Soybean Rust Update for Organic Producers–2009

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Introduction

Asian soybean rust (ASR), arrived in the U.S. in 2004 and presented the potential to be the single most important impediment to economical soybean production in the U.S., with an estimated economic impact in organic systems ranging from $30 to $120 million in yield loss. The ASR fungus (*Phakopsora pachyrhiza)* http://www.aphis.usda.gov/publications/plant_health/content/printable_version/SBR_IDcard_11-04.pdf survives year-round in warm areas, such as the southern United States. During a growing season, the pathogen is disseminated by northward seasonal wind. Dry weather conditions in the South in 2008 kept soybean rust out of Iowa, but was found as far north as Illinois. Rust has been reported in 2009 from the Southern U.S. in Alabama, Georgia, Florida, Louisiana and Texas and will likely travel northward again throughout the rest of the season. Farmers can track the spread of ASR though a national website: http://sbrusa.net/cgi-bin/sbr/public.cgi and on a soybean rust webiste at Iowa State University: http://www.plantpath.iastate.edu/soybeanrust/taxonomy/term/1.

Iowa State University was awarded a grant from USDA in 2005 to investigate "Strategies for Management of Asian Soybean Rust in Organic Systems," which included treatments allowable under certified organic conditions. Trials were run from 2005 to 2007 in an area of Florida where rust is present to examine the effect of these treatments. Experiments also were established in Iowa, Pennsylvania and Michigan to examine yield effects of these treatments under non-rust conditions.

Over four years of trials in Iowa, organic soybeans were grown using typical organic operations, including organic seed. In our 2008 trial, organic Blue River 34A7 soybeans were planted at the Neely-Kinyon Farm, Greenfield, Iowa, at 200,000 seeds/acre. There were four replications of the following treatments: MicroAF™ (TerraMax, Inc., Cottage Grove, MN) at 1 gallon/acre, Sonata® (AgraQuest, Inc., Davis, CA) at 1 gallon/acre, and Heads-Up™ (Heads Up Plant Protectants, Inc., Kamsack, Saskatchewan, Canada) at 7 g/acre (mixed with seed at planting). All treatments were compared with a control. Treatments were applied on July 14, 2008, at the R-1 stage (when first flowers were observed), and every two weeks between July 14 and September 1 except for the Heads Up™. Leaves were inspected for disease on alternate weeks to treatment spraying. Plots were maintained with two rotary hoeings and three row cultivations. Soybeans were harvested on November 19. The percentage of discolored soybeans (soybeans showing disease) was determined by counting the number of stained soybeans in a 200-gram sample that was randomly collected from the harvest of each plot. Staining factors could include direct fungal attack from purple stain (*Cercospora kikuchii*) and *Fusarium* spp. or indirect effects from bean pod mottle virus (BPMV) from feeding by the bean leaf beetle.

Soybean rust was not observed in any of the trial plots in Iowa, Pennsylvania or Michigan from 2005 to 2008. Florida experienced heavy rust pressure every year of the study. **The most effective, organic-compliant product for mitigation of Asian soybean rust in the Florida trials was Champion® Wettable Powder (Nufarm, Burr Ridge, Illinois) containing 77% copper hydroxide.** No other treatment provided effective control. Across the trials, spray treatments did not

significantly increase or decrease yields. Yields averaged 35 bushels/acre, which was decreased from the average 48 bushels/acre in previous years, due to late planting due to floods in 2008. Other soybean diseases, observed at low levels, included bacterial blight, brown spot, frogeye leafspot and downy mildew in limited areas of the experimental plots, but these pathogens did not affect yields. Photos of these diseases can be viewed at http://www.plantpath.iastate.edu/soybeanrust/lookalike. Soybean staining averaged 18% in 2008, higher than 2007 rates, with no significant difference among treatments. Grain quality also was unaffected by spray treatments (protein averaged 34%).

Disease pressure was extremely low in 2008, despite flooded conditions in the early part of the growing season. We will continue to test products in 2009, and monitor treatment effects on other soybean diseases, in the event of no rust appearing. Sentinel plots will continue throughout Iowa to monitor the arrival of soybean rust should it ever enter Iowa fields (see: http://www.extension.iastate.edu/CropNews/2008/061608darenm.htm). If you ever suspect a soybean rust infestation, bring a sample to your local Extension office for identification. Soybean varieties with some resistance to soybean rust have been developed in Brazil, China and Taiwan. The potential for a traditionally-bred (not transgenic) soybean variety that is resistant to soybean rust is fairly high in the next five years.

References

http://www.plantpath.iastate.edu/soybeanrust/
http:// sbrusa.net (Pest Information Platform for Extension and Education)
http://extension.agron.iastate.edu/organicag/
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Acknowledgments

We would like to thank the Leopold Center for Sustainable Agriculture and USDA-CSREES Integrated Organic Program for their support of the organic soybean rust projects.