

Host Range Study of Soybean Rust in Brazil

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Phakopsora pachyrhizi Sydow was detected in Brazil for the first time in 1936 by A. S. Muller as P. crotalariae (Diet.) Arth. infecting Crotalaria striata, in Viçosa, State of Minas Gerais (Thurston 1940).

In 1961, Viegas included P. pachyrhizi on various hosts in the INDEX OF FUNGI OF SOUTH AMERICA. There was no other reference of P. pachyrhizi in Brazil until February 1979 when Deslandes recorded it on Glycine wightii, Phaseolus lunatus var. macrocarpus, and Glycine max. Other reports of P. pachyrhizi infecting leguminous species have since been published (Deslandes and Yorinori 1981; Chaves et al. 1982; Yorinori 1982).

The objective of the present work was to study the resistance of 24 leguminous species to P. pachyrhizi under greenhouse conditions.

Materials and Methods

The abaxial surface of each leaf of thirty-day-old plants was inoculated with 1 ml uredospore suspension of 1 mg/ml of water plus 0.05% Tween-80. After inoculation, the plants were incubated in a dew chamber at 21°C for 24 hr. They were placed in the dark for the first 15 hr, and then moved to a greenhouse where they were maintained until the appearance of symptoms.

Five plants were rated in each species and the following parameters were analyzed: the latent period (LP) which is the time in days from inoculation until 50% of uredia had sporulated; average number of lesions per square centimeter of leaf area infected (ANL) taken 15 days after inoculation; average number of uredia per lesion (ANUL) taken when 50% of uredia had sporulated; and intensity of sporulation (E) taken 15 days after inoculation on the following scale:

- 0 - no sporulation
- 1 - $<1.0 \times 10^3$ uredospores/cm² of leaf area
- 2 - 1.0×10^3 to 3.0×10^3 uredospores/cm² of leaf area
- 3 - 3.0×10^3 to 5.0×10^3 uredospores/cm² of leaf area
- 4 - 5.0×10^3 to 7.0×10^3 uredospores/cm² of leaf area
- 5 - $>7.0 \times 10^3$ uredospores/cm² of leaf area

Part of the plants used in the greenhouse study were then transferred to a nearby field where Phaseolus lunatus (lima bean) had been

severely and naturally infected. These leguminous plants were retained in the field during the winter to observe the telia. Observations on the presence of telial stage was evaluated for two consecutive years.

Results and Discussion

Vigna mungo (blackgram) was the most susceptible to Phakopsora pachyrhizi with the highest average number of lesions per square centimeter of leaf area and the highest sporulation intensity (Table 1). Under field conditions, V. mungo planted near the inoculum source died due to pathogen attack.

Crotalaria striata did not show any macroscopic symptom of the disease when inoculated several times under greenhouse conditions. However, when plants were maintained in the field close to severely infected Phaseolus lunatus, some lesions were observed even in the telial stage.

Table 1. Reaction of leguminous species to Phakopsora pachyrhizi.

Leguminous Species	LP ^a	ANL ^b	ANUL ^c	E ^d	TELIA ^e
<u>Calopogonium mucunoides</u> Desv.	10	71.43	2	4	-
<u>Canavalia</u> sp.	-	-	-	-	-
<u>Centrosema pubescens</u> Benth.	-	-	-	-	-
<u>Crotalaria granziana</u>	11	2.14	3	1	-
<u>C. juncea</u> L.	12	17.85	1	1	-
<u>C. striata</u> (Jacq.) Urb.	- ^f	-	-	-	+
<u>Galactia striata</u>	-	-	-	-	-
<u>Glycine max</u> (L.) Merr.	10	28.57	3	2	+
<u>G. wightii</u> (Grah ex Wight Arn) Verdc.	11	20.00	2	4	+
<u>Lablab purpureus</u> (L.)	11	8.90	1	1	+
<u>Macroptilium atropurpureum</u> (DC.) Urb.	10	25.00	2	4	-
<u>M. lathyroides</u> (L.) Urb.	11	20.71	4	3	-
<u>Phaseolus bracteolatus</u>	10	25.00	4	4	+
<u>P. lunatus</u> L.	11	28.57	3	4	+
<u>P. vulgaris</u> L.	11	17.00	2	2	-
<u>Pueraria phaseoloides</u> (Roxb.) Benth.	-	2.00	-	-	-
<u>Stylosanthes guianensis</u> (Aubl.) Sw.	-	-	-	-	-
<u>S. hamata</u> (L.) Taub.	-	-	-	-	-
<u>Teramnus uncinatus</u>	-	3.21	0	0	-
<u>Vigna mungo</u> (L.) Hepper	10	89.28	4	5	-
<u>V. unguiculata</u> (L.) Walp.	-	-	-	-	-
<u>V. wilmaii</u>	10	24.28	2	4	-

^aLP: latent period.

^bANL: average number of lesions per square centimeter.

^cANUL: average number of uredia per lesion.

^dE: intensity of sporulation, 0 (zero) = no uredia and 5 = the highest degree of sporulation.

^eTELIA: (-) absence and (+) presence under field conditions.

^f(-) no symptoms or signs developed when plants were artificially infected under greenhouse conditions.

Canavalia sp., Centrosema pubescens, Feijao alado, Galactia striata, Stylosanthes guianensis, S. hamata, and Vigna unguiculata did not show any observable symptoms.

Literature Cited

- Chaves, G. M., L. Zambolim, and F. X. R. Vale. 1982. Ferrugem da soja em lavoura comercial na regio do Alto Paranaíba. *Fitopatologia Brasileira* 7(3):482 (Abstract).
- Deslandes, J. A. 1979. Ferrugem da soja e de outras leguminosas causadas por Phakopsora pachyrhizi no Estado de Minas Gerais. *Fitopatologia Brasileira* 4(2):337-339.
- Deslandes, J. A. and J. T. Yorinori. 1981. Espécies de leguminosas suscetíveis ao fungo Phakopsora pachyrhizi, causador da ferrugem da soja. *Fitopatologia Brasileira* 6(3):603 (Abstract).
- Thurston, W. H. 1940. The rusts of Minas Gerais, Brazil, based on collections of A.S. Muller. *Mycologia* 32:290-309.
- Viegas, A. P. 1961. Índice de fungos da América do Sul. Instituto Agronomico - Campinas/SP. 921 pp.
- Yorinori, J. T. 1982. Doenças da soja causadas por fungos. *Informe Agropecuário* 8(94):40-46.