

Effect of Timing of Fungicide Applications on Development of Soybean Rust

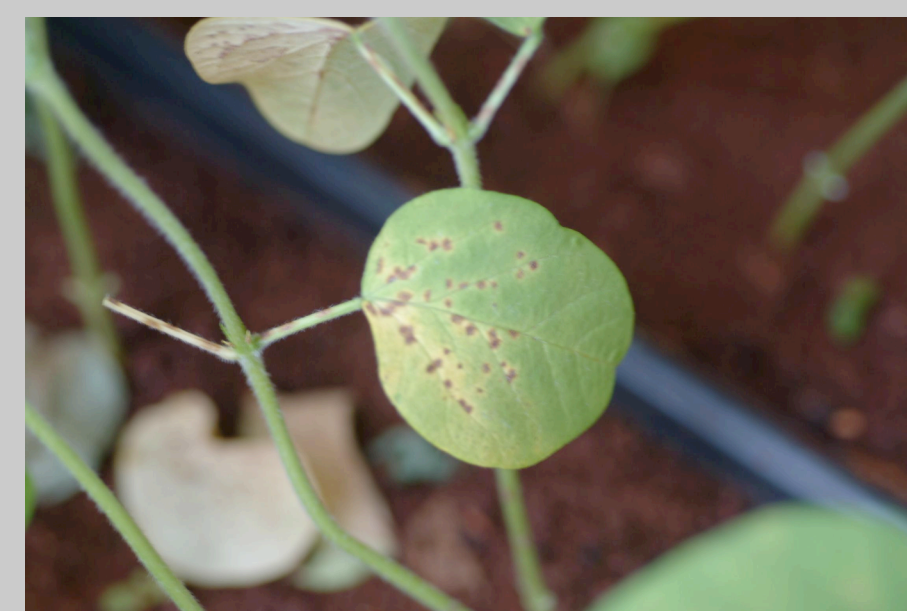
T.A. Mueller¹, W. Morel³ and G.L. Hartman^{1,2}

¹Dept. of Crop Sciences, National Soybean Research Center, University of Illinois, Urbana, IL 61801; ²USDA-ARS, National Soybean Research Center, University of Illinois, Urbana, IL 61801; ³Centro Regional de Investigación Agrícola, Dirección de Investigación Agrícola, Ministerio de Agricultura y Ganadería, Capitán Miranda, Itapúa Paraguay

Introduction

Fungicides are used to control soybean rust (*Phakopsora pachyrhizi*), and the timing of application of fungicides is critical for effective, economic disease management.

The objective of this study was to determine the efficacy of different classes of fungicide applied at different times before and after soybean rust inoculation. Four fungicides were evaluated: two triazoles [Folicur[®] (tebuconazole) and Tilt[®] (propiconazole)], a strobilurin [Headline[®] (pyraclostrobin)], and a combination of a triazole and a strobilurin [Quilt[®] (azoxystrobin and propiconazole)]. This research was done in Capitán Miranda, Paraguay, in March 2005, shortly after soybean rust was found in the United States.



Data collection and analysis

- 10 soybean plants were randomly selected from each half of a flat.
- Lesion number was counted on the middle leaflet of the first trifoliolate two weeks after inoculation, while plants were still in vegetative stages of development.
- Analysis of variance was done with SAS Proc GLM.

Greenhouse experimental setup



- Randomized complete block design with four replications.

- 70 soybean seeds per flat; Paraguayan soybean variety Pua'e.

- Half of each flat was a different treatment.

- Folicur[®], Tilt[®], Headline[®], and Quilt[®] were applied 0, 3, and 6 days before and after inoculation with soybean rust.

- Temperature was kept near 20°C.



Inoculation

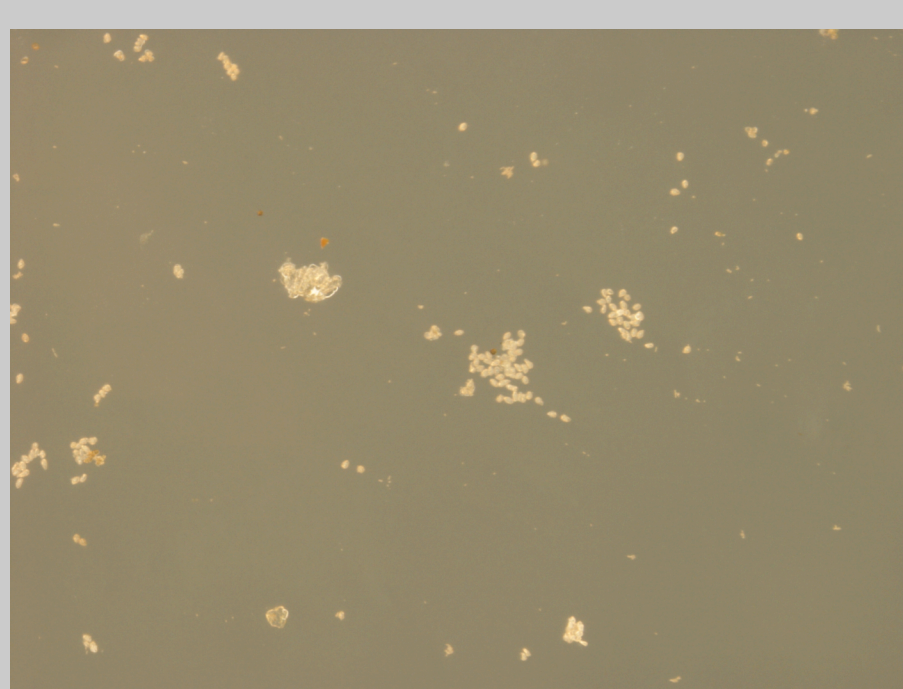


- *P. pachyrhizi* urediniospores were brushed from infected soybean leaves in the field.

- Collected urediniospores were immediately suspended in water with 0.04% Tween-20 at 30,000 spores/ml.

- 50 ml of spore suspension was sprayed with an airbrush late in the evening onto 200 plants at growth stage V2-V4.

- Plants were placed in a mist chamber overnight for 12-14 hours.



Fungicide application

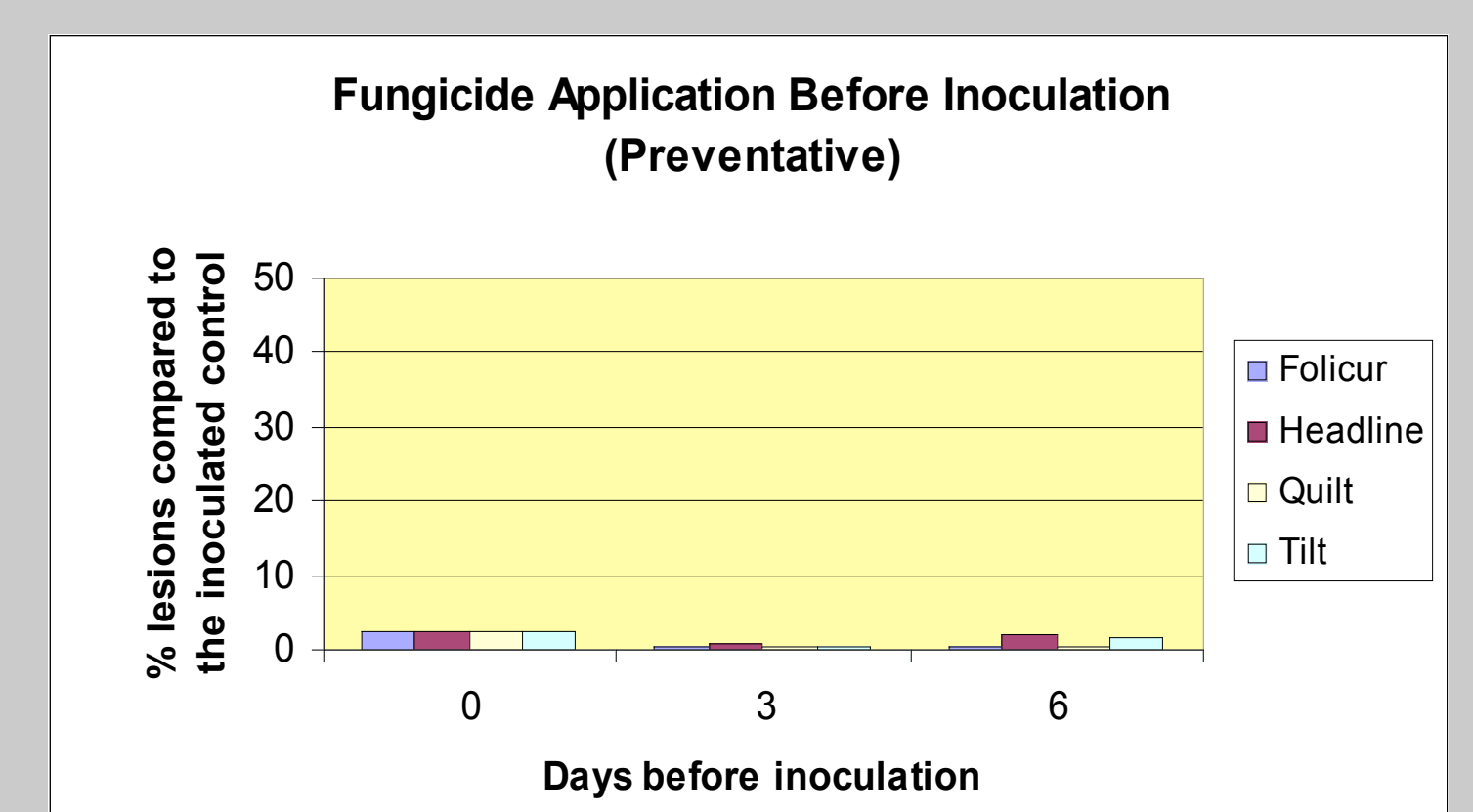


- Fungicides were applied with a backpack sprayer at the recommended rate for each (Folicur[®] @292 ml/ha, Tilt[®] @512 ml/ha, Headline[®] @877 ml/ha, and Quilt[®] @1023 ml/ha)

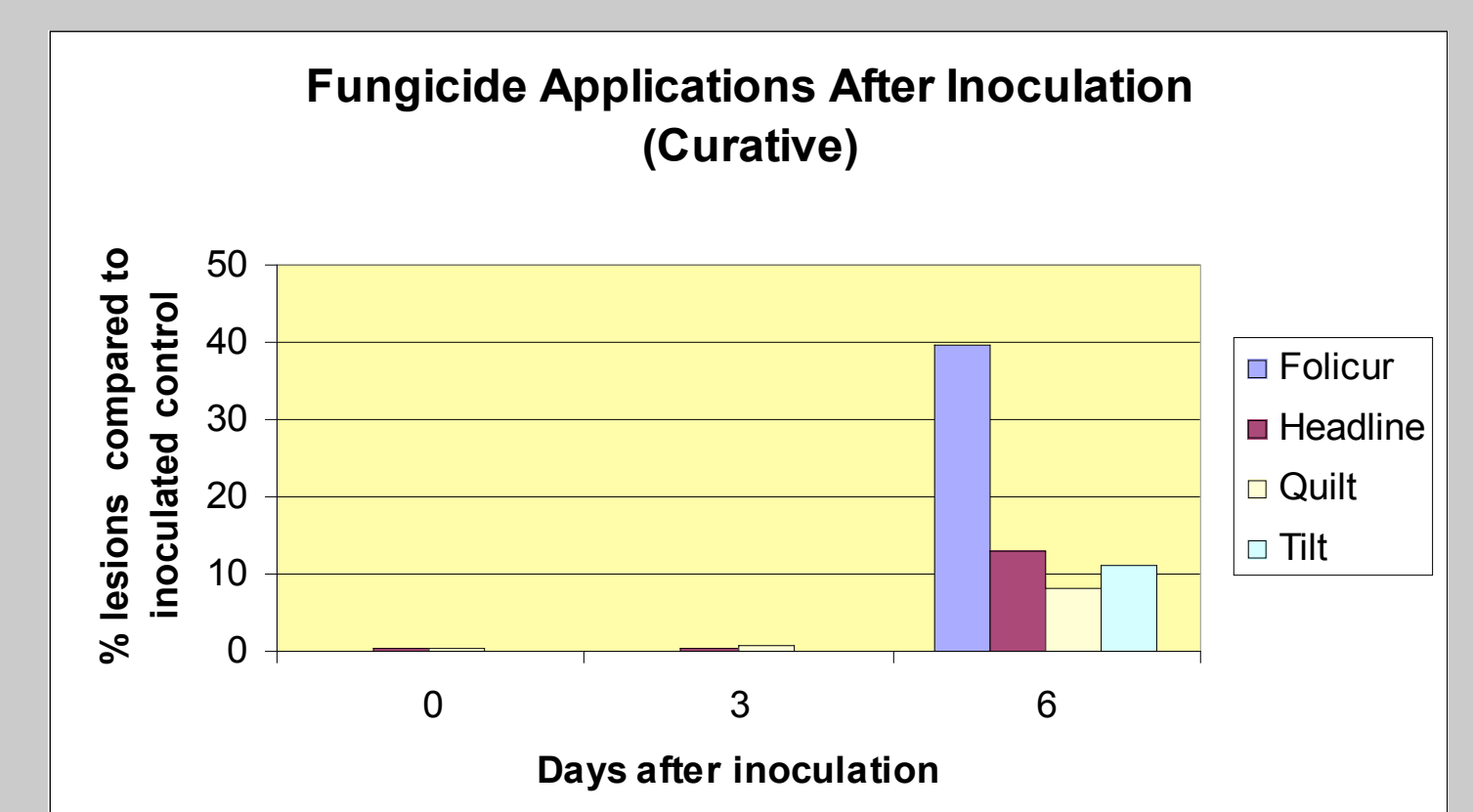
Results and conclusions

- All four fungicides significantly reduced the number of rust lesions compared to the unsprayed inoculated control at all application times (0, 3, and 6 days before and after inoculation).

- When fungicides were applied preventatively, all four fungicides significantly reduced the percentage of lesions at all application timings. Soybean lesions per leaflet were <3% compared to the inoculated control (19, 44, and 43 lesions per leaflet at 0, 3, and 6 days, respectively).



- When fungicides were applied curatively, soybean lesions per leaflet were <1% (when applied 0 and 3 days after inoculation) and ranged from 8 to 40% (when applied 6 days after inoculation) compared to the inoculated control (16 lesions per leaflet).



- All fungicides were efficacious when applied preventatively.

- Efficacy of all fungicides decreased as the time between inoculation and application of fungicides (curative activity) increased.

