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## Managing Soybean Rust in South Dakota in 2006

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Soybean rust, caused by the fungus *Phakopsora pachyrhizi*, was first introduced to the U.S. in Fall 2004. It survived the winter in small pockets of infected kudzu in Florida and produced a widespread low-severity disease in the southeastern U.S. in 2005. During Winter 2005, the pathogen survived over a much wider area and appears to have become established in Mexico. That means the threat from soybean rust is greater in 2006 than in 2005, and we can expect that the threat will generally increase over the coming years as the pathogen becomes established in new areas with little risk of winter freeze.

Fungicides remain the only practical and effective control for this disease. Several fungicides have received EPA labeling and more products are being considered. Which fungicide products are available is a constantly changing landscape. Check with your local county Extension office for a listing of the most current products

or go to <http://plantsci.sdstate.edu/planthealth> and link to Soybean Rust.

The most critical decisions in using a fungicide is (1) product choice relative to the presence or absence of the pathogen, and (2) how recently infections may have occurred. Products that have strictly protectant/preventative activity should only be used before soybean rust has infected your crop. Curative fungicides have some activity early in the post-infection period and also serve a preventative function. These products are more forgiving in their activity relative to the timing of infection.

A table of all fungicide products available is on the back side of this page (Table 2). In simplest terms, the process followed in Table 1 can be used in managing soybean rust. Other products and strategies can be considered, but for managing soybean rust in South Dakota, this offers the simplest approach to rust management.

Table 1. Simplified fungicide decision tool.

<i>Crop Growth Stage</i>	<i>SBR Risk*</i>	<i>1st Spray**</i>	<i>2nd Spray</i>
Vegetative	n/a	Do not spray	n/a
R1 through R5 (the critical window for application)	Low High	Do not spray Section 18	n/a Section 18
R6 or later	n/a	Do not spray	n/a

\* Determine your farm's soybean rust risk by staying current with recommendations from Extension specialists and educators and trusted industry and/or crop consultants for the region or state. View the USDA-CSREES website (<http://www.sbrusa.net>) often.

\*\* Section 18 fungicides containing a triazole component are suggested for any situation where infection may have already occurred. This would include solo triazoles or premix products with a triazole component in addition to partner fungicide with another mode of action, such as a strobilurin.

n/a Not applicable. Treatment of the crop at this stage of growth has not been shown to provide an economic return associated with rust control

Table 2. Full decision tree guidelines for soybean rust fungicide use in 2006.

Fungicide strategy for 1 <sup>st</sup> application	Crop and disease status		Fungicide application <sup>3</sup>	
	Crop stage <sup>1</sup>	Disease level <sup>2</sup>	1 <sup>st</sup> Application	If warranted...
			2 <sup>nd</sup> application	
Pre-infection →	Vegetative →	No disease observed →	SPRAYING NOT RECOMMENDED	
	R1 through R5 →	No disease observed RISK LOW →	SPRAYING NOT RECOMMENDED	
		No disease observed but RISK HIGH →	Chlorothalonil <sup>4</sup> →	Triazole <sup>5</sup> →
			OR →	OR
				Premix <sup>6</sup> →
			Strobilurin <sup>7</sup> →	Triazole <sup>5</sup> →
OR →	OR			
	Triazole <sup>5</sup> →	Premix <sup>6</sup> →		
	Premix <sup>6</sup> →	Triazole <sup>5</sup> →	OR	
		Premix <sup>6</sup> →		
R6 or later →	Irrelevant →	Days to harvest an issue/non - economical		
Early-post infection →	Early-vegetative →	Increasing →	BENEFIT TO SPRAYING UNCERTAIN	
	Late-vegetative through R5 →	10% or less incidence in lower canopy →	Triazole <sup>5</sup> →	Premix <sup>6</sup> →
			OR	
			Premix <sup>6</sup> →	Triazole <sup>5</sup> →
			OR	
		Premix <sup>6</sup> →	Premix <sup>6</sup> →	
R6 or later →	Irrelevant →	Days to harvest an issue/non - economical		

1. Vegetative = stages before flowering; R1 = beginning flowering; R6 = full seed. Current data indicate that fungicide applications are not needed when a crop is in the early vegetative stages. Spraying at a late vegetative stage, however, may be prudent if disease is increasing and the crop will soon be at R1. This is especially true for late-planted crops and/or very late-maturing varieties that may develop a large canopy before flowering. Soybean rust symptoms are most prevalent, and increase most rapidly, during crop reproductive growth stages. Spraying at the late growth stages (R6 and later) is not recommended due to lack of yield response. In addition, many fungicides have days to harvest (pre-harvest intervals) or growth stage restrictions. Refer to fungicide labels for specific directions and restrictions.

2. Incidence = number of leaves out of 100 with any rust. Risk is determined based on national, regional, and local reports of rust activity and disease forecasts. **Yield loss is very likely once rust can be found in the mid crop canopy.** Numerous factors play into the decision as to the latest you can apply a fungicide. Crop stage, disease level, yield potential, crop insurance, and many other factors should be considered. Fungicide labels specify upper limits for their products.

3. Except as noted differently on the fungicide label, the first fungicide application should be made before soybean rust has appeared on more than 2% of leaves in the lower crop canopy of reproductive soybean. One, two, or three applications may be needed depending upon in which growth stage the disease is first detected and the subsequent environmental conditions. Spray coverage and penetration into the canopy are essential to success. **Consecutive solo applications of a strobilurin or a triazole should never be made due to resistance concerns.** Refer to fungicide labels for specific directions and restrictions.

4. Chlorothalonil (e.g., Bravo, Echo) is a protective fungicide that should only be used as the 1st application in a pre-infection program.

5. Triazoles (e.g., Caramba, Alto, Bumper, Domark, Folicur, Laredo, Orius, PropiMax, Tilt, Uppercut) have limited post-infection ability and are likely to have reduced efficacy if disease incidence in the lower canopy exceeds 10%. Only one application of Domark is allowed. **No more than two applications may be made with any given Section 18 active ingredient.**

6. A Premix (e.g. Quilt, Stratego) is a manufactured combination product of a strobilurin + triazole. Use triazole + strobilurin co-packs (i.e., Headline SBR, Headline-Caramba CoPack) and label-approved tank mixes the same as you would a premix. **No more than two applications may be made of a given Section 18 active ingredient.**

7. Strobilurins (e.g., Quadris, Headline) are protective products and have NO post-infection activity. Solo applications of a strobilurin should be restricted to the 1st application in a pre-infection program.