

Evaluation of fungicides for reduction of Leaf Spot, Rust and White Mold diseases of Peanut (*Arachis hypogaea*), 2007

C. R. Semer IV and Amanda Gevens, University of Florida-IFAS,
Plant Medicine Program and Department of Plant Pathology
Gainesville, FL

Cercospora arachidicola (Early Leaf Spot); *Cercosporidium personatum* (Late Leaf Spot);
Puccinia arachidis (Peanut Rust); *Sclerotium rolfsii* (White Mold)

A field (Kendrick loamy sand) at the University of Florida-IFAS Plant Science Research and Education Unit (PSEU) in Citra, Florida was used for experimentation. On 4 May, 2006, seeds of peanut var. 'Georgia Green' were planted at a density of 5 seeds per ft into rows on 36-in.-centers. Fungicides were applied seven times on 14 day intervals in the Leaf Spot and Rust Trial and in the White Mold trial at 14 day intervals starting June 6, 2007. Treatment six in the white mold test had product applied on May 11, 2007 as a drench when the seed had cracked the soil surface. All spray applications were applied using a CO₂ backpack sprayer at 30 lb/in² (psi) in 50gpa water through a two 8004 TeeJet® flat fan tips on a 36 in. boom. Each fungicide treatment and a non-treated control were replicated five times using two rows twenty ft in length separated by an untreated guard row. All plots which were arranged in a randomized complete block design. Two separate plots were established one for the Leaf Spot and Rust test and another plot was established for the White Mold test. Inoculum for the Leaf Spot and Rust experiment was naturally occurring. A few scattered Leaf spots were observed on June 21, 2007 and disease rating for leaf spot and rust started on 17 July and continued every two weeks throughout the test. Disease ratings were made by randomly collecting 10 peanut leaflets from each treated row and rating Leaf spot and Rust incidence and severity. Rust severity was determined using "A Manual of Assessment Keys for Plant Diseases" 1971, Clive James, Canada Department of Agriculture, leaf disease rating scale. Leaf spot was first observed on June 21, 2007 and throughout the remainder of the test. Rust was first observed on August 1, 2007. Inoculum for the White Mold test was prepared using three isolates of the pathogen. Fifty grams of prepared inoculum (infested corn + wheat grain) was applied on August 6, 2007 to the crowns of plants in the northern row of each two-row plot. The plants were shaken to allow the inoculum to fall to the soil. The plots were examined for disease incidence and rated for foot of row infected. Some Tomato Spotted Wilt was observed throughout the planting; however the incidence of the virus was low. The plots were dug on September 10, 2007, and harvested on September 13, 2007. The peanuts were bagged, identified by plot and replicate, and placed into a dryer. When the peanuts had sufficiently dried they were removed from the dryer and the yield from each replicated plot was weighed

Leaf Spot and Rust application schedule

Application dates	June 2	June 21	July 3	July 19	August 2	August 16	August 30
	A	B	C	D	E	F	G
T1-Untreated check							
T2- Echo 720 (1.5pt=705ml/A)	X	X					X
T2- Provost 433 SC [8oz/A]			X	X	X	X	
T3- Evito (3.8 fl.oz/A)	X	X					X
T3 Echo 720, 1.5 pt			X	X	X	X	
T4- Topsin (10 oz/A) +Folicur (7.2oz/A)	X	X	X	X	X	X	X
T5- Topsin (10 oz/A)	X	X					X
T5- Folicur (7.2oz/A)			X	X	X	X	
T6- Topsin (10 oz/A) + Echo 720 (1.5pt=705ml/A)	X	X	X	X	X	X	X
T7- Echo 720 (1.5pt=705ml/A)			X	X	X	X	
T8- Abound, 9.2 fl. Oz	X	X					X
T8- Echo 720, 1.5 pt			X	X	X	X	
T9- Byotrol-175 ppm	X	X	X	X	X	X	X

Treatments: Leaf Spot and Rust

- T1-Untreated check
- T2- Echo 720 (1.5pt=705ml/A) (ABG)
- T2- Provost 433 SC [8oz/A] (CDEF)
- T3- Evito (3.8 fl.oz/A) [ABG]
- T3- Echo 720, 1.5 pt (CDEF)
- T4- Topsin (10 oz/A) +Folicur (7.2oz/A) [ABCDEFGG]
- T5- Topsin (10 oz/A) (ABG)
- T5- Folicur (7.2oz/A) (CDEF)
- T6- Topsin (10 oz/A) + Echo 720 (1.5pt=705ml/A) [ABCDEFGG]
- T7- Echo 720 (1.5pt=705ml/A) [CDEF]
- T8- Abound, 9.2 fl. Oz (ABG)
- T8- Echo 720, 1.5 pt (CDEF)
- T9- Byotrol 175 ppm [ABCDEFGG]

White Mold application schedule

Application dates	May 11	June 6	June 21	July 3	July 19	August 2	August 16
	A	B	C	D	E	F	G
T1 Untreated check							
T2- Abound 12.3oz/A			X		X		
T2- Folicur (7.2oz/A)				X		X	
T3- Moncut (1.07lb/A)					X		X
T4-Folicur (7.2 oz/A)		X	X		X		X
T4 Evito (3.8 oz/A)				X		X	
T5- Byotrol		X	X		X		X
T6- Proline SC 5.7oz/A	X						
T6- Provost 433SC 8oz/A				X	X	X	X
T6- Echo 720 1.5pt/A		X	X				

Treatments: White mold

- T1 Untreated check
- T2- Abound 12.3oz/A (CE)
- T2- Folicur (7.2oz/A) (DF)
- T3- Moncut (1.07lb/A) (EG)
- T4- Evito (3.8 oz/A) (DF)
- T4- Folicur (7.2oz/A) (BCEG)
- T5- Byotrol (175 ppm)
- T6- Proline (A)
- T6- Provost (DEFG)
- T6- Echo(BC)

Results

Table 1. Evaluation of selected materials for control of Early & Late Leaf Spot and Rust in Peanuts

Treatment	Early Leaf Spot		Late Leaf Spot		Rust		Yield in Pounds		ROI
	Incidence	Severity	Incidence	Severity	Incidence	Severity	Plot	Acre	
1- Untreated check	82.25A	19.88A	37.68A	4.97AB	33.15E	4.15C	9.96BC	3615	NA
2-Echo/ Provost	62.59CD	5.45DE	23.43ABC	2.62CD	50.49BCDE	6.57ABC	13.81A	5013	\$13.80
3-Evito/ Echo	72.89ABC	8.9C	20.43BCD	2.88CD	68.56AB	9.90ABC	12.34AB	4479	\$13.25
4-Topsin + Folicur	49.26E	3.88E	10.33CD	1.07D	36.62DE	4.93C	11.84ABC	4292	\$6.54
5- Topsin/Folicur	57.35DE	7.29CD	17.25BCD	2.12CD	40.67CDE	4.78C	12.11ABC	4395	\$22.25
6-Topsin +Echo	65.85BCD	7.13CD	24.15ABC	3.23BC	56.82ABCD	8.95ABC	10.57BC	3836	\$9.62
7-Echo	79.17A	8.8C	17.25BCD	2.11CD	41.49CDE	5.74BC	10.74BC	3898	\$44.41
8- Abound/Echo	79.17A	9.97C	6.27D	0.87D	73.29A	11.01AB	9.98BC	3622	\$12.59
9-Byotrol	77.73AB	14.23B	31.11AB	5.36A	57.88ABC	12.34A	9.54C	3463	NA

- Values presented in table are percent values
- Values followed by the same letter are not significantly different at $P > 0.05$. Means were separated using Duncan's multiple range test.
- Percent data was transformed to arcsine values prior to analysis and ANOVA analysis was conducted using SAS 9.1
- Yield in pounds per Acre is a calculated value and thus was not analyzed statistically
- \$ return for \$ invested is a calculated value based upon market value for peanuts of \$410.19/ton at the end of the day on September 18, 2007 and only includes the cost of pesticides applied throughout the test.

Table 2. Evaluation of selected materials for control of White Mold Disease in Peanut

	Foot of Row diseases	Yield per Plot in Pounds	Yield in pounds per Acre
T1- Untreated	0.8A	9.4C	3412
T2- Abound alternated with Folicur	0.5A	11.53AB	4185
T3- Moncut	0.2A	10.46BC	3796.9
T4- Folicur alternated with Evito	0.5A	11.08ABC	4022
T5- Byotrol	0.5A	9.7C	3521
T-6 Proline+Provost+Echo	0.3A	12.69A	4606

- Values presented in table are percent values
 - Values followed by the same letter are not significantly different at $P>0.05$. Means were separated using Duncan's multiple range test.
 - Percent data was transformed to arcsine values prior to analysis and ANOVA analysis was conducted using SAS 9.1
- Yield in pounds per Acre is a calculated value and thus was not analyzed statistically

Table 3. Rainfall (in inches) and Relative humidity at PSEU Citra Florida

Month	Rainfall		Relative Humidity	
	5 Year Average at Citra	2007 actual	5 Year Average at Citra	2007 actual
May	1.15	0.16	70.4	68
June	6.44	4.36	79.2	78
July	7.09	6.49	80.6	80
August	5.42	2.94	81.8	79
September	6.78	5.69	81	83

Results:

In 2007 the average rainfall was significantly lower than the five year monthly averages (see Table 3). The rainfall events occurred such that the bulk of the rainfall occurred during one or two events per month. The first observation of leaf spot and rust disease occurring on June 21, 2007 and August 1, 2007, was approximately 30 days later than has been observed in prior seasons. These reduced disease incidence effects were also observed in the White Mold study where even after inoculation the incidence of disease was significantly reduced. The low relative humidity within the canopy and the reduced rainfall most likely had the greatest impact upon disease development. One additional factor that may have impacted the incidence of disease is the difference in physiological condition of the crop when first infected and the adverse weather throughout the growing season.

Leaf Spot and Rust :

Early Leaf Spot

Topsin tank mixed with Folicur (T4) showed the lowest incidence of Early Leaf Spot but this level of control was not different than Topsin alternated with Folicur, Echo alternated with Provost or Topsin and Echo Tank mixed. Topsin tank mixed with Folicur had the lowest severity of leaf spot but this was not different than the severity associated with Echo alternated with provost, Topsin alternated with Folicur or Topsin tank mixed with Echo.

Late Leaf Spot

Abound alternated with Echo had the lowest Late Leaf Spot incidence and severity however this treatment was not different than Echo alternated with Provost, Evito alternated with Echo, Toipsin and Folicur tank mixed, Topsin alternated with Folicur or Echo applied by itself.

Rust

Rust incidence and severity was lowest in the untreated check but this did not differ from Treatment 4 Topsin and Folicur tank mixed or Topsin and Folicur alternated.

Yield

The Echo alternated with Provost had the greatest yield and Byotrol had the lowest yield. The yield of the echo alternated with Provost was not different from the yield recorded with Evito alternated with Echo, Topsin and Folicur Tank mixed and Topsin alternated with Folicur.

White Mold

Disease incidence was not different between any of the treatments. This was due to the weather conditions previously discussed. The yield of the Proline, Provost alternated with Echo was the greatest but this yield was not different from the yield recorded for Abound alternated with Folicur and Folicur alternated with Evito.