

Foliar Fungicides on Soybeans (Final Report)

Purpose:

With the introduction of Asian soybean rust (a new invasive disease) into the US in the fall of 2004 and its subsequent establishment in Ontario in the fall of 2007 the risk to Ontario soybean production has increased. As the disease continues to establish in North America, the risk of an outbreak in the Corn Belt as well as Ontario will become more likely. For the foreseeable future, the primary management option for North American producers will be fungicides since other alternatives such as resistant varieties are not presently available. In Ontario various fungicides have received registration for the control of soybean rust. These products have been shown to be very effective in US trials against soybean rust.

A number of North American trials have shown a significant yield boost with the use of a fungicide, even in the absence of rust. This yield boost may be a function of controlling bean diseases that have previously been ignored, or may result from plant enhancements resulting from the application of the fungicide. It's believed that these plant enhancements in the absence of disease are associated with a reduction in plant respiration, a reduction in the plant hormone ethylene, a change in nitrogen processing and a number of changes in the anti-disease, anti-stress systems in the plant.

The main economic question for soybean growers is whether yield benefits are large enough to warrant spraying in the absence of disease outbreaks. From 2005 to 2007 trials were conducted to assess the possible yield benefits of foliar fungicides on soybeans in Ontario.

Methods:

On-farm strip trials were set up by OMAFRA and various agribusinesses across Ontario and data was collected from 44 sites in Ontario from 2005 through 2007. Trials were established across a wide variety of soil types, environmental conditions and geography.

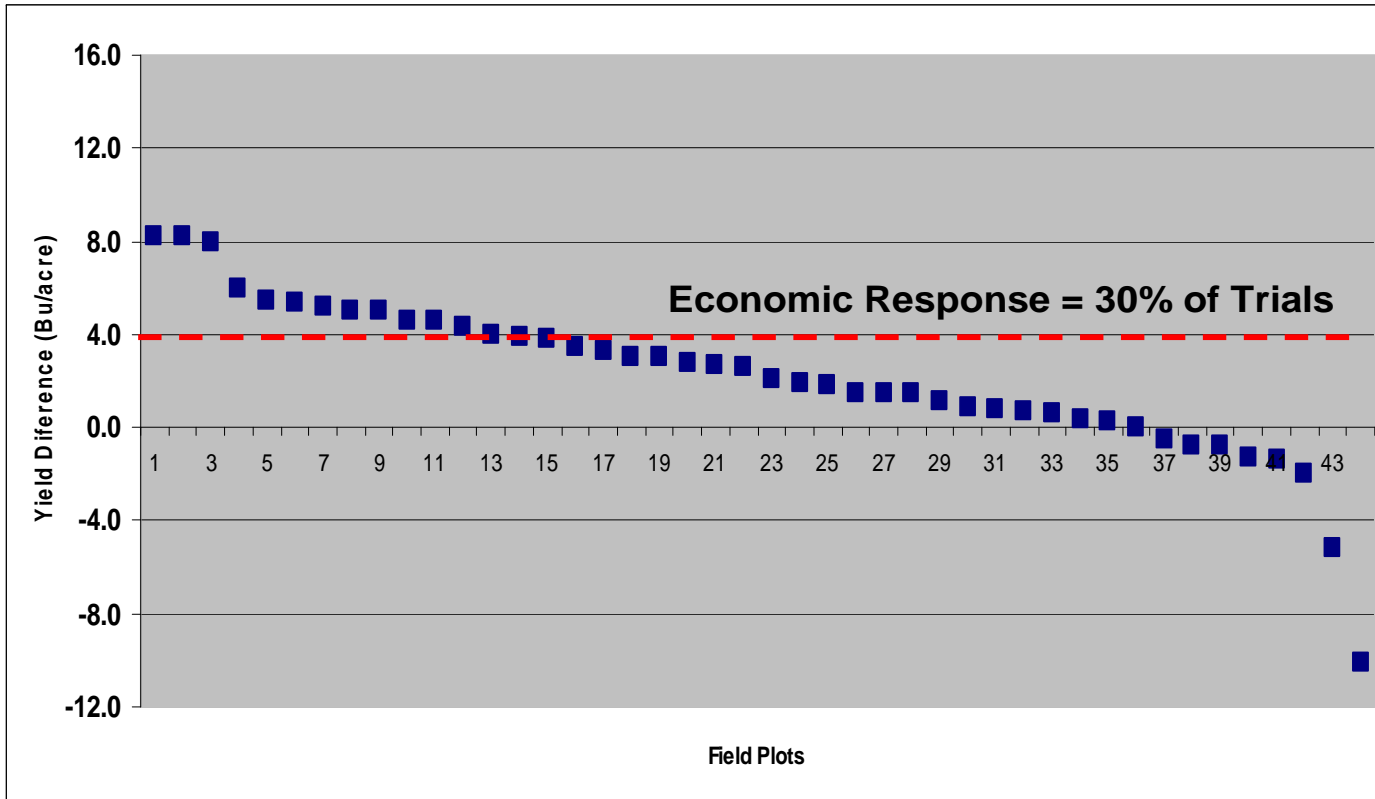
With the exception of fungicide applications, fields were treated as a whole when applying herbicides, fertilizers, insecticides, and tillage practices. Whenever possible, crop inputs were applied perpendicular to the direction of the fungicide treatments. This ensured that mistakes or misses in field operations occurred across all trial treatments.

The majority of trials were sprayed with the fungicide at the R2 – R3 soybean plant growth stage (full bloom) which has been promoted in plant health literature.

Leaf samples were taken and sent to the University of Guelph Pest Diagnostic Clinic for disease detection and identification.

Results:

Graph #1: Soybean Yield Response to Foliar Fungicides in Ont. (2005-07)



Summary:

Of the 44 large scale strip trials in this study, 35 trials (80%) showed a yield gain. The average yield gain across all the sites was 2.2 bu/ac.

The cost for strobilurins (Headline and Quadris) is approximately \$16.00 per acre. Assuming an application cost of about \$8.00 per acre and a tramping loss of 1.0 bu/ac, a 4.0 bu/ac yield increase would be required to break even (\$16.00 product + \$8.00 application + \$8.00 tramping loss, at a sale price of \$8.00/bu). The 1 bu/ac tramping loss assumed in this analysis is an average and will vary depending on the width of the boom, row width, etc.

When considering the above factors only 13 of the sites in this study had a yield gain high enough for a positive economic return. In other words 30% of the trials increased profits while 70% of the trials showed an economic loss.

No significant foliar leaf disease pressure was present in the three years of this study.

Yield response to the application of a foliar fungicide could not be correlated to production practice, yield potential, or weather in this study. The reason why some sites responded positively in this study while others did not respond could not be determined.

Growing conditions varied considerably in 2005, 2006, and 2007. In 2005 conditions were drier than average while 2006 was wet and 2007 was extremely dry. Average trial yields in 2005 and 2006 were 53 and 52 bu/ac respectively. In 2007 the trials averaged 40 bu/ac. There was no significant yield difference in respond based on year.

Considerable work is underway across North America to understand when positive economic returns can be found with the use of foliar fungicides on soybeans. Results from this study show that yield results are too inconsistent when applying foliar fungicides on soybeans to be economically viable in the absence of disease.

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