

**Evaluation of Selected Treatments for Control of Asian Soybean Rust (*Phakospora pachyrhizi*) on Soybean (*Glycine max*).**

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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 31, May seeds of roundup ready var Asgrow 0703314 were planted 5 seed per foot in rows on 3 ft centers so that the plots were two parallel rows 20 feet in length separated by a 12 foot alley with a spreader rows planted between each treatment. All product applications were made as described in Table 1. The sprays were applied using a CO<sub>2</sub> backpack sprayer at 30 lb/in<sup>2</sup> (psi) in 50gpa water through a pair of 8004 TeeJet® flat fan tips on a 36 inch boom. Each treatment and a non-treated control were replicated six times using two parallel rows 20 feet in length with a spreader row planted between each treatment which were arranged in a randomized complete block design. Six untreated buffer rows surrounded each plot with a complete untreated plot on each end of the test. Eighteen sites surrounding the test plots were inoculated by infected Kudzu leaves which were fixed onto soybean leaves on June 27, 2006 in buffer rows adjacent to the treatment rows. Each kudzu leaf and soybean leaf pair was moistened by spraying with water from a hand held atomizer at 4:30 p.m. to insure an overnight dew period. Examination of the inoculated plants showed the presence of the pathogen on the inoculated plant on July 14, 2006. The treated rows were examined weekly for the presence of the pathogen which was first observed on August 11, 2006. Weekly examination of the plots were started on August 18, 2006 and ended on September 20, 2006 when disease incidence was 100%. The plot was monitored for pod maturity and harvested on October 12, 2006. Fresh weight of the yield from each plot was taken on October 13, 2006.

**Treatments:**

Untreated Check

Experimental Chemical 1 (Roundup @ 20 days after planting and at R2)

Experimental Chemical 2 (Roundup @ 20 days after planting, R2 and R4)

Headline 7.8 oz/A @ R2 and R4

Physpe 9.7oz/A (V5, R1-R2, R4, R5)

Physpe 14.4 oz/A (V5, R1-R2, R4, R5)

Physpe 28.8 oz/A (V5, R1-R2, R4, R5)

Data collected included:

A. Incidence of rust per 20 random terminal leaflets/plot

B. Disease Severity using ASR Disease severity Evaluation Scale (Bayer Crop Science) of each leaf

0 = 0

1 < 5%

2 = 5 to 15

3 = 15 to 35

4 = 35 to 67.5

5 = greater than 67.5

C. Yield at end of trial

Table 1. Product application for control of Asian Soybean Rust (*Phakopsora pachyrhizi*) on Soybean (*Glycine max*).

	Plant out	Reproductive Growth stages				
		V-5 20 d.a.p.	R1	R2	R4	R5.4
Treatment/Application date	May 31, 2006	June 20, 2006	July 18, 2006	August 3, 2006	September 1, 2006	September 14, 2006
T1 Untreated Check						
T2 Roundup		X		X		
T3 Roundup		X		X	X	
T4 Headline 7.8 oz/A				X	X	
Physpe 9.7oz/A		X	X	X	X	X
Physpe 14.4 oz/A		X	X	X	X	X
Physpe 28.8 oz/A		X	X	X	X	X

Table 2. Summary of Asian Soybean Rust disease incidence, disease severity and yield in 2006 field trial conducted at Citra, REU, University of Florida

	August 18, 2006		August 23, 2006		August 30, 2006		September 6, 2006		September 14, 2006		September 20, 2006		Yield bu/A /% moisture
	DI %	DS %	DI %	DS %	DI %	DS %	DI %	DS %	DI %	DS %	DI %	DS %	
T1 Check	80a <sup>x</sup>	18.9a	60.8a	8.4a	92.5a	16.8a	99.2a	29.4a	100a	56.8a	100a	82.3a	12.5b/ 8.41
T2 Roundup @ V5 and R2	77.5ab	12.4a	34.2cd	3.5b	56.0c	2.0d	89.2bc	7.7c	99.2a	20.6bc	100a	49.0b	16.0ab/ 9.75
T3 Roundup @ V5, R2 and R4	66.6b	8.2a	32.5d	3.3b	60.0c	3.0d	82.5c	7.6c	98.3a	15.5c	100a	43.8b	18.2ab/ 10.15
T4 Headline @ R2 and R4	83.3ab	16.1a	49.2b	4.0b	70.0bc	4.7cd	84.2c	8.7c	99.2a	31.9b	100a	46.2b	22.3a/ 10.86
T5 Physpe 9.7oz/A	83.3a	15.4a	39.2bcd	3.3b	87.5a	12.0abc	98.3a	21.5ab	100a	51.3a	100a	75.2a	11.4b/ 9.16
T6 Physpe 14.4 oz/A	83.6ab	18.2a	46.7a-d	3.9b	85.0ab	9.0bcd	94.2ab	16.0bc	99.2a	48.8a	100a	81.3a	14.2ab/ 10.01
T7 Physpe 28.8 oz/A	78.3ab	17.5a	55.0ab	4.4b	91.7a	13.8ab	99.2a	24.3ab	100a	56.0a	100a	82.1a	13.9ab/ 9.23

Leaf samples for disease rating were collected on August 18, 23, 30, September 6, 14, and 20, 2006

DI= disease incidence calculated from reading 20 randomly collected trifoliolate leaves (60 individual leaves)

DS= disease severity calculated from reading 10 randomly collected trifoliolate leaves (30 leaves) and % was bracketed by the Bayer rating scale

<sup>x</sup> values followed by the same letter are not significantly different at P<0.05 determined using SAS v 9.1 and analysis of variance (ANOVA) and Duncan's Multiple Range test

Results: The initial leaf sampling for disease incidence was made by collecting leaves within 4 inches of the soil line. The remaining leaf samples were collected from within the canopy at least 12 inches from the soil line. In the initial sampling there was no significant difference between any of treatments for disease incidence or disease severity. On the August 23 sampling date treatments 2,3,4 and 5 were significantly different from the untreated check when disease incidence was evaluated however when disease severity was examined all treatments were different from the untreated check. When the plots were sampled for disease incidence on August 30 treatments 2, 3 and 4 were significantly different from the untreated check and also different from the untreated check when disease severity was examined. These trends continued in the September 6 and 14 sampling dates. When the plots were examined on September 20 disease incidence was 100 percent for all treatments and disease severity in treatments 2, 3 and 4 continued the trend already reported for earlier samplings. The plots remained in place while the pods matured and leaf abscission started to take place. On October 12, 2006 the plots were harvested and the yield for each treatment was determined. The yield for treatment 4 was significantly different from the untreated check and treatment 5 but not significantly different for the other treatments.

Conclusions: All treatments had 100 % disease incidence 83 days after border rows had been inoculated and disease severity data showed that treatments 2, 3 and 4 had significantly lower disease severity 43-49% compared to the untreated check (82%) and the other treatments 75-82%. When yield for all treatments was examined only treatment 4 had a significantly greater yield than the untreated check and the yield of treatment 4 was also significantly greater than treatment 5.

The results of this test suggest that Abound fungicide and Roundup herbicide both have the potential to reduce soybean rust severity over the course of a season. Treatment 2 is a label-legal use in Florida. Treatment 3 is off-label and provided no statistically significant additional reduction in disease compared to the label-legal treatment 2. Neither the Roundup nor Abound completely controlled rust with the extreme disease pressure observed, but yields were numerically higher for these treatments and statistically higher for Abound. Additional research is needed to further investigate non-target effects of glyphosate fungicides. See attached Figures 1, 2, 3, 4, and 5.

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