Sensitivity monitoring of *Phakopsora pachyrhizi* populations to triazoles in Brazil

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Introduction

Asian soybean rust (ASR), caused by the fungus *Phakopsora pachyrhizi* is considered one of the main diseases of the crop in Brazil. It was reported for the first time in 2001 in South America and spread quickly to most important Brazilian soybean areas.

Fungicides used for the control belong mostly to QoI (strobilurins) and SBI (azole) compounds. Until 2006/07 due to the high level of efficacy, low price and generic brands in the market straight azoles fungicides were used to control ASR and recommended even in curative situations. A lower efficacy of these fungicides was observed in some regions in the end of the crop seasons 2006/07 and 2007/08.

The objective of this study was to evaluate the variation of EC$_{50}$ values in several rust populations in Brazil to different azole compounds.

Figure 1. Detached leaf method to estimate the EC$_{50}$ values for *P. pachyrhizi* populations.

Materials and Methods

✓Monitoring assays were done using **detached leaf method** (Figure 1) developed by Bayer CropScience and approved by FRAC (1) to evaluate the EC$_{50}$ values of *P. pachyrhizi* populations.

✓Leaves samples infected with ASR were collected in nine Brazilian states, in a total of 36 populations.

✓The triazoles/rates tested were cyproconazole, metconazole, tebuconazole and prothioconazole (0; 0.125; 0.25; 0.5; 1.0; 2.0; 4.0; 8.0; 16.0; 32.0 ppm).

✓The experimental design was completely randomized with four replicates; each replicate consisted of a Petri dish with three leaflets.

✓Urediniospores from infected leaves were harvested using a vacuum collector. The samples percentages germination were assessed.

✓After inoculation, the leaflets were incubated at 25 ± 2°C with 12/12h light/dark cycles, RH>60%.

✓Disease severity (2) was evaluated 15 days after inoculation. The EC$_{50}$ values were estimated by Proc Probit, SAS®, version 9.1.3.

Results

Cyproconazole EC$_{50}$ ranged from 0.06 to 1.37 ppm (average 0.53 ppm). Sample collected in January in Londrina, PR was the most sensitive and the less sensitive was the one collected in April in Goiânia, GO (Figure 2A).

Metconazole EC$_{50}$ ranged from 0.02 to 3.89 ppm (average 0.77 ppm). Sample collected in January in Londrina, PR was the most sensitive and the less sensitive was the one collected in April in Goiânia, GO (Figure 2B).

Tebuconazole EC$_{50}$ ranged from 0.02 to 1.28 ppm (average 0.38 ppm). Sample collected in March in Uberlândia, MG and São Gabriel do Oeste, MS were the most sensitives and the less sensitive was the one collected in April in Ponta Porã, MS (Figure 2C).

EC$_{50}$ values among the populations were statistically significant, P<0.01 , for cyproconazole, metconazole and tebuconazole.

Prothioconazole EC$_{50}$, there was not a distribution because with 0.25 ppm, the populations tested didn't develop symptoms of ASR.
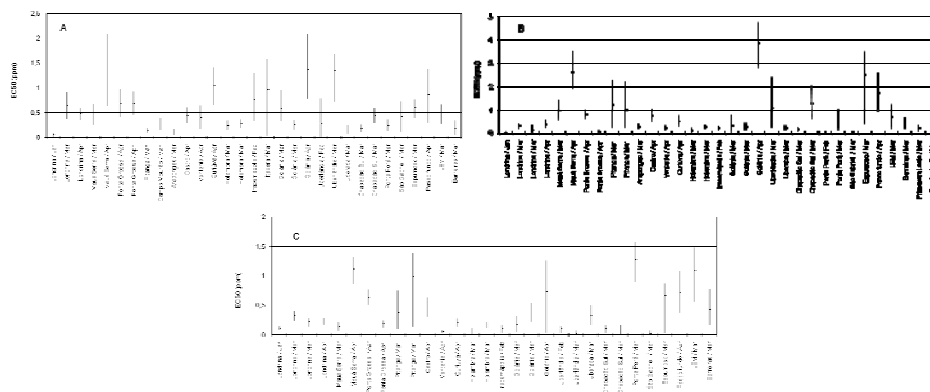

Figure 2. EC$_{50}$ values distribution for cyproconazole (a), metconazole (b) and tebuconazole (c) for *P. pachyrhizi* populations in different regions in Brazil. Growing season 2008/09.

Conclusion

The detected oscillation of EC$_{50}$ values probably is the normal response from different *P. pachyrhizi* genotypes that constitute a population collected in different regions and periods of the crop season.

References
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