

## Symptoms of Soybean Rust on Soybean and Other Legumes

In response to the discovery of soybean rust in the southeastern United States in November 2004, the USDA Agricultural Research Service's Foreign Disease-Weed Science Research Unit (FDWSRU) (Morris Bonde and Reid Frederick), in cooperation with The Pictsweet Company (Steve Little), Mississippi State University (Billy Moore), and Iowa State University (XB Yang), initiated a host range study with *Phakopsora pachyrhizi*. The study was conducted in the USDA-ARS FDWSRU Biosafety Level 3 Plant Pathogen Containment Facility at Fort Detrick, MD with the purpose of determining the susceptibility of important legume crops other than soybean [*Glycine max* (L.) Merr.], and the role winter legume species (including weeds) might play in the over wintering of the pathogen. We plan to publish an extensive report of our findings in the near future describing the specific results of the cultivars, accessions, and isolates used in the study. The purpose of the release of these photographs at this time is to assist investigators in the field as they search for the disease.

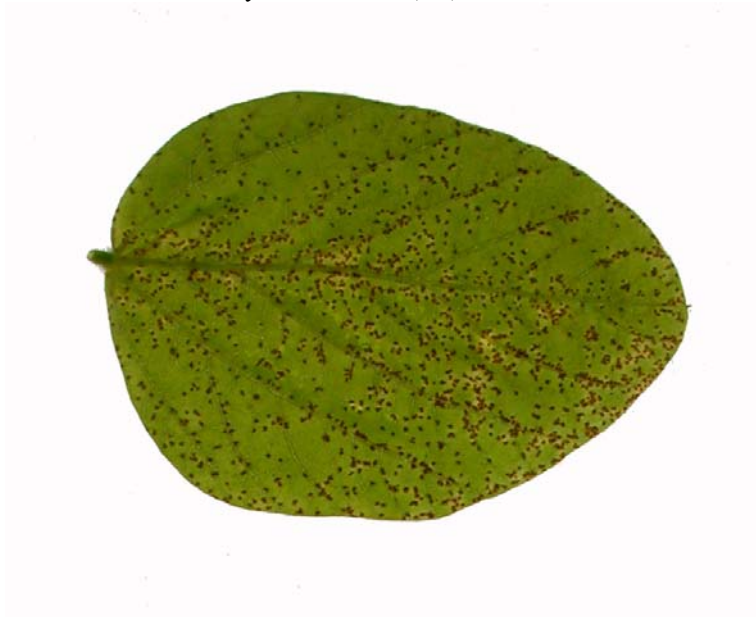
Because this study was conducted in a greenhouse, and not under natural conditions, symptoms may not necessarily be the same as those that might occur in the field. Experience has shown, however, that knowledge of symptoms of soybean rust on soybean in the FDWSRU greenhouse has been beneficial in recognizing the disease on soybean in the field. The photographs presented here are from infected plants on which urediniospores were allowed to accumulate. In the field, urediniospores sometimes do not accumulate and are disseminated by rain and wind.

In our study, soybean, kudzu [*Pueraria montana* var. *lobata* (Willd.) Maesen & S. Almeida], jicama [*Calopogonium caeruleum* (Benth.) Suoiev.], lupine (*Lupinus* L.), and some green bean (*Phaseolus vulgaris* L.) cultivars sporulated relatively well compared to soybean. Kudzu and green bean were particularly interesting, with some accessions highly susceptible and others highly resistant. Susceptible kudzu accessions sporulated heavily, and resistant accessions little, if any. Susceptible accessions produced tan lesions and resistant accessions large reddish brown lesions. In general, the most resistant plants had the most severe symptoms, but fewer spores were produced.

Infected soybean, kudzu, jicama and green bean sporulated mostly on the lower leaf surface. In contrast, lupine produced most lesions on the upper leaf surface with many spores. The manner in which lesions and spores are produced likely is associated with the anatomy of the leaf.

# SOYBEAN

*Glycine max* (L.) Merr.



Bottom



7X

Top



7X



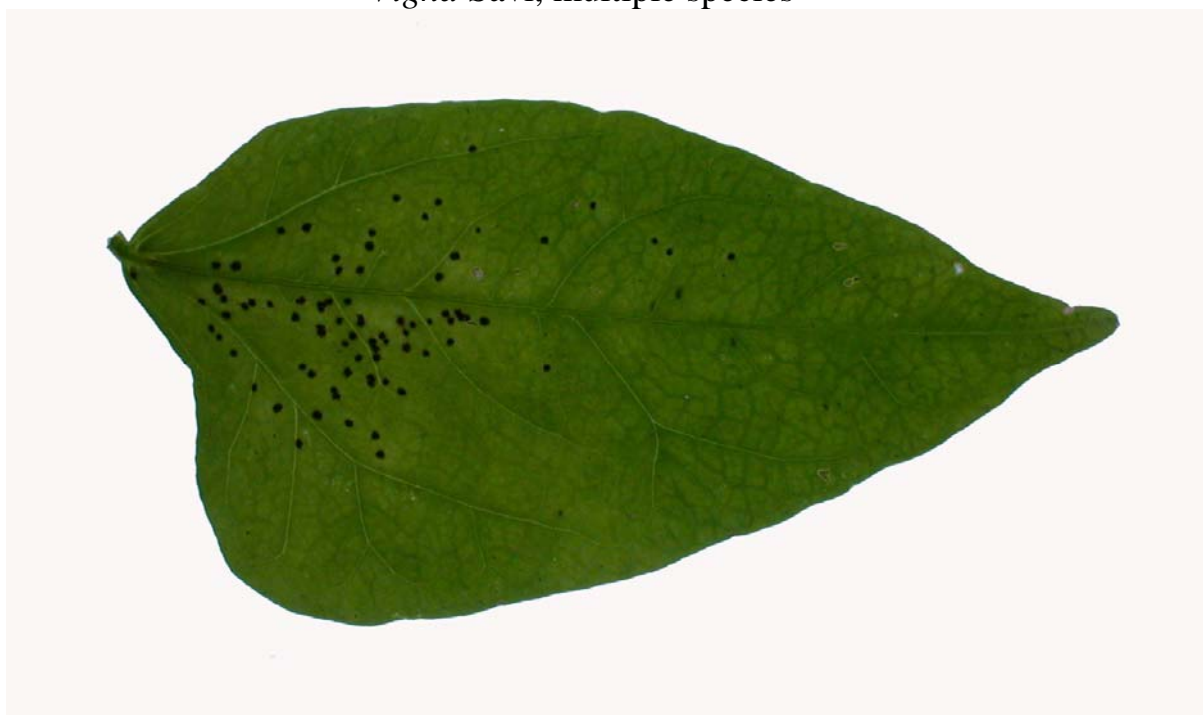
25X



25X

# COWPEA

*Vigna Savi*, multiple species



Bottom



7X

Top



7X



25X

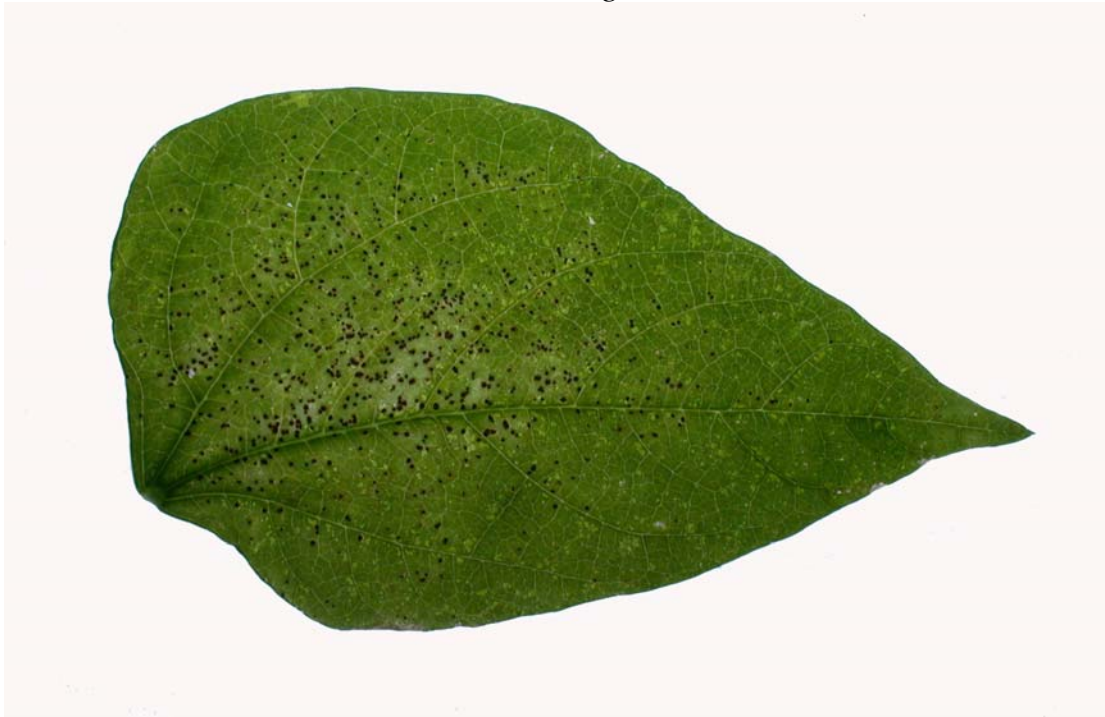


25X



# GREEN BEAN, HIGH SPORULATING

*Phaseolus vulgaris* L.



Bottom



7X

Top



7X



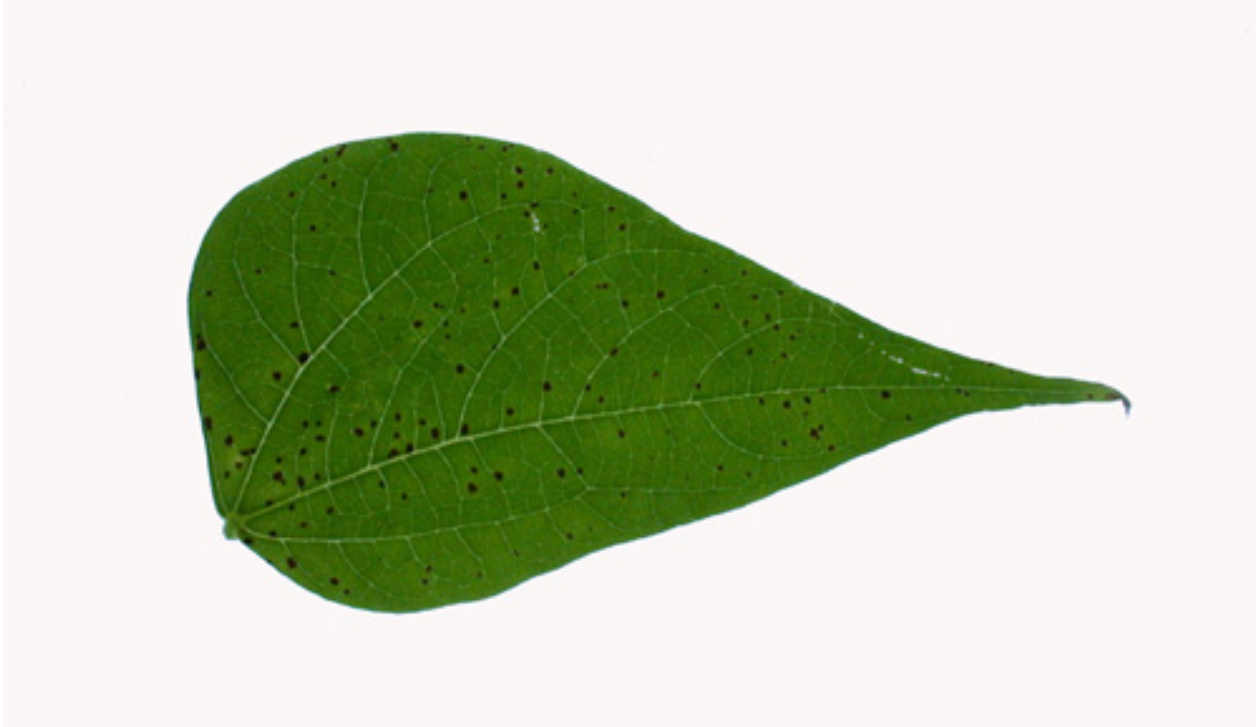
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25X

# GREEN BEAN, LOW SPORULATING

*Phaseolus vulgaris* L.



Bottom



7X

Top



7X



25X

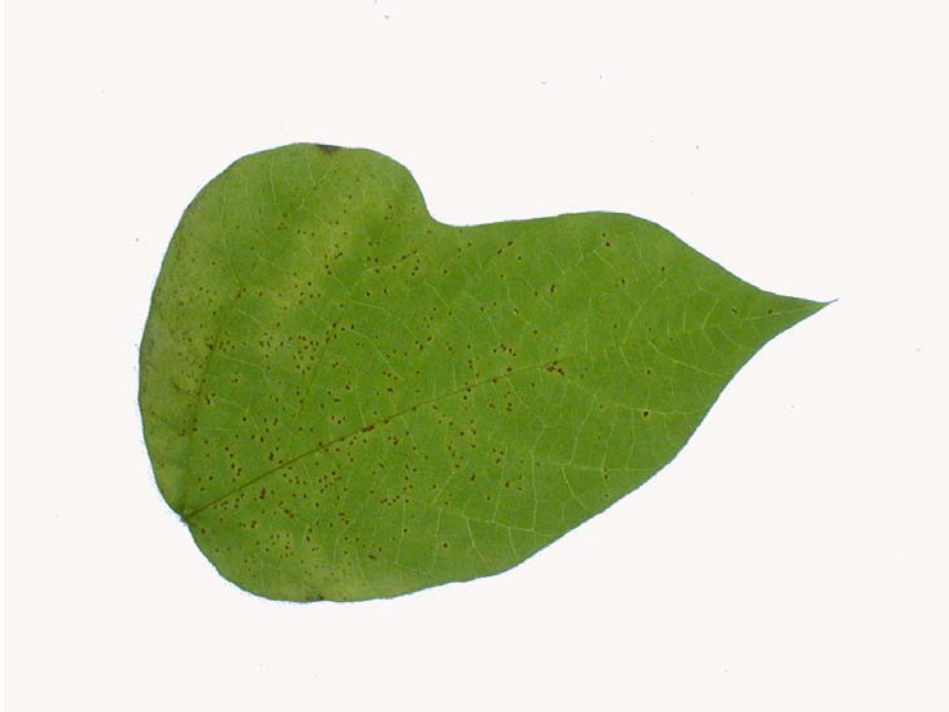


25X



# KUDZU, HIGH SPORULATING

*Pueraria montana* var. *lobata* (Willd.) Maesen & S. Almeida



Bottom



7X

Top



7X



25X



25X

# KUDZU, LOW SPORULATING

*Pueraria montana* var. *lobata* (Willd.) Maesen & S. Almeida



Bottom

Top



7X

7X



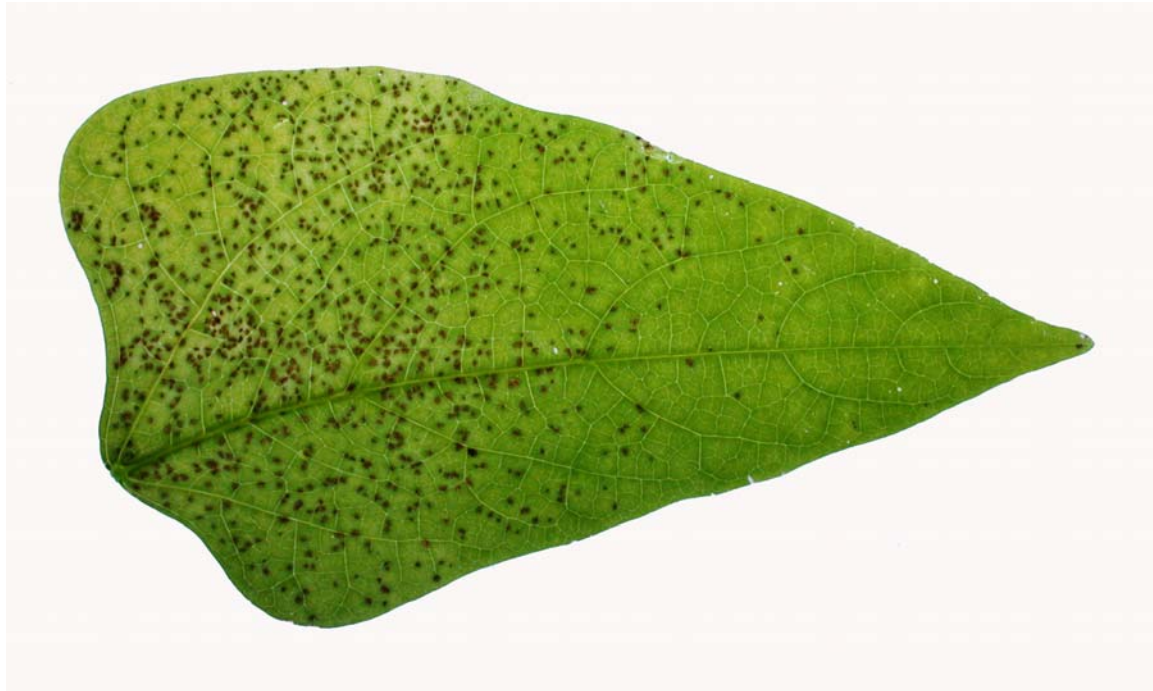
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# LIMA BEAN

*Phaseolus lunatus* L.



Bottom



7X

Top



7X



25X



25X



# OTHER HOSTS

JICAMA – *Calopogonium caeruleum* (Benth.) Suav.

Bottom



25X

Top



25X

LUPINE – *Lupinus* L. numerous species



25X



25X

RED KIDNEY BEAN – *Phaseolus vulgaris* L.



40X



40X