NOTICE:

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DISCLAIMER:

The following translated document originates from Brazil, is based on Brazilian data and experience, and was developed by EMBRAPA for Brazilian farmers. Aspects of SBR development and fungicide efficacy comparisons may not be the same under U.S. and Brazilian conditions. Similarly, certain control measures suggested by Brazilian officials reflect the unique SBR situation in Brazil, as well as year-round soybean production in certain parts of that country. Therefore, do not use this information for making fungicide purchasing or SBR control decisions in the U.S. Instead, use control measures developed by your state's Land Grant University scientists. Be advised that fungicide product names for the same active ingredient and manufacturer are typically different for Brazil and the U.S.; however, the common names for the active ingredient (such as tebuconazole or propiconazole or azoxystrobin) are the same in both countries.

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Supporting Organizations

Developed by VRSys Systems

Control

Control

- Eliminate volunteer soybean plants between cropping periods with the objective of reducing inoculum for the next crop. In the case of soybeans grown during winter, perform efficient control by applying fungicides.
- Plant earlier cultivars of soybeans, concentrating planting at the beginning of the suggested planting period for each region, so as to escape the higher risk period of disease occurrence and to avoid longer exposure of the crop in the field.
- Avoid multiple planting dates and late cultivars.
- Plant soybean seeds at a plant density that allows for good leaf aeration and for greater efficiency of penetration of fungicides.
- Monitor the crop from the beginning of soybean growth and, particularly, when it is close to flowering.
- Control the disease with fungicide applications at the beginning of the appearance of symptoms or as a preventative. The decision about the timing of application (initial symptoms or preventative) is complex, taking into account the factors necessary for the appearance of rust (presence of the fungus in the region, age of the plants and favorable climate conditions), the logistics of the application (equipment availability and size of the property), the presence of other diseases, and the cost of control.

Products registered for control of soybean rust

Table 1. Products registered with the Ministry of Agriculture for control of soybean rust (*Phakopsora pachyrhizi*). Observe the registration for the State.

Common name	Commercial name	Dosage/hectare		Grouping[3]
		g. of a.i. [1]	L or kg of c.p. [2]	
azoxystrobin	Priori[4]	50	0.20	*
azoxystrobin + cyproconazole	Priori Xtra[4]	60 + 24	0.30	***
cyproconazole	Alto 100	30	0.30	-
cyproconazole + propiconazole	Artea	24 + 75	0.30	***
difenoconazole	Score 250 CE	50	0.20	*
epoxiconazole	Opus	50	0.40	**
fenarimol	Rubigan	30-36	0.25 - 0.30	*
fluquinconazole	Palisade[5]	62.5	0.25	*
flutriafol	Impact 125 SC	62.5	0.50	***
flutriafol	Mercury	50 - 75	0.40 - 0.60	-
flutriafol	Potenzor	50 - 75	0.40 - 0.60	-
myclobutanil	Systhane 250	100 - 125	0.40 - 0.50	**
propiconazole	Juno	125	0.50	*
pyraclostrobin + epoxiconazole	Opera	66.5 + 25	0.50	***
tebuconazole	Constant 200 CE	100	0.50	***
tebuconazole	Elite 200 CE	100	0.50	***
tebuconazole	Folicur 200 CE	100	0.50	***
tebucon azole	Orius 250 CE	100	0.40	***
tebuconazole	Rival	100	0.50	***
tebuconazole	Tríade 200 CE	100	0.50	***
tetraconazole	Domark 100 CE	50	0.50	**
tetraconazole	Eminent 125 EW	50	0.40	**
thiophanate-methyl + flutriafol	Celeiro	300 + 60	0.60	***
thiophanate-methyl + flutriafol	Impact duo	300 + 60	0.60	***
trifloxystrobin + cyproconazole	Sphere[5]	56.2 +24	0.30	***
trifloxystrobin + propiconazole	Stratego[5]	50 + 50	0.40	*
trifloxystrobin + tebuconazole	Nativo	50+100/60+120	0.50 - 0.60	***

Brazil Guidelines--Not necessarily applicable to the United States.

The products may show the same behavior in situations of low disease pressure.

Differences in effectiveness do not imply that products may be applied following less rigorous application standards.

The delay in application results in reductions in productivity if climate conditions favor disease development.

After confirmation of the disease in the region give preference to products ** and ***.

The manufacturer is responsible for the information of product efficacy.

[1] g of a.i. = grams of active ingredient

[2] L or kg of c.p. = liters or kilograms of commercial product

[3] Grouping was done according to network assays for soybean diseases, 2003/2004 and 2004/05 crops. (***) - greater than 86% control; (**) 80% to 86% control and (*) 60% to 79% control.

[4] Add Nimbus 0.5% v/v application with tractor-sprayer or 0.5% L/ha for air application.

[5] Add 250 ml/ha of mineral or vegetable oil.

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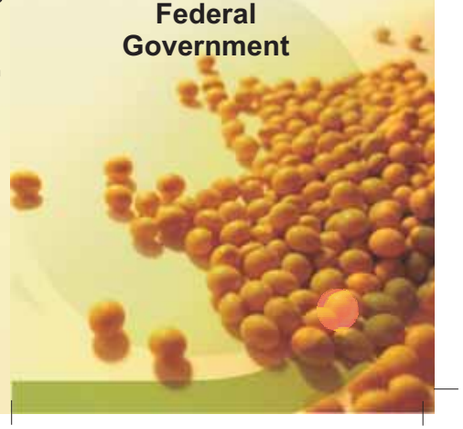
Asian Soybean Rust

Ministry of Agriculture and Supply

Brazilian Federal Government



Asian Soybean Rust

Asian soybean rust, caused by the fungus *Phakopsora pachyrhizi*, was identified in Brazil, state of Paraná, in May 2001. The disease spread rapidly to nearly all soybean producing regions during the last few years, due to efficient dissemination by wind. The main damage caused by rust is the early defoliation that hinders the complete development of the seeds with consequent reduction in productivity.

Symptoms

The initial symptoms of rust start in the lower and middle third of the plant and appear as tiny spots (1 mm in diameter at most) which are darker than the surrounding healthy leaf tissue and gray - greenish in color.

Confirmation of rust is made by observing the undersides of leaves for elevated areas, similar to small lesions (pustules), which are the fungal reproductive structures (uredinia). This observation is done most easily by using a magnifying glass, capable of 10 - 20x magnification, or under a dissecting microscope.

To identify the disease at the early stages, careful monitoring must be performed by collecting several leaves from the lower and middle part of the plant and observing them against the light to verify the presence of dark spots.

With time, the leaves infected by the fungus become yellow and drop off the plant.

"Confirmation of rust is done by observing fungal reproductive structures (uredinia) on the undersides of leaves (abaxial surface)".

Diseases that Can Be Confused with Rust

Bacterial blight (*Pseudomonas savastanoi* pv *glycinea*)

Bacterial pustule (*Xanthomonas axonopodis* pv *glycines*)

Brown spot (*Septoria glycines*)

Identification

Monitoring

Monitoring for rust and its identification in the initial stages are essential for effective control.

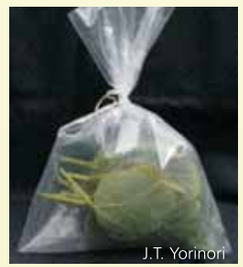
Perform the broadest monitoring possible, paying more attention to initial plantings and to places with higher accumulation of humidity.

Monitor beginning at emergence and intensify monitoring after flowering and/or after confirmation of rust in the region.

Collect leaves from the lower and middle third of the plants.

Observe the leaves against the light and look for dark spots. The presence of elevated areas similar to small lesions (pustules) on the undersides of leaves confirms rust.

When in doubt, place the leaves in a plastic bag, blow a little air into the bag, and tie the bag to make a small moist chamber; a moist piece of paper or cotton wool may be placed in this bag. Leave the bag closed in a cool place, at room temperature, for 12 to 24 hours. During this incubation period the fungus will produce spores (urediniospores) and these will accumulate on the surface of the pustules making them more visible.



Warning Units (Sentinel Plots)

These units are made up of small areas planted with soybeans up to one month before the normal season, with no fungicide application on the aerial parts of the plants. Because symptoms of rust are in general seen after flowering, these areas tend to show symptoms before the commercial crop, alerting the producer to the need for disease control.

Warning System

Updated information about new foci of rust during the crop season can be obtained from the web site:

www.cnpso.embrapa.br/alerta

Diagnostic Laboratories

The diagnosis of rust can be done in laboratories accredited by the Anti-Rust Consortium formed by universities, public and private research institutions and cooperatives. Addresses of the laboratories can be found on the web site:

www.cnpso.embrapa.br/alerta

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Monitoring