

Evaluating Soybean Foliar Fungicide Timing

Purpose:

Foliar fungicides can be an important management tool in soybeans to suppress white mold. Foliar fungicides also aid in the control of foliar leaf diseases such as septoria brown spot and frogeye leaf spot. Recently liquid in-furrow fungicide applications are being used in some US states.

Many trials have been conducted in Ontario to assess the yield and seed quality benefits of foliar fungicides. Across 7 years of Ontario trials, the average yield response has been 2.3 bushels/acre to foliar fungicides. Seed size and quality can be improved especially when there is significant disease pressure.

Assessing the correct fungicide spray timing window is more challenging with soybeans than corn or wheat because soybeans flower over an extended 4-5 week window. Trials were designed to assess optimal timing for single and dual fungicide applications.

Methods:

In order to determine the best management practice for fungicide application timing, a number of field scale trials were conducted in 2014 and 2015. The following treatment list, tested on two varieties at each study location, was used to evaluate the use of in-furrow liquid Priaxor fungicide on soybeans as well as foliar application timings and tank mixes. The treatments applied in 2014 were as follows:

- 1 Untreated Control
- 2 Priaxor In-furrow
- 3 Priaxor V6
- 4 Priaxor R2
- 5 Priaxor R4
- 6 Priaxor R2 + KP Plus
- 7 Priaxor R4 + KP Plus
- 8 In-furrow Priaxor + Priaxor R2
- 9 In-furrow Priaxor + Priaxor R2 + Acapela R4

In-furrow application of fungicide was put on at seeding time using Keaton seed firmers and a liquid fertilizer application system attached to a Kearney custom planter in 15" rows. Foliar application of fungicides utilized a custom spray applicator at the various plant growth stages indicated in the treatment list; KP Plus (0-51-33) was tank mixed and applied with the fungicide on the treatments indicated.

Trial sites were established at three locations in 2014 including Bornholm, Lucan and St. Thomas. Soybean varieties included DeKalb 28-60 RY and Pioneer 91Y01, 9905 and DeKalb 28-60RY, Pioneer 91Y01 and Pioneer P16T04R, respectively at each location.

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In 2015 only a single location at Bornholm was conducted with two varieties. The treatment list was:

- 1 UTC
- 2 Priaxor In-furrow
- 3 Priaxor V6
- 4 Priaxor R2
- 5 Priaxor R4
- 6 Priaxor R2 + KP Plus
- 7 Priaxor R4 + KP Plus
- 8 Stratego Pro R2
- 9 Allegro R2
- 10 Acapela R2
- 11 Allegro R2 + Acapela R3
- 12 Priaxor R2 + Acapela R3

All treatments were replicated 3 times.

Results:

The 2014 growing season proved to be a challenging one. Wet conditions were typical in most areas of Ontario and persisted throughout the growing season. The temperature was slightly below average; however, the conditions were favourable for disease incidence in soybean fields. White mould was present at both the St. Thomas and Bornholm sites, but was not observed at the Lucan location.



Image 1. Example of white mold observed on plants in field trials sites.

Table 1. Average Soybean Yield Response to Fungicide Application in 2014 (All Sites and Varieties)

Treatment and Application Timing		Yield (bu/ac)*	
1	Untreated Control	49.1	de
2	Priaxor In-furrow	48.6	de
3	Priaxor V6	47.8	e
4	Priaxor R2	50.9	bc
5	Priaxor R4	50.9	bc
6	Priaxor R2 + KP Plus	49.4	cde
7	Priaxor R4 + KP Plus	51.8	bc
8	In-furrow Priaxor + Priaxor R2	49.5	cd
9	In-furrow Priaxor + Priaxor R2 + Acapela R4	54.3	a
* yields followed by the same letter(s) are not significantly different from each other.			

Table 1 shows a positive yield response of about 1.8 bu/ac was observed when Priaxor was applied at the R2 or R4 soybean growth stage. There was no statistical yield advantage to adding the KP Plus foliar fertilizer although there was a small numerical advantage at the R4 growth stage. These results concur with previous research completed in Ontario that showed about a 2 bu/ac average yield gain when applying one application of foliar fungicides.

The greatest yield response was observed in the most intensive treatment, which included an in-furrow and foliar R2 application of Priaxor, with an additional foliar application of Acapela at the R4 growth stage. The average yield increase with this treatment observed across all sites and varieties was 5.2 bu/ac. The in-furrow portion of the treatment likely did not have an impact on the yield since that treatment by itself (treatment #2) did not change yields.

There was no statistical change in yield when the fungicide was applied solely in-furrow, or at the V6 growth stage.

Summary:

1. Positive yield responses were observed when fungicides were applied at the R2 and R4 growth stages in 2014. The yield responses on average were about the same at 1.8 bu/ac.
2. There was no yield advantage observed when fungicides were applied very early, either in-furrow at the time of planting, or at the V6 growth stages. This indicates that applying foliar fungicides in combination with herbicides is not beneficial.
3. Tank mixing fungicides with foliar fertilizer did not improve yield in this study.
4. Yields response varied based on location, with St. Thomas and Bornholm locations having much higher response than the Lucan location in 2014. This is

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likely due to the presence of white mould and higher disease incidence observed at the St. Thomas and Bornholm locations during the course of the growing season.

5. Although there was no white mould in 2015 and the yield gains were not statistically significant numerical trends were similar to 2014.
6. For white mould suppression two applications are necessary for best results. Likely the best timing is late R1 (early R2) and then again 10-14 days later.
7. For general leaf disease pressure one application at the R2-R3 is likely the best application window.

Table 2. Average Soybean Yield Response to Fungicide Application in 2015

Treatment and Application Timing		Yield (bu/ac)*	
1	Untreated	61.1	nsd
2	Priaxor In-furrow	62.2	nsd
3	Priaxor V6	63.5	nsd
4	Priaxor R2	63.9	nsd
5	Priaxor R4	64.4	nsd
6	Priaxor R2 + KP Plus	63.3	nsd
7	Priaxor R4 + KP Plus	63.9	nsd
8	Stratego Pro R2	63.0	nsd
9	Allegro R2	61.7	nsd
10	Acapela R2	64.1	nsd
11	Allegro R2 + Acapela R3	64.6	nsd
12	Priaxor R2 + Acapela R3	64.7	Nsd
*although there was a numerical yield increase with the application of fungicides they were not statistically significant.			

Acknowledgements:

We would like to thank the cooperators who lent their time and land to the project. We would also like to thank Pioneer, Dekalb and BASF for materials provided for this project. The access to tractors for these field projects from John Deere is greatly appreciated. This project was conducted in Partnership with Dr. David Hooker (U of G).

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