoliation ($\leq 25\%$), 6 = leaf spots numerous with significant defoliation ($\leq 50\%$), 7 = leaf spots numerous with heavy defoliation ($\leq 75\%$), 8 = numerous leaf spots on few remaining leaves with severe defoliation ($\leq 90\%$), 9 = very few remaining leaves covered with leaf spots and severe defoliation ($\leq 95\%$), and 10 = plants defoliated or dead. Leaf spot ratings were taken within 1 week of harvest for the early, mid-season, and late maturing peanut lines. Rust severity was rated on all peanuts lines using the ICRISAT 1-9 rating scale where 1 = no disease to 9 = 80 to 100% of leaves withered. White mold [southern stem rot (SSR)] hit counts, where 1 hit equals ≤ 1 ft of consecutive white mold-damaged plants per row, were made when the peanuts were inverted. Yields are reported at 10% moisture. Significance of treatment effects were tested by analysis of variance and Fisher's protected least significant difference (LSD) test ($P=0.05$).

Results: Average 3 year yields were highest for Florida C-99R and GA02C. Yields were fairly similar for ANorden, AP-3, and Georgia Green (Table 1). The 2-year average yields were higher for GA01R than any other peanut cultivars (Table 2). Other high yielding cultivars were Florida C-99R and GA02C. Tifrunner was clearly had the lowest yields of all of the late maturing peanut cultivars. The 2-year average yields for Georgia Green, ANorden, and Tifrunner were similar.

Incidence of TSWV increased incrementally from 2003 through 2005. The 3-year average for TSWV incidence was lowest for AP-3 (Table 3). Other cultivars that had noticeably few TSWV hit counts than the current industry standard Georgia Green were GA02C, GA03L, and Tifrunner. ANorden and Florida C-99R also had fewer TSWV hits than Georgia Green but GA01R did not.

Table 1. Three-year average yield of peanut cultivars at the Gulf Coast Research and Extension Center, 2003-2005.

Peanut Cultivar	Yield (lb/A)			Average Yield
	2003	2004	2005	
ANorden	4324	5179	3224	4242
AP-3	4324	5114	3918	4452
Florida C-99R	4129	5034	5220	4794
GA02C	4359	5300	5220	4960
Georgia Green	3877	5009	4211	4366

Table 2. Two-year average yield of peanut cultivars at the Gulf Coast Research and Extension Center, 2004 and 2005.

Peanut Cultivar	Yield (lb/A)		Average Yield
	2004	2005	
ANorden	5179	3224	4242
AP-3	5114	3918	4452
Florida C-99R	5034	5220	4794
GA01R	5509	6033	5571
GA02C	5300	5220	5265
Georgia Green	5009	4211	4366
Tifrunner	4259	4301	4280

Table 3. Reaction of commercial peanut lines to TSWV (tomato spotted wilt virus).

Peanut Cultivar	TSWV (no. hits/60 row ft)			Average TSWV
	2003	2004	2005	
ANorden	5.3	7.8	11.3	8.1
AP-3	1.8	4.3	4.7	3.6
Florida C-99R	4.5	7.8	11.6	8.0
GA01R	---	13.0	10.5	11.8
GA02C	1.3	8.0	8.7	6.0
GA03L	---	---	3.7	3.7
Georgia Green	5.3	13.3	18.9	12.5
Tifrunner	---	5.8	6.7	6.3

Lowest 2- or 3-year average late leaf spot ratings were recorded for Tifrunner (Table 4). ANorden, GA01R, and GA02C had slightly lower late leaf spot ratings than Georgia Green. The only cultivar with appreciably higher late leaf spot ratings than Georgia Green was GA03L.

Table 4. Reaction of commercial peanut cultivars to late leaf spot.

Peanut Cultivar	Late leaf spot rating			Average LLS rating
	2003	2004	2005	
ANorden	3.0	3.8	3.7	3.5
AP-3	3.8	3.9	3.9	3.9
Florida C-99R	4.5	3.1	3.8	3.8
GA01R	---	---	3.5	3.5
GA02C	3.3	3.8	3.6	3.6
GA03L	---	---	4.1	4.1
Georgia Green	3.5	4.0	3.9	3.8
Tifrunner	---	2.9	3.3	3.1

Overall rust intensity appeared to be higher in 2004 and 2005 than in 2003 (Table 5). Highest average rust ratings were recorded for AP-3 and Georgia Green. The rust rating for ANorden and GA03L was slightly lower compared with the industry standard Georgia Green. Florida C-99R, GA01R, GA02C and Tifrunner had lowest average rust ratings.

Table 5. Reaction of peanut cultivars to peanut rust.

Peanut Cultivar	Rust			Average Rust rating
	2003	2004	2005	
ANorden	2.8	6.3	5.2	4.8
AP-3	4.5	6.0	4.9	5.1
Florida C-99R	3.3	3.8	4.7	3.9
GA01R	---	3.5	4.6	4.1
GA02C	2.8	4.5	4.9	4.1
GA03L	---	---	4.7	4.7
Georgia Green	4.5	5.5	5.7	5.2
Tifrunner	---	4.3	3.9	4.1

Average white mold incidence was higher on ANorden than on most of the other peanut cultivars except for Tifrunner (Table 6). Cultivars with intermediate white mold ratings were AP-3, Florida C-99R, GA01R, and Georgia Green. The fewest white mold hits were noted on GA02C and GA03L.

Table 6. Reaction of peanut cultivars to white mold.

Peanut Cultivar	White Mold (hits/60 row ft)			Average White mold
	2003	2004	2005	
ANorden	2.5	5.5	5.4	4.5
AP-3	3.3	2.8	2.9	3.0
Florida C-99R	2.5	3.5	2.8	3.3
GA01R	---	2.5	2.4	2.5
GA02C	1.5	2.0	0.6	1.4
GA03L	---	---	1.7	1.7
Georgia Green	3.3	1.5	3.1	2.6
Tifrunner	---	4.3	3.6	4.0

Summary: The highest 2- and 3-year average yields were noted for GA01R and GA02C. Yields for these cultivars averaged approximately 1000 to 1200 pound per acre higher than those recorded for Georgia Green. Florida C-99R was the only other cultivar that consistently yielded more than Georgia Green. Yields for AP-3, ANorden, Tifrunner, and Georgia Green were fairly similar.

Levels of TSWV gradually increased in Georgia Green over the 3-year test period. Incidence of this disease as intensified to the point that virus levels will greatly reduce pod yields. With this increase in TSWV, selection of disease resistant peanut cultivars, as well as delayed planting, and adopting twin row and reduced tillage practices. Several cultivars also displayed partial resistance to late leaf spot, rust, and white mold. However, the level of resistance displayed would not offset the need for protective fungicide treatments.