Variation in productivity of lesions, uredinia and urediniospores of *Phakopsora pachyrhizi* among leguminous plants.

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Introduction

Soybean rust has been one of the most important diseases for soyeban production in Brazil sice it occurred in South America in 2001. Since the causal agent, *Phakoprsora pachyrhizi*, is an obligate parasite, living tissue is necessary for the fungus to survive during the season when soybean is not available in the fields. *P. pachyrhizi* infects more than 90 leguminous plants. But it produces many urediniospores on some hosts but not on others. Plants on which it produces abundant urediniospores will be good hosts and which have green tissues in winter season can be good overwintering hosts and inoculum sources. This presentation shows the differences of productivity of lesions, uredinia and urediniospores by *P. pachyrhizi* among legminous species.

Materials and Methods

Twenty five leguminous species were examined for lesion, uredinia and urediniospore production by *P. pachyrhizi*. The plants were selected from common crops, forage crops, green manures and common weeds around soybean fields in Brazil. Seeds were sown in potted soil. The plants were first grown in a rust-free greenhouse for three to four weeks. The pots were transferred to the greenhouse in which soybean plants infected with *P. pachyrhizi* were maintained. Further artificial inoculation was not made. Production of lesions, uredinia and urediniospores was evaluated from 26 days to 75 days after transfer. The plants were kept there to check further production of lesions. In case that lesions were produced in plants except soybean, the leaves were detached and put in a moistened plastic box, and incubated for two days at 23 degree Celsius to verify the appearance of uredinia and urediniospores.

Results and Discussion

The results are summarized in the Table 1. The most lesions with urediniospores were observed on *Glycine max*, followed by *Phaseolus vulgaris* and *Neonotonia wightii* (Fig. 1). Many urediniospores were produced on some plants but not all of *Pueraria lobata*. Many lesions and a few urediniospores were produced on *Cajanus cajan*, *Calopogonium mucunoides*, *Desmodium tortuosum*, *Lablab purpureus*, *Macroptilium atropurpureum*, *Pisum sativum*, *Pueraria phaseoloides* (Fig. 2). Few lesions and almost no urediniospores were produced on *Centrosema* sp., *Crotalaria juncea*, *Vigna angularis* and *V. unguiculata*. No lesions were observed on *Arachis pintoi*, *Crotalaria spectabilis*, *Desmodium ovalifolium*, *Mucuna* sp., *Lotus corniculatus*, *Medicago* sp., *Senna obtusifolia*, *Stylosanthes guianensis*, *Trifolium pratense* and *T. vesiculosum*.

P. lobata, N. wightii and volunteer *G. max* survived in winter of 2005 in Londrina, Parana, southern Brazil. Since *P. pachyrhizi* multiplied well on them, they will be good inoculum sources of soybean rust. Urediniospores on *C. cajan*, *C. mucunoides*, *D. tortuosum*, *L. purpureus*, *M. atropurpureum*, *P. sativum* and *P. phaseoloides* may serve also as the source of inoculum if the plants survive in winter. Since the environmental condition and the amount of inoculum in the experiments were very favorable to the multiplication of the fungus, these hosts may be less susceptible in the field conditions. A field observation of the susceptibility to *P. pachyrhizi* is necessary for a reliable evaluation. Differences in susceptibility among varieties of leguminous species are also taken into account for the evaluation. There are many leguminous trees in Brazil. But we should examine the productivity of urediniospores on common leguminous trees that grow around soybean fields.

Table 1. Production of lesions, uredinia and urediniospores, and cross inoculation of plants infected by *P. pachyrhizi*.

Species	Affected leaf area (%) [a)]	Uredinia production [b)]	Urediniospore production [b)]	Cross inoculation to soybean
Arachis pintoi	0	0	0	
Crotalaria spectabilis	0	0	0	
Desmosium ovalifolium	0	0	0	
Lotus corniculatus	0	0	0	
Medicago sp.	0	0	0	
Mucuna sp.	0	0	0	
Senna obtusifolia	0	0	0	
Stylosanthes guianensis	0	0	0	
Trifolium pratense	0	0	0	
T. vesiculosum	0	0	0	
Centrosema sp.	0-40	2	1-2	not tested
Crotalaria juncea	1	1	1	+
Vigna angularis	0-20	3	1-2	+
V. unguiculata	0-10	1	1	not tested
Cajanus cajan	50-60	1	1	+
Calopogonium mucunoides	30-50	2	2	+
Desmodium tortuosum	5-15	2	1-2	-
Lablab purpureus	30-60	1	1-2	+
Macroptilium atropurpureum	30-80	1	1	not tested
Pisum sativum	10	1-2	1	+
Pueraria phaseoloides	50-60	0-3	0-3	+
Glycine max	100	3	3	+
Phaseolus vulgaris	5-50	3	3	not tested
Neonotonia wightii	15-30	3	3	+
Pueraria lobata	0-70	3	3	+

a) Affected leaf area by *P.pachyrhizi* was rated in the most infected leaf of the plants per pot.

b) Percentage of lesions with uredinia and urediniospores. 0: 0%; 1: less than 10%; 2: from 10 to 50%; 3: more than 50%.

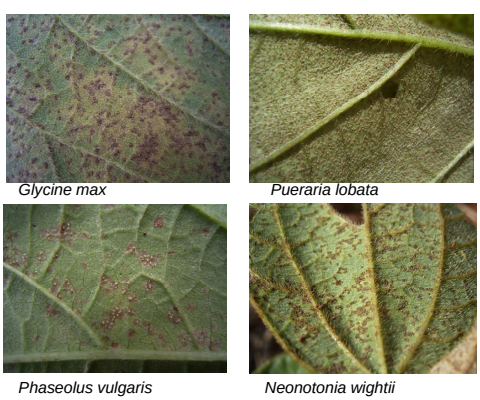

Fig. 1. Hosts on which *P. pachyrhizi* produces a number of urediniospores.

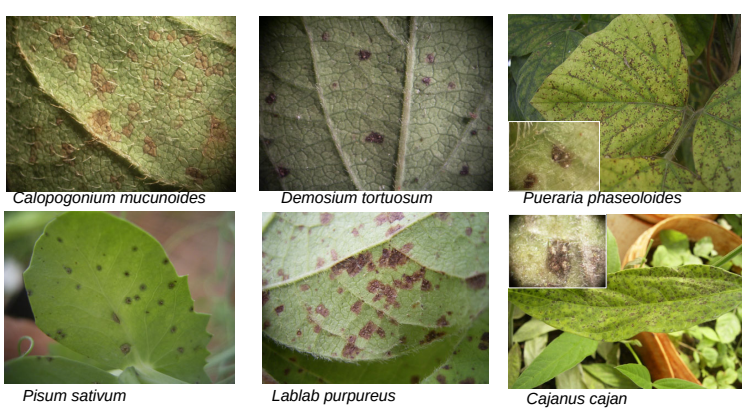

Fig. 2. Hosts on which *P. pachyrhizi* produces a number of lesions and a few urediniospores.