

Latest Development on Alternative Hosts

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First Reports of Soybean Rust

- First reported in 1903 as *Uredo sojae* from leaves of *Glycine max* subsp. *soja* or wild soybean in Japan in 1903 (*Hedwigia*)
- In 1914, it was described as *Phakopsora pachyrhizi* from leaves of *Pachyrhizus erosus*, or yam bean in Taiwan (*Annales Mycologici*)

Hosts of *Phakopsora pachyrhizi* in Asia/Australia up to 1992

- 93 hosts of *P. pachyrhizi* reported
- All hosts belong to the legume family Fabaceae (18,000 species in 650 genera) and are within the subfamily Papilionoideae (13,860 species in 476 genera)

(Ono, Y., Buritica, P., and Hennen, J. F. 1992. Delimitation of *Phakopsora*, *Physopella* and *Cerotelium* and their species on Leguminosae. Mycol. Res. 96:825-850)

Current Hosts in the U.S.

- Soybean

(Schneider, R. W., Hollier, C. A., Whitman, H. K., Palm, M. E., McKemy, J. M., Hernandez, J. R., Levy, L., and DeVries-Paterson, R. 2005. First report of soybean rust caused by *Phakopsora pachyrhizi* in the continental United States. Plant Dis. 89:774.2006)

- Kudzu

(Harmon, P. F., Momol, M. T., Marois, J. J., Dankers, H., and Harmon, C. L. 2005. Asian soybean rust caused by *Phakopsora pachyrhizi* on soybean and kudzu in Florida. Plant Health Progress)

- *Desmodium tortuosum* (Florida Beggarweed)

(Sconyers, L. E., Kemerait, R. C., Brock, J. H., Gitaitis, R. D., Sanders, F. H., Phillips, D. V., and Jost, P. H. 2006. First report of *Phakopsora pachyrhizi*, the causal agent of Asian Soybean Rust, on Florida beggarweed in the United States. Plant Dis. 90:972)

- *Phaseolus coccineus*, *P. lunatus*, and *P. vulgaris*

(Lynch, T. N., Marois, J. J., Wright, D. L., Harmon, P. F., Miles, M. R., and Hartman, G. L. 2006. First report of soybean rust caused by *Phakopsora pachyrhizi* on *Phaseolus* spp. in the United States. Plant Dis. 90:970)

- What are some of the other potential hosts of *P. pachyrhizi* in the U.S.?

Greenhouse Screening of Potential New Hosts



- 176 species within 57 genera of legumes were planted at the FDSWRU in Ft. Detrick, MD in Spring 2006
- Inoculated with a mixture of 4 international isolates 30 days after planting: Brazil 01-1, Paraguay 01-2, Thailand 01-1, and Zimbabwe 01-1
- 65 new hosts in 25 genera were positive for rust



Tephrosia



Crotalaria



Desmodium



Lupinus



Astragalus



Cologania



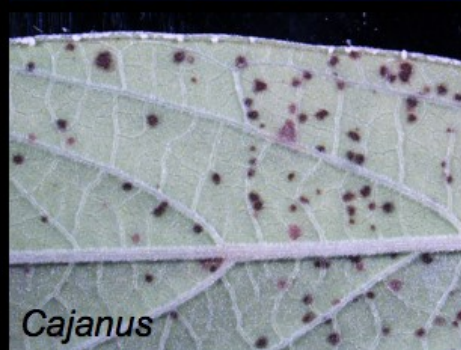
Indigofera



Centrosema



Kummerowia



Cajanus



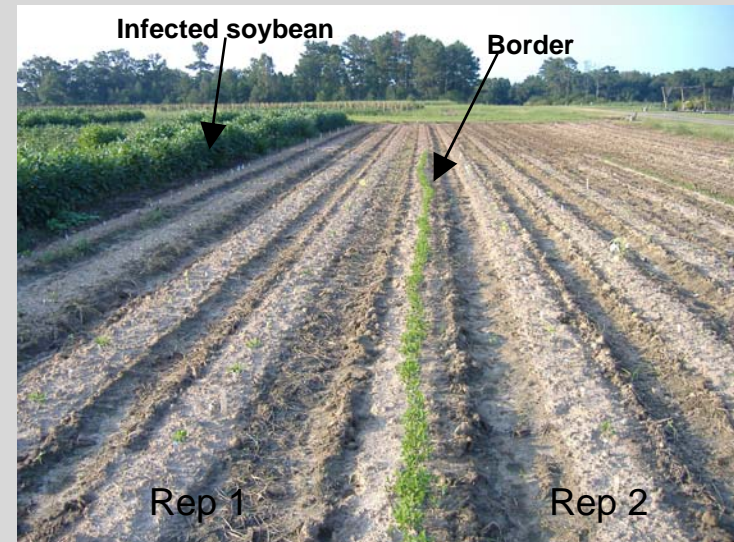
Baptisia



Calopogonium

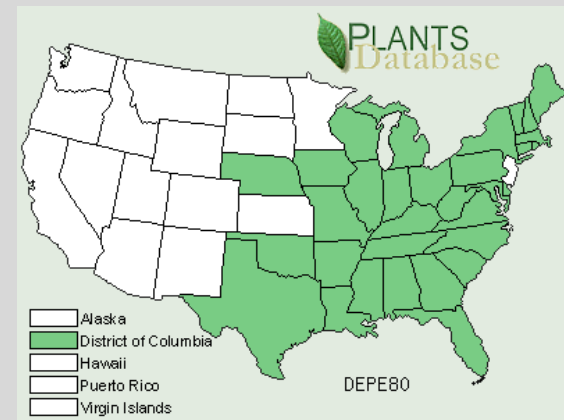
Field Screening

- 105 species in 32 genera were planted in IL in peat flats and at 4 weeks were transplanted into a field adjacent to rust-infected soybeans in Quincy, FL in September 2006 and 2007.
- In both years combined, a total of 41 species in 26 genera were confirmed to have rust by the presence of sporulating uredinia.



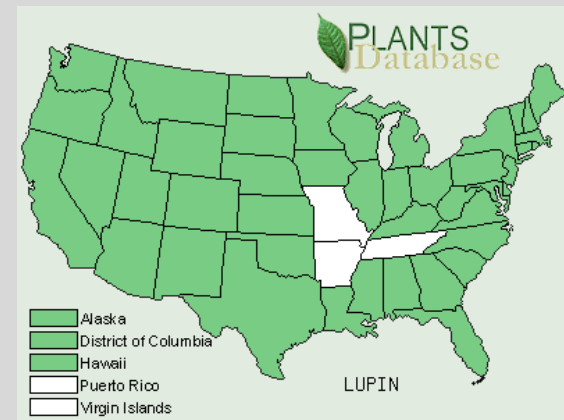
Desmodium perplexum

- **Perplexed ticktrefoil**
- Native, perennial herb
- New host
- Capable of growing in a variety of habitats
- Potential overwintering host in south and source of inoculum



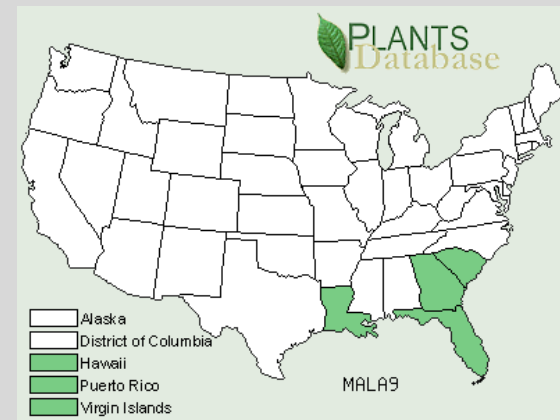
Lupinus spp.

- **Lupines**
- Native and naturalized, annual and perennial herbs
- Individual species tend to have narrow distributions, but the genus as a whole is widely distributed.
- All lupines tested (5 spp.) have been susceptible.
- Potential to overwinter and spread inoculum



Macroptilium lathyroides

- **Wild bushbean**
- Native, perennial vine/herb
- Widespread in Central and South America as forage
- Overwintering host



Conclusions

- So far we have found 65 new host species representing 25 genera
- Many of these hosts exist in areas in the southern US that do not have hard freezes
- Legumes in these areas should be scouted for rust to determine if these are overwintering hosts for *Phakopsora pachyrhizi*

Acknowledgements

- Tara Lynch, Monte Miles & Tristan Mueller
- Personnel at Fort Detrick - Reid Frederick & Mo Bonde
- Personnel at the University of Florida - James Marios & David Wright
- Illinois Soybean Association & the North Central Soybean Research Program for partial support