Evaluation of Several Fungicide Treatments for Control of Asian Soybean Rust ((*Phakopsora pachyrhizi)* on Soybean (*Glycine max*).

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Materials and Methods:

A field (Kendrick loamy sand) at the University of Florida-IFAS Plant Science Research and Education Unit (PSEU) in Citra, Florida will be used for experimentation. On 5 June, 2007seeds of var. 95M30 were planted 5 seed per ft in rows on 15 inch centers so that the plots were two parallel rows 20 ft in length separated by a 12 ft alley with untreated spreader rows planted between each treatment. All product applications were made as described in Table 1. The sprays were applied using a CO_2 backpack sprayer at 50 lb/in^2 (psi) in 20gpa water through a pair of 8002 TeeJet® flat fan tips on a 15 in. boom. A randomized complete block design was used. Five untreated buffer rows surrounded each plot with a complete untreated plot on each end of the test. Numerous sites surrounding the test plots will be inoculated using ***Phakopsora pachyrhizi***-infected Kudzu leaves which were fixed onto soybean leaves on 10, July 2007 in buffer rows adjacent to the treatment rows Each kudzu leaf and paired soybean leaf was moistened by spraying with water from a hand held atomizer at 4:30 p.m. to insure an overnight dew period. Daily overhead irrigation was initiated 15 July, 2007 to increase the humidity in the crop canopy. Additional inoculations were made on 24, July and 7 August, 2007. Examination of the inoculated plants showed the presence of the pathogen on 29 August 2007. The treated rows were examined weekly for the presence of the pathogen. Disease data acquisition included incidence of rust per 20 random terminal leaflets/plot and disease severity using the Bayer Crop Science 0-5 Asian Soybean Rust (ASR) Severity Evaluation Scale (0 = 0, 1 < 5%, 2 = 5 to 15, 3 = 15 to 35. 4 = 35 to 67.5, 5 = greater than 67.5). The leaf samples were collected from within the canopy at least 12 in. from the soil surface on 29 August, and 13 September, 2007. The plot was monitored for pod maturity and harvested on 16 October, 2007. Fresh weight and moisture content of the harvested seed were recorded.

Table 1. Treatment and application timing versus Incidence and severity of Asian Soybean rust

	Growth Stages							
	R 1-2	R3	R5	R6	Rust Incidence %**	Rust Severity %	Yield (Bu/A)/ % moisture	ROI
T1- Untreated Ck					16AB*	3.22A	9.8/14.6	
T2- Echo 1.5 pt/A	X	X	X	X	15AB	2.24AB	13.72/15.5	$7.82
T3-Headline 6oz/A	X				17AB	2.04AB	11.97/14.9	$12.44
T4- Headline 6oz/A		X			7AB	0.53AB	11.0/15.3	$11.44
T5- Headline 6oz/A			X		4B	0.27B	9.58/14.4	$9.95
T6- Headline 6oz/A				X	4B	0.22B	11.54/15.1	$11.99
T7-Folicur 4oz/A	X				11AB	0.88AB	10.89/15.6	$16.96
T8-Folicur 4oz/A		X			7AB	0.44AB	7.9/15.1	$12.31
T9-Folicur 4oz/A			X		12AB	1.36AB	7.55/14.8	$11.76
T10-Folicur 4oz/A				X	11AB	1.13AB	9.36/14.2	$14.58
T11-Headline (4.7 oz/A)+Folicur (3.1oz/A)	X				13AB	0.66AB	10.38/14.4	$8.32
T12-Headline+Folicur		X			11AB	1.04AB	11.1/14.8	$8.89
T13-Headline+Folicur			X		21A	2.07AB	10.89/14.9	$8.73
T14-Headline+Folicur				X	6AB	0.51AB	8.05/14.9	$6.45

Leaf samples were collected for disease rating on August 29, and September 13, 2007. When plants were examined September 20, 2007 for sample collection the plants were 90% defoliated.

- Table 1. Treatment and application timing versus Incidence and severity of Asian Values followed by the same letter are not significantly different P>0.05. Means separation made with Duncan's new multiple range test using SAS 9.1.
- Data present is percent data however analysis was conducted on arcsine transformed data
- Yield data is a calculated value in Bushels/A (1 Bushel=60Lbs at 13.3 % Moisture). Moisture data is % moisture data collected using a Steinlite SB 900 seed moisture analyzer with the followings settings: commodity code =239 soy 85 TC.

- $ return for $ invested is a calculated value based upon market value for soybeans of $9.74/Bu at the end of the day on October 16, 2007 and only includes the cost of pesticides applied throughout the test.

Results: This test was conducted to evaluate the efficacy product application timing for disease control. In 2006 the inoculation conducted on July 14, 2006 resulted in infection on August 11, 2006. However, in 2007 an inoculation made on 11, July 2007 was not followed by infection. Repeated inoculations were made and daily overhead irrigation was conducted and disease was then observed on 29 August 2007. In 2007 the average rainfall was significantly lower than the five year monthly averages (see Table 2- below). The rainfall events occurred such that the bulk of the rainfall occurred during one or two events per month. This reduced the relative humidity within the crop canopy and even daily additional irrigation for two hours was insufficient to increase the relative humidity within the canopy to such a level that was favorable for disease. When rust was finally observed in this test it occurred 45 days later than in 2006. The occurrence of rust at this late date in the crop maturity means that the pods had already set and the seed were maturing when infection was detected. The difference in physiological condition of the crop when first infected and the adverse weather throughout the growing season probably had the greatest impact upon observed disease incidence and severity. In 2006 disease incidence and severity increased from 50% at the time of first observation in early August through the end of the test in October. The delay in the beginning of infection at the end of August 2007 reduced the incidence and severity of the disease. Treatments of Headline applied at R5 and R6 showed a statistically significant reduction in disease severity compared to the untreated check. None of the treatments provided a significant reduction in disease incidence. The yield data collected this year showed no statistically significant differences between any of the treatments.

Table 2. Rainfall (in inches) at PSEU Citra Florida

Month	5 Year Average at Citra	2007 actual
May	1.15	0.16
June	6.44	4.36
July	7.09	6.49
August	5.42	2.94
September	6.78	5.69