



SOYBEAN FACTS

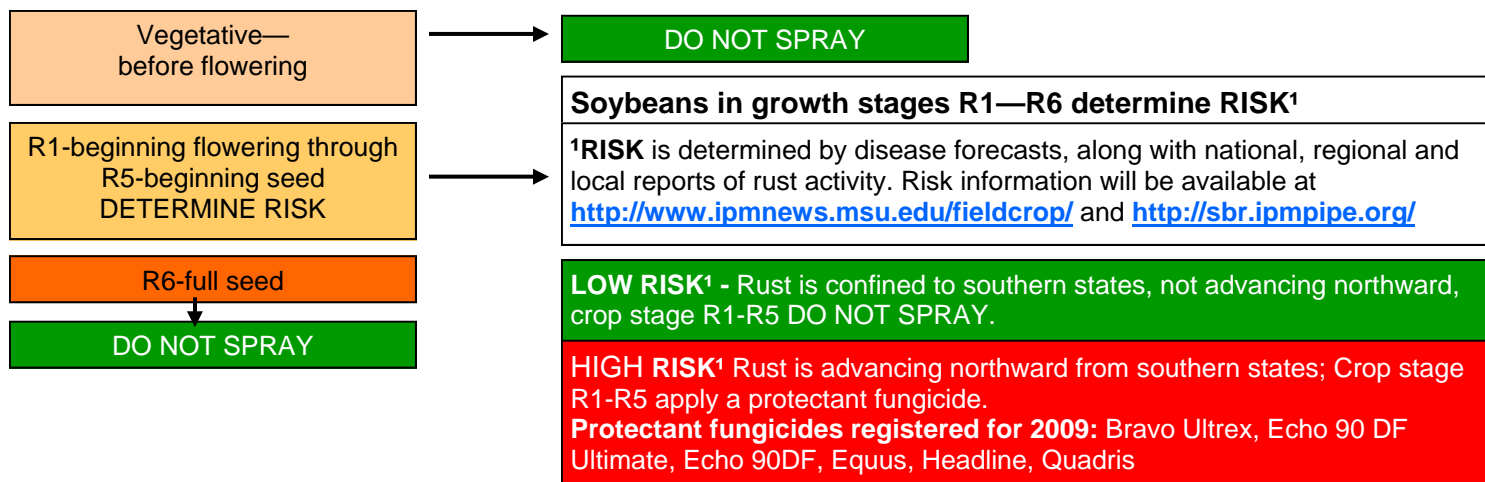
Soybean Rust Fungicide Use Guidelines for 2009

Prepared by D. Brown-Rytlewski, Michigan State University. Updated January 2009. Modified from "2005 Soybean Rust Fungicide Guidelines" developed by D. Hershman (University of Kentucky), A. Dorrance (Ohio State University), and M. Ddraper (South Dakota State University).

Determining when to apply a fungicide for soybean rust is based on several factors, starting with whether or not soybean rust is present in your field. To help you through the decision-making process. If no rust is present, go to A) to determine the crop growth stage and the risk of infection to decide whether or not a fungicide is needed. If rust is present, proceed to B) below.

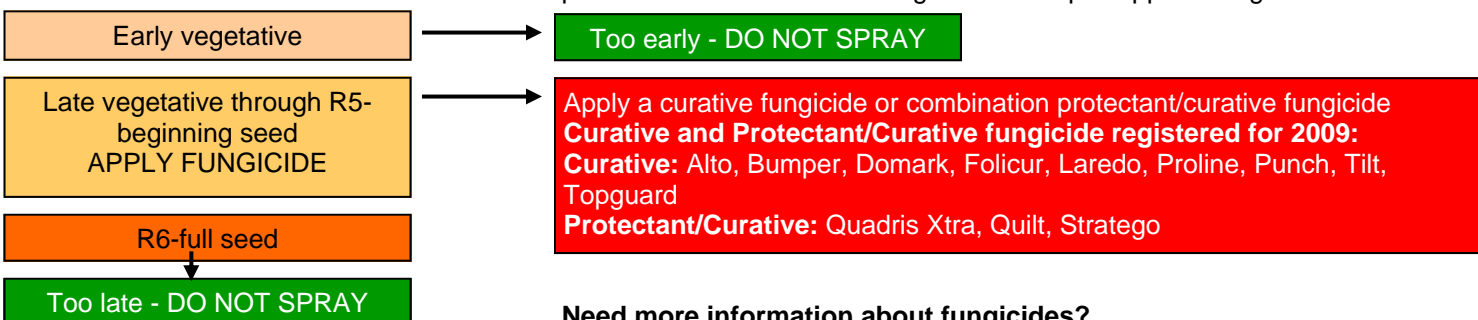
A) No rust is present in field

Crop growth stages



B) If rust is present in field

(Less than 10% of leaves infected in lower canopy.) Spraying when rust can be easily found in the canopy may not provide satisfactory or economical control.



If rust is present in the field, determine the crop growth stage and the level of infection in the canopy to decide if a fungicide application is warranted. Most reports indicate that soybean rust does not need to be controlled when detected in the vegetative crop stages as long as a curative spray program is started as soon as crop flowering begins. Spraying before flowering may be prudent if disease is increasing and the crop is approaching R1.

**Need more information about fungicides?
See "Fungicide Basics" on reverse side.**



Fungicide Basics

Why are fungicides needed to manage soybean rust?

Asian soybean rust is caused by the fungus *Phakopsora pachyrhizi*. None of the currently available soybean varieties are resistant to the soybean rust fungus, so the only way to stop the development of the disease is to use fungicides. Although soybean rust can not overwinter in Michigan, spores can travel on storm systems from infected fields in the south to fields in the north. Once a viable spore lands on a leaf of a healthy plant and temperature, humidity, and leaf wetness conditions are favorable, the spore can germinate and then penetrate into the leaf and cause infection. As spores are produced on infected plants, these spores can move easily from infected plants to healthy plants by wind or rain splash or being moved about by human activity or equipment. Fields can quickly become infected due to a repeating cycle of spore production and re-infection, causing considerable loss of yield.

Avoiding fungicide resistance

Resistance is an inherited change in a plant pathogen's susceptibility to a fungicide. Intensive use, overuse or misuse of certain fungicides can result in the development of resistance. Rotate fungicides with different mode of action categories for successive fungicide applications. Avoid making consecutive solo applications of a strobilurin or triazole.

Use a protectant fungicide (P) alone for the first application, only if no rust is present, but risk is high. If rust is present (less than 10% incidence) and lesions are sporulating in the lower canopy, use a triazole.

Protectant fungicides (P)

- Protect the plant against infection
- Must be applied before the spores land on the leaf
- Stop the infection process on the leaf surface
- Have no effect once the fungal mycelia enter the leaf
- Chlorothalonil-stops germination of spores
- Strobilurins-stop spore germination, spore penetration of leaf

Curative fungicides (C)

- Can stop or slow an infection that has already occurred
- Must be applied soon after initial infection
- Are not effective once the fungus begins to produce spores
- Triazoles have limited curative activity

Protectant/Curative combinations (P/C)

- Combined protectant and curative fungicides-premixed.

Fungicide mobility in the plant

Fungicides differ in their mobility in the plant. Chlorothalonil, a contact fungicide, is not absorbed into the leaves. Strobilurins are absorbed by leaves and move through the leaf, but are not truly systemic. Triazoles are absorbed by leaves and can move through water-conducting tissues to the upper parts of the plant, but do not move downward in the plant. Good coverage (especially in the lower canopy) is needed with all fungicides.

| No rust in field, soybeans at R1-R5, Risk HIGH, use: | |
|------------------------------------------------------|-----------------------------|
| 1st application | 2nd application (if needed) |
| Strobilurin | Triazole or premix |
| Triazole | Premix |
| Chlorothalonil | Triazole or premix |
| Premix | Triazole or premix |

| Rust in field, soybeans at R1-R5 <10% rust in canopy | |
|------------------------------------------------------|-----------------------------|
| 1st application | 2nd application (if needed) |
| Triazole | Premix, tank mix, co-pack |
| Premix, tank mix, co-pack | Triazole |

| | TRADE NAMES | COMMON NAME | FUNG-TYPE |
|-------------|-----------------------------------------|---------------------------------|-----------|
| Triazoles | Alto | Cyproconazole | C |
| | Tilt, Bumper | Propiconazole | C |
| | Domark | Tetraconazole | C |
| | Folicur | Tebuconazole | C |
| | Laredo | Myclobutanil | C |
| | Proline | Prothioconazole | C |
| | Punch | Flusilazole | C |
| | Topguard (Sec 18's continue until 2010) | Flutriafol | C |
| Strobilurin | Quadric | Azoxystrobin | P |
| | Headline | Pyraclostrobin | P |
| Premixes | Quadric Xtra | Azoxystrobin + cyproconazole | P/C |
| | Quilt | Azoxystrobin + propiconazole | P/C |
| | Stratego* | Trifloxystrobin + propiconazole | P/C |
| | Bravo, Echo, Equus | Chlorothalonil | P |