



## Crop Observation and Recommendation Network

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### Is Aerial Application as Effective on Soybean Rust as Ground Applications?

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As we all know, there is no actual field data available in the U.S. to answer this question. However, a 2004 study conducted in Brazil by Prof. Ulisses Antuniassi and his colleagues at Sao Paulo State University (UNESP) addresses this exact question. They compared yield increases and efficacy levels achieved from applying a soybean rust fungicide using both ground and aerial applications. Note that this study was conducted in a soybean field which had already received one rust fungicide application earlier in the season. However, their findings still give us important clues about the effectiveness of aerial and ground applications. The first fungicide application was done at R1 growth stage of soybeans. Applications for this study were done 21-24 days after the first application. They concluded: "soybean rust was controlled satisfactorily by all treatments". Rust infection in all plots sprayed with fungicides varied from 0.8 to 2.3%, but this variation is not considered statistically significant. Here are more detail about this study:

Ground applications were done at 13 gpa using a pull-behind sprayer with a 60-ft boom traveling at 6 mph. The ground applications were done with TX hollow cone, and XR flat fan nozzles. Aerial applications were done at 0.5, 0.9, 1.25, and 3.2 gpa using cone nozzles (D10-45) at 3.2 gpa, and rotary atomizers (Turboaero 88 A) at other application rates. A soybean oil and emulsifier was added to the spray mixture when the aerial application was done at lower carrier rates using the rotary nozzle. The fungicide Myclobutanil was used in all the treatments at 5.5 ounces per acre. Each one of these six treatments was replicated four times, and a control plot was established at each one of the replicated treatments, bringing the number of the control plots to 24. The average increase in yield and average infection rate for each treatment were determined from these plots. Average soybean yield from each replicated treatment was determined and was compared to the average yield from the 24 control plots which received no fungicide during this study, except the first early treatment.

The results showed that the soybean rust was controlled satisfactorily by all the treatments. Average infection in all treated plots varied from 0.6 to 2.3% and these differences were not statistically significant. The average infection rate for the control plots was 32.5%. It is important to note that the infection level on control plots would have been much greater if the entire field had not been treated earlier with a rust fungicide.

Yield increases varied from 5.5% (with aerial application at 3.2 gpa, no oil and emulsifier in the mixture) to 23% with the ground application using cone nozzles. The second highest yield increase (18%) was with the aerial application at 1.25 gpa with the carrier containing soybean oil and emulsifier. There was a strong correlation between the infection rate and the yield increase. Naturally, highest yields were obtained from plots with the lowest infection rates.

If done properly, both aerial and ground applications of fungicides should provide effective control of soybean rust. The important thing is to apply a preventative fungicide before the disease gets established on the soybeans. Either aerial or ground application will be a good choice. The timing of application is the critical issue with soybean rust. The equipment that can properly apply the fungicide the quickest (if costs are nearly equal) should be your first choice.

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