The Effect of Fungicide Applications based on a Threshold System versus Calendar Based Applications for Management of Peanut Pod Rot.

Gaines and Terry Counties
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Summary:

Fungicides were applied in two peanut fields to manage pod rot based either on the experience of the producers (calendar applications), without input from filed scouting; or on a threshold of pod rot of 1-2% (low), 3-4% (moderate) or 5-6% (high). Plots were scouted for pod rot from the time of early pod formation through the end of the season. Both sites started with primarily *Pythium* pod rot, which was low in incidence and generally didn't show up until August or September. *Rhizoctonia* pod rot was also found in both fields, and it became the dominant problem in one field in September and into early October. Pod rot tended to be lower in plots where applications were made earlier based on producer experience (calendar applications) and before pod rot had been found, than delaying application for a low threshold to trigger. Yield was similar across all treatments in both fields. In the field with lower pod rot (Virginia type peanuts), grade factors were similar across all treatments, and most treatments returned similar profit per acre (value/acre minus chemical costs). The exception was plots treated twice with Ridomil Gold SL **+** Provost, which had higher chemical costs and resulted in less profit/acre. In the Runner field, which had slightly more pod rot, the grade and value of the crop/ton was higher with calendar applications that had Abound FL applied twice, and deductions were less with this treatment. However, when chemical costs were included, all treatments gave similar profitability.

Objective:

This project is designed to evaluate if chemical treatments for peanut pod rot can increase net returns (profit) if made based on a disease threshold rather than by calendar dates. To achieve this goal, we must identify what threshold is better for timing of fungicides than calendar treatments. This was the third and final year of the study, however only the data for 2011 is reported here.

Materials and Methods:

The two test sites were setup similarly, with seven treatments replicated four times at each site. Plot size was four rows wide (36-inch centers) and 1,000 feet in length. Calendar applications were made

based on the experience of the producer, without regard to scouting and disease occurrence in the field. The treatments were: calendar applications with Abound FL; calendar applications with Abound FL rotated with a combination of Ridomil Gold **+** Provost; calendar applications with Ridomil Gold **+** Provost; threshold applications with Abound FL made when pod rot reached at least 1% in scouted plots (low threshold); applications with Abound FL made when pod rot reached at least 3% in scouted plots (moderate threshold); applications with Abound FL made when pod rot reached at least 5% in scouted plots (high threshold); and no fungicide applied (untreated for pod rot). All other field practices were the same for each treatment.

Plots were scouted weekly at five locations per plot. Scouting was conducted by digging 1.5 feet of row length per location and examining all pods for symptoms of pod rot; locations were selected randomly within the plot. The Jackson field was planted April 22 to Virginia market type peanuts; the Johnson field was planted April 29 to runner market type peanuts.

Each field was dug and inverted as the producer determined. Sites were harvested with a four-row peanut thrasher and the contents of each plot was dumped into a trailer on load cells and weighed to determine yield per acre. Three grade subsamples were taken from each harvested plot and these were graded to determine percent sound mature kernels, percent sound splits, percent damaged kernels, percent other kernels, percent foreign matter, and with the Virginia peanut field, percent extra-large kernels. Peanut values were calculated from yield and grade based upon USDA-Farm Service Agency (FSA) peanut loan schedules for the crop year and the appropriate market type of peanut. Chemical costs were calculated as an average price from three area chemical distributers.

Results and Discussion:

Jackson field: The calendar based applications were made on July 22 and August 28 . One low threshold based application was made on September 10 after pod rot averaged 1.5% in the untreated check on September 9. Pod rot averaged over the entire season was similar across all treatments (including the untreated check), and the pods had a low incidence of *Pythium* spp. and a very low incidence of *Rhizoctonia*. *Pythium* spp. was isolated from rotted pods starting on August 15, while the first isolates of *Rhizoctonia* were found on September 2 (Fig. 1). Pod rot was < 1% all season for calendar applications of Abound FL (AA) and Ridomil Gold EC+ Provost (RR) (Fig. 2). There was considerable damage to pods by soil dwelling pests during the season, but the scouts did not call it pod rot, unless there were symptoms of rot in the absence of pest feeding damage. There were no differences between calendar, threshold, or no fungicide treatments with respect to peanut grade, percent damaged kernels, percent extra-large kernels, value of the peanuts/ton, yield, yield **x** value/ton (Table 1); but the plots treated with Ridomil Gold **+** Provost returned less ($557/acre) than did all other treatments with Abound FL, Abound FL rotated with Ridomil Gold + Provost, or the untreated check (average of all other treatments was $652/acre).

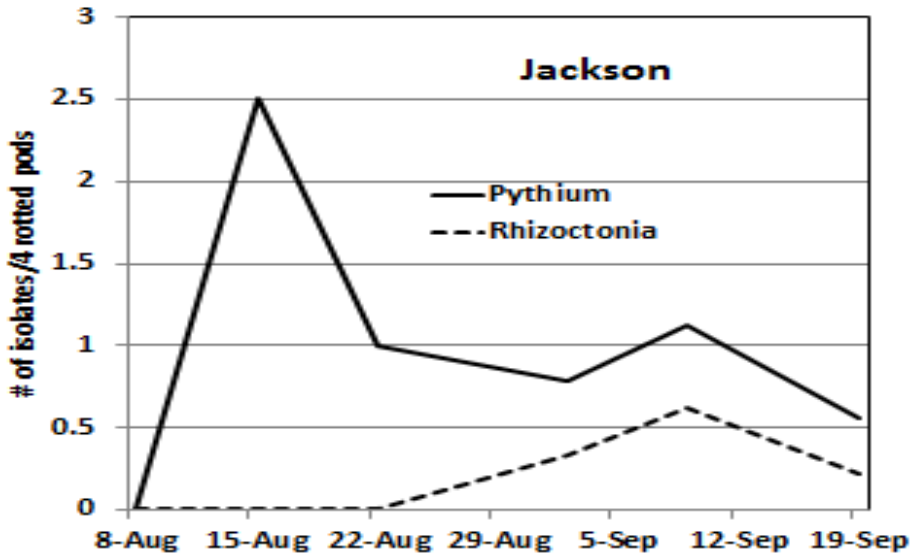

Figure 1. Number of isolations of *Pythium* and *Rhizoctonia* spp. at the Jackson field over time, when 4 or fewer rotted pods/sample were examined. Averaged across all fungicide treatments, since there were no differences between fungicide treatments.

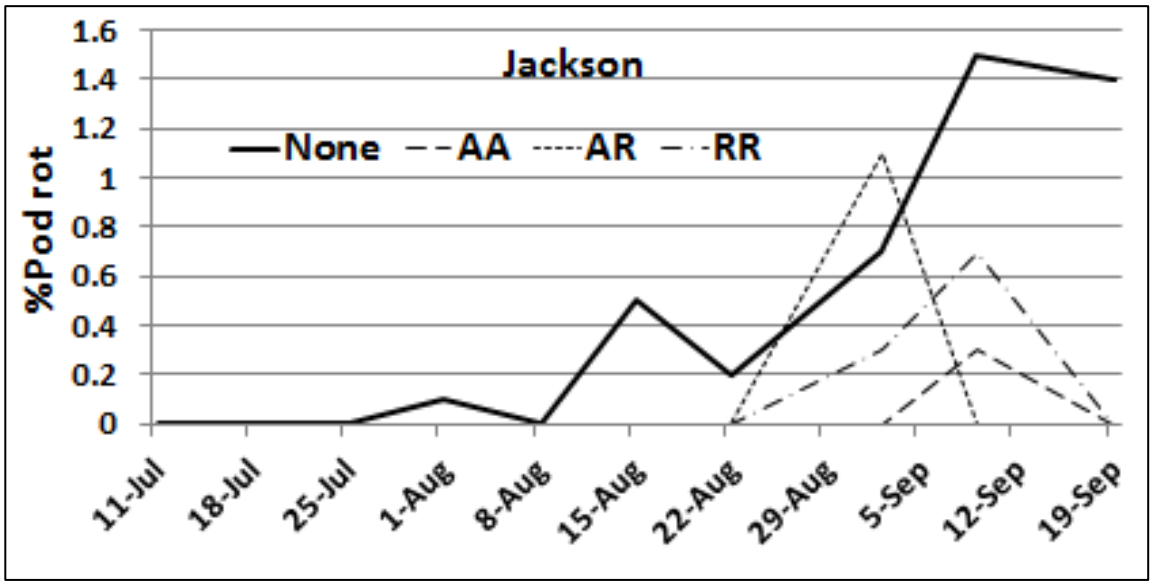

Figure 2. Percent pod rot over time for various fungicide application strategies at the Jackson field. None=no fungicides for pod rot applied; AA = 2 applications with Abound FL (calendar timed); AR = 1 application with Abound FL and one with Ridomil Gold SL + Provost (calendar timed); and RR = 2 applications with Ridomil Gold SL + Provost (calendar timed).

Table 1. Effect of treatments on pod rot, kernel grades, and yield at the Jackson field.

Trt[1]	Yield Lbs/a	Value $/ton[2]	Value ($)/acre[2]	Minus Chem Costs ($/acre)[3]	Grade	% DK[2]	% ELK[2]	%Pod rot	Pyth[4]	Rhiz[4]
A/A	3,983	349	694.32	644 a	67	0.7	49	0	0	0
A/RP	3,938	350	689.23	624 a	68	0.8	49	0.1	0	0.005
RP/RP	3,675	347	637.53	557 b	67	1.0	50	0.1	0.05	0.005
Low	3,978	352	700.95	676 a	68	0.8	52	0.4	0.04	0.013
None	3,803	348	662.46	662 a	68	1.0	48	0.4	0.01	0
Prob.>t	0.36	0.70	0.25	0.015	0.72	0.52	0.42	0.24	0.09	0.62

[1]A=Abound FL; RP = Ridomil Gold + Provost; Low=low threshold; None indicates no fungicides sprayed.

[2]Value/ton was calculated at ($4.947 x Grade)+($1.40 x %Other kernels)+($0.35 x %Extra large kernels (ELK)) – deduction from damaged kernels (DK). Value/acre was calculated by multiplying value/ton x the number of tons/acre.

[3]The chemical (Chem) costs per acre were calculated at: $6.51/oz for Ridomil Gold SL, $1.91/oz for Abound FL, and $2.21/oz for Provost. Rates applied (banded in 20 inches) for Abound FL (A) were 24.8 oz/acre; Ridomil Gold SL (R) at 8 oz/acre, and Provost at 10.7 oz/acre.

[4]Pyth = isolation frequency for *Pythium* spp. from rotted pods, and Rhiz=isolation frequency for *Rhizoctonia* spp. from rotted pods. Generally pods selected for isolation had relatively new lesions.

Johnson field (Virginia market type peanuts): The calendar based application was made on August 10. A low threshold application was made on September 1 and October 3, and a moderate threshold application was made on October 3. *Pythium* pod rot was present in August, but *Rhizoctonia* pod rot began to dominate later in the season (Fig. 3). Pod rot remained above 1% for untreated plots from August 31 until October 12, except for one sampling date (Fig. 4). Plots treated with the moderate threshold and no fungicides had more *Rhizoctonia* pod rot than did plots treated with Abound FL based on a calendar application or Ridomil+Provost based on a calendar application (Table 2). The percent of pod rot averaged across all sampling dates was higher for plots treated with the moderate threshold (average of 1.8%) than all other treatments, including the untreated checks; the average percent pod rot ranged from 0.5 to 1.0% (Table 2). Plots treated with Abound FL, based on the calendar, had a higher grade (73%) than did plots treated with the low or moderate threshold (69% grade) (Table 2). The percent damaged kernels and deductions for damaged kernels were higher for the low, moderate, and untreated plots than for the calendar treated plots. The value/ton for peanuts was highest in plots treated by the calendar with Abound FL once during the season ($353/ton) and lowest for plots with the low and moderate thresholds ($333 and $331/ton, respectively). Yield was similar

across all treatments, as was the final value of the treatments ($/acre) after subtracting chemical costs.

Table 2. Effect of treatments on pod rot, kernel grades, and yield at the Johnson field.

Trt[1]	Yield Lbs/a	Value[2]	Value[2] ($)/a	Minus[3] Chem Costs ($/a)	Grade	% DK[2]	Ded[2] DK ($/ton)	% Pod Rot	Pyt[4]	Rhiz[4]
A	3,474	353 a[5]	619	593	73 a	1.0 b	0.43 c	0.5 b	0.03	0.08 c
RP	3,664	345 ab	635	594	70 ab	1.1 b	1.13 bc	0.6 b	0.07	0.16 abc
Low	3,717	333 b	619	567	69 b	1.9 a	3.50 ab	1.0 b	0.04	0.27 a
Mod	3,213	331 b	512	486	69 b	2.3 a	5.53 a	1.8 a	0.04	0.17 ab
None	3,327	339 ab	564	564	71 ab	2.0 a	3.42 ab	0.8 b	0.06	0.06 c
Prob. >t	0.71	0.015	0.46	0.59	0.041	0.001	0.0003	0.0001	0.69	0.002

[1]A=Abound FL; RP = Ridomil Gold + Provost; Low=low threshold; None indicates no fungicides sprayed.

[2]Value/ton was calculated at ($4.85 x Grade)+($1.40 x %Other kernels) – deduction from damaged kernels (DK) and sound splits. Value/acre was calculated by multiplying value/ton x the number of tons/acre.

[3]The chemical (Chem) costs per acre were calculated at: $6.51/oz for Ridomil Gold SL, $1.91/oz for Abound FL, and $2.21/oz for Provost. Rates applied (banded in 20 inches) for Abound FL (A) were 24.8 oz/acre; Ridomil Gold SL (R) at 8 oz/acre, and Provost at 10.7 oz/acre.

[4]Pyt = isolation frequency for *Pythium* spp. from rotted pods, and Rhiz = isolation frequency for *Rhizoctonia* spp. from rotted pods. Generally pods selected for isolation had relatively new lesions.

[5]Differences between treatments that are significant at a Probability $\leq$0.05 have different letters.

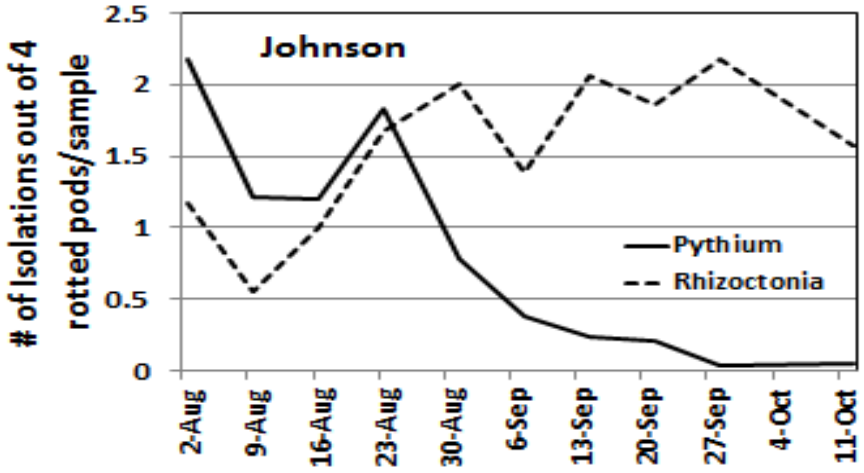

Figure 3. Number of isolations of *Pythium* and *Rhizoctonia* spp. at the Johnson field over time, when 4 or fewer rotted pods/sample were examined.

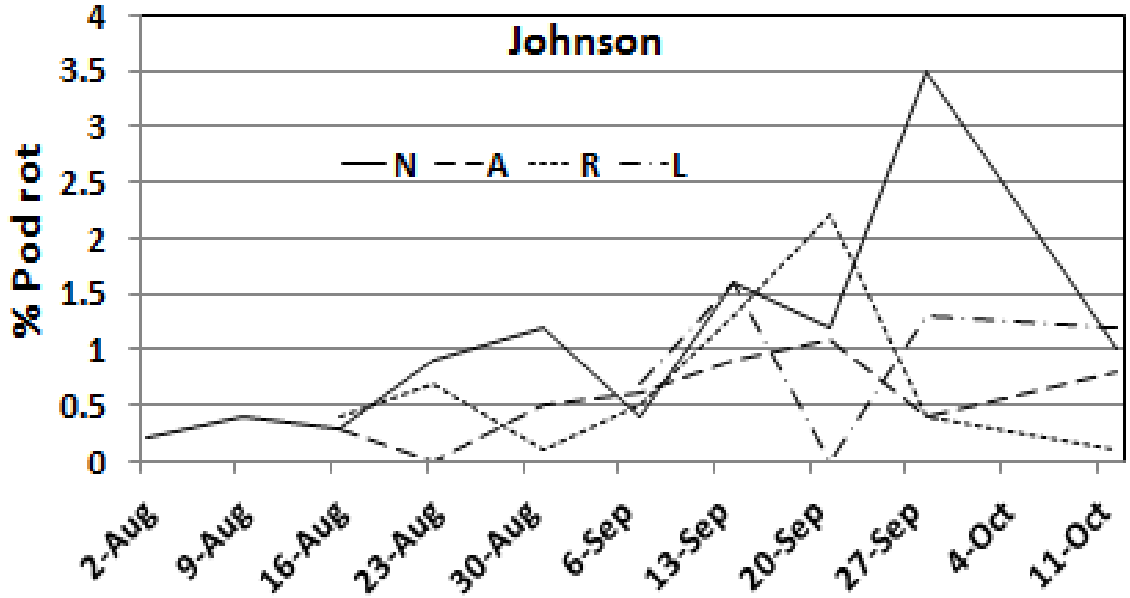

Figure 4. Percent pod rot over time for various fungicide application strategies at the Johnson field. N=no fungicides for pod rot applied; A = 1 application with Abound FL (calendar timed); R = 1 application with Ridomil Gold SL + Provost (calendar timed); L = 2 applications with Abound FL timed when % pod rot reached 1% (1 Sept.) and again on 3 October.

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