



Asian soybean rust in Entre Ríos Province (Argentina): morphologic and pathometric characterization

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INTRODUCTION

Asian soybean rust (ASR) was detected in Argentina during 2002-03 growing season. A year later, the disease spread over the northern area of the country and was observed in the North of Entre Ríos Province (Formento et al. 2005) late in the season (April 24). The presence of *Phakopsora pachyrhizi* was confirmed by polymerase chain reaction (PCR) assay described by Frederick et al. (2002) in the Instituto Ewald A. Favret (Instituto Nacional de Tecnología Agropecuaria).

During 2004-05 growing season, ASR was detected 52 days earlier in Entre Ríos (March 4 in Concordia State) than the former growing season and resulted in the first reduction of soybean yield reported at the province.

The objective of this research was to bring a characterization of ASR symptoms and signs on leaflets and the urediniospores of the pathogen (*Malupa sojae*).

RESULTS AND DISCUSSION

The mean number of lesions and uredinia per leaflet was 333.4 (n = 50) (11.6 per cm²) and 1372.4 (n = 73) (range 2 to 11299) (48.67 per cm²) respectively.

The mean number of uredinia per lesion was 2.65 (1 to 15) (n = 3214).

The uredinia distribution with the major frequency was irregular (56%) followed by in groups (24%) and near ribs and margins (10%). The major frequency in the position scale was UL (33%), followed by DR (25%), UR (22%) and UR (20%).

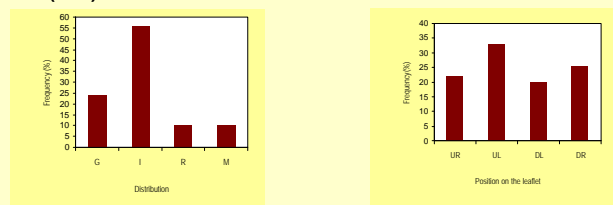


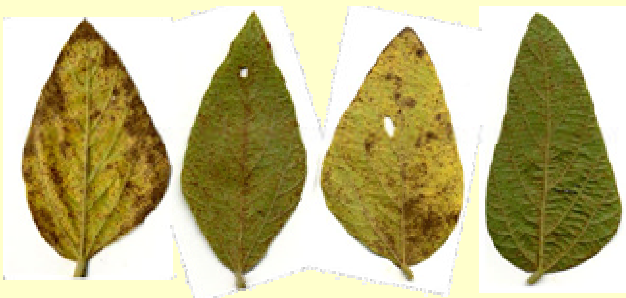
Fig. 1 & 2. ASR uredinia distribution and position on the leaflets

MATERIALS AND METHODS

The following variables were recorded on leaflets of soybean leaves (*Glycine max* (L.) Merr.) using a stereoscopic microscope of 20-40 magnification.

1. **Number of lesions/leaflet and number of lesions/cm²** Over 50 leaflets a frame of 1cm² was placed in four equidistant positions and lesions were counted inside these areas according to de Souza et al. (2005).
2. **Number of pustules/leaflet and number of pustules/cm²** Direct uredinia were quantified over 73 leaflets.
3. **Number of pustules/lesion** Uredinia per lesion were counted placing a frame of 1 cm² on four positions in 50 leaflets.
4. **Uredinia distribution and position on the leaflet** Leaflets with low levels of RAS (n = 34) were divided in quarters to determinate the uredinia locations (upper right, upper left, down left and down right) and it was made the following scale to evaluate their position on the leaflets too: G: In groups, I: Irregulars, R: on ribs, and M: on margins.

5. **Urediniospores characterization** Urediniospores (n = 100) were measured and described. The size range is given following by the mean, standard deviation of error, and number of measurements taken (n).



Since uredinia are found predominantly on the abaxial surface of the leaflet (Melching et al., 1979), counts were carried out only on this surface. The leaflet area were determined using the ASSESS program (Lamari, 2002).

In a same leaflet, were observed one or more positions and distributions too. We conclude that the observations to detect ASR at the beginning of the disease, should be done at the complete leaflet and not observing an specific position.

The urediniospores size was (19.8-) 24.6-31.0 (-34.2) x (14.4-) 17.9-21.7 (-23.4) μm (mean = 27.8 μm ± 3.2 by mean = 19.8 μm ± 1.9, n = 100).

Urediniospores are sessile, obovoid to broadly ellipsoid, and echinulate. The color of the urediniospores ranges from colorless to pale yellowish - cinnamon brown with age. In number, germ pores are mostly 6 (2 or 4 to 8 or 10). In position, germ pores are equatorial or scattered on the equatorial zone.

		LARGO
N	100	100
MEDIA	19,793	27,799
SD	1,8635	3,1788
VARIANZA	3,4727	10,105
C.V.	9,4151	11,435
MÍNIMO	14,4	19,8
MEDIANA	19,8	26,8
MÁXIMO	23,4	34,2

Late in the season it was observed uredinia on petioles and stems. The presence of telia state (*Phakopsora pachyrhizi*) was registered on leaflets adjacent to uredinia (in the shore).



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