

P. pachyrrhizi
Host Range and Epidemiology
Studies at FDWSRU

by M.R. Bonde

Host range



“.. an analysis of the threat of rust to soybeans in the United States must await the results of other studies involving the potential host range and pathogen survival.”

J.S. Melching, K.R. Bromfield, C.H. Kingsolver
1979

Objective: Determine susceptibility of various legumes to soybean rust under greenhouse conditions

A. winter legumes

B. legume crops other than soybean

Procedure

- Inoculate plants at about one month of age.
- Examine 2 weeks after inoculation.
- Record reaction type.
- Rate lesion density and percent of lesions sporulating.
- Collect leaf tissue, fix, clear and stain.
- Determine average number of uredinia per lesion and average unredinia diameter.
- Calculate spore producing area per lesion (SPAPL).

Reaction Types



Tan



RB



Mixed

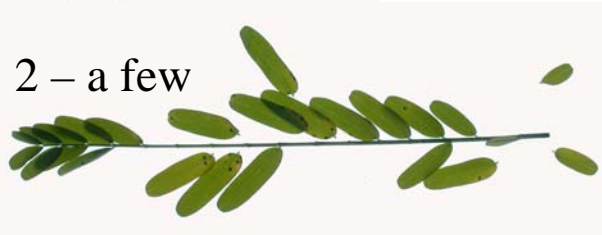
Lesion Density - Compare heaviest lesion density on plant to soybean control and rate from 1 to 5.



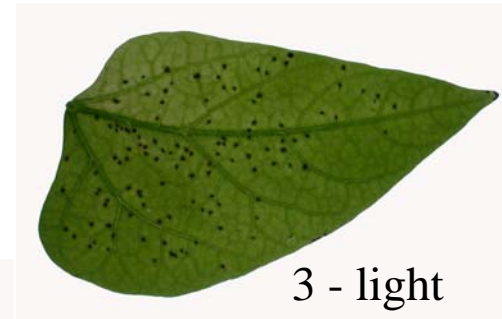
Soybean control



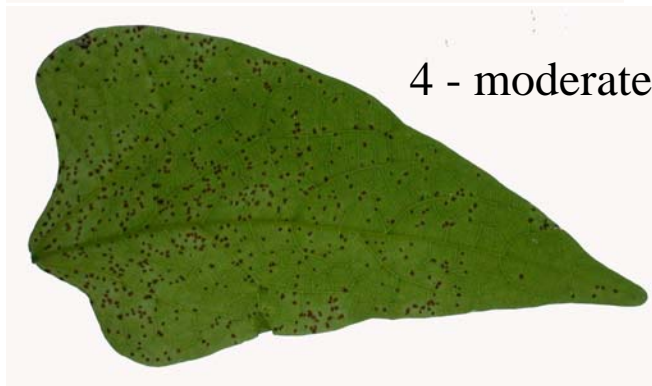
1 - none



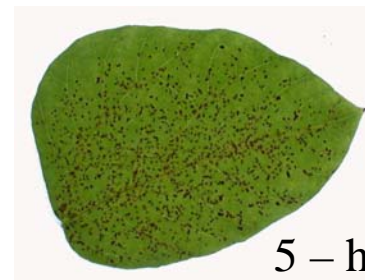
2 - a few



3 - light



4 - moderate



5 - heavy

Percent sporulation

— Estimate the percent of lesions that are sporulating and assign number.

0 – none

1- 20%

2 – 40%

3 – 60%

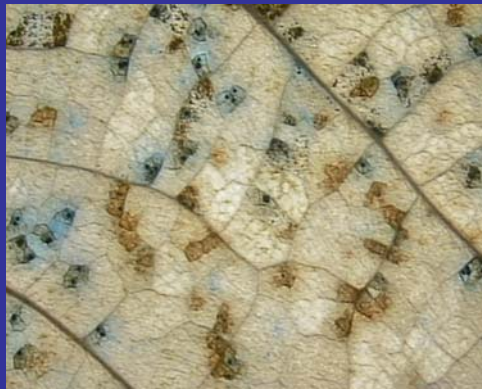
4 – 80%

5 – 100%



Spore producing area per lesion –

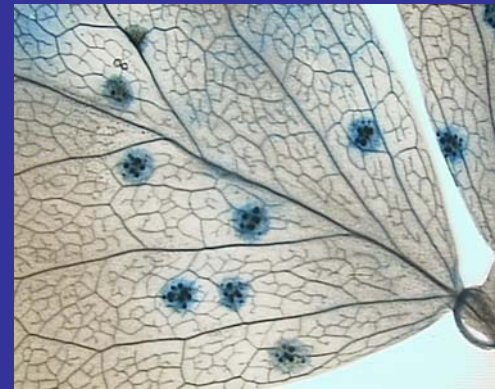
Calculate from average number of uredinia per lesion and average uredinia diameter on stained leaves.



3,700 μm^2

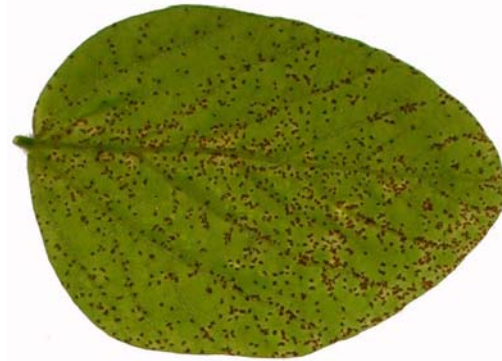


33,500 μm^2



58,600 μm^2

SOYBEAN
Glycine max (L.) Merr.



Bottom



7X

Top



7X



25X



25X

GREEN BEAN, HIGH SPORULATING

Phaseolus vulgaris L.



Bottom

Top



7X

7X

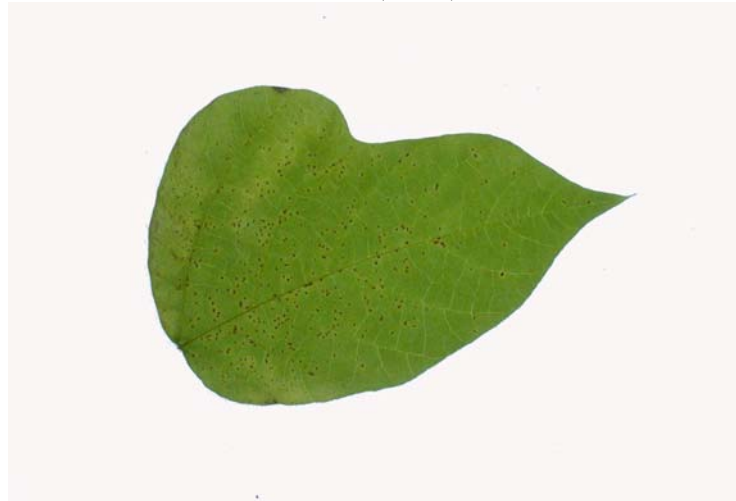


25X

25X

KUDZU, HIGH SPORULATING

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



Bottom

Top



7X



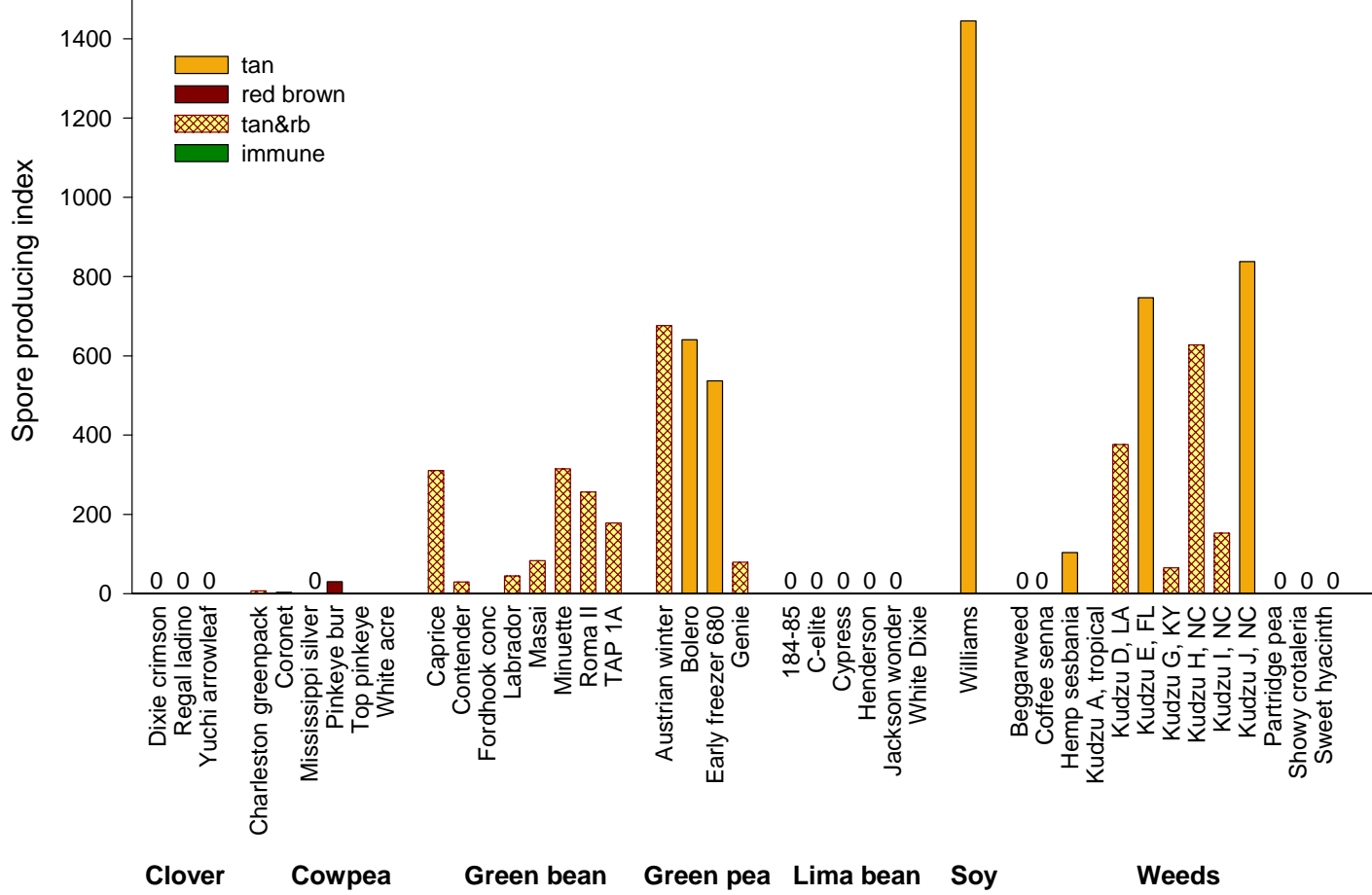
7X



25X



25X



Conclusions

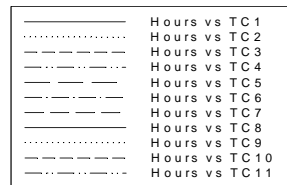
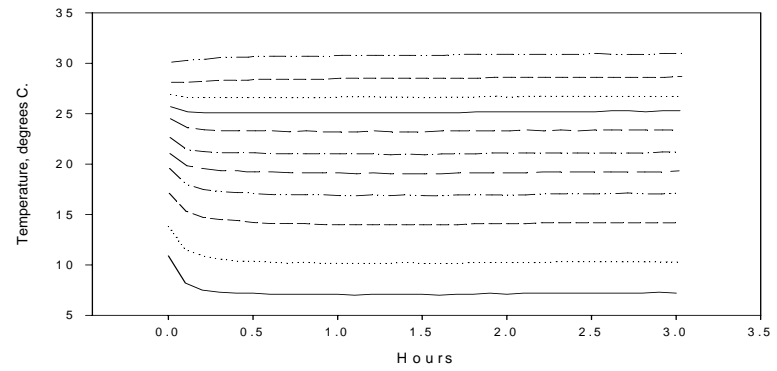
- Clovers – not very important
- Cow pea – susceptible but does not sporulate well
- Green beans – some fairly susceptible
- Green peas - very susceptible but leaves fall rapidly
- Lima beans – susceptible but does not sporulate
- Kudzu – susceptible with high sporulation in general

Epidemiology

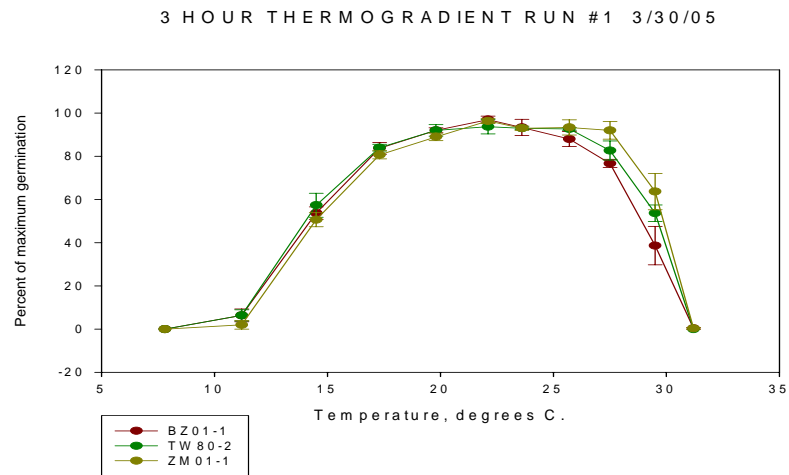
Temperature Gradient Plate



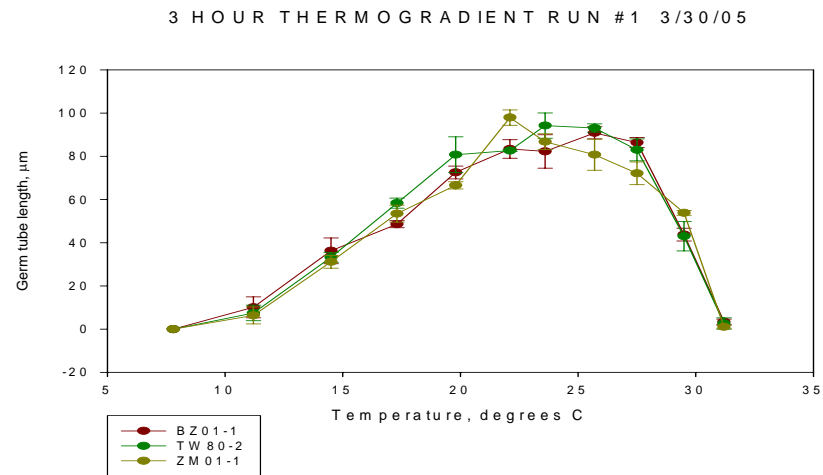
3 HOUR THERMOGRADIENT RUN #1 TEMPERATURES



Germination

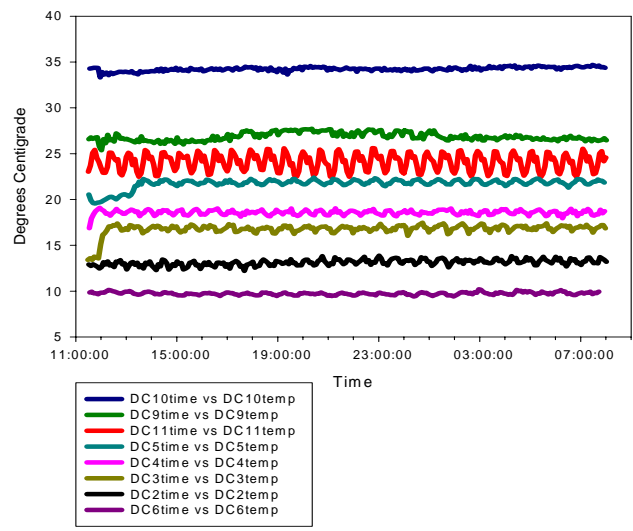


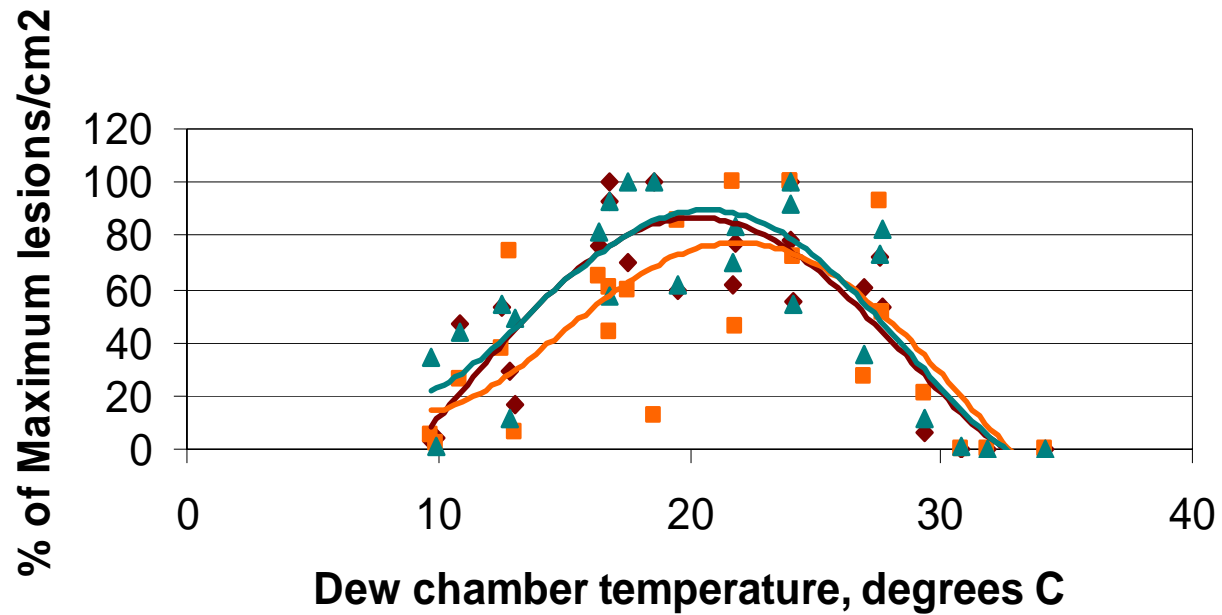
Germ Tube Length



Dew Chamber Infection Studies

Dew Chamber Study Run 3 - 1/2/04





— Poly. (ZM01-1) — Poly. (BZ01-1) — Poly. (TW80-2)