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Should We be Spraying Fungicides on Corn at V12?

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Abstract
In 2017, we tested several foliar fungicides on corn at six locations in Iowa: ISU Northwest Research and Demonstration Farm (NWRF), Sutherland; Northeast Research and Demonstration Farm (NERF), Nashua; Northern Research and Demonstration Farm (NRF), Kanawha; Southwest Research and Demonstration Farm (SWRF), Lewis; Southeast Research and Demonstration Farm (SERF), Crawfordsville; and the Ag Engineering and Agronomy (AEA) Farm, Boone. At all locations, the previous crop was soybean. Hybrids varied across locations, and were rated between 3 and 5 for gray leaf spot (GLS) resistance where 9 = most resistant.

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The purpose of these trials was to help farmers determine if foliar fungicides should be incorporated into their production. Our objectives were:

1. Assess the effect of application timing of fungicides on disease.
2. Evaluate the yield response of hybrid corn to foliar fungicide application.
3. Discern differences, if any, between fungicide products.

**Products used and application timings tested**

In 2017, eight products were tested (Table 1). The timing of application varied by product and was suggested by the companies contributing each product. Fungicides were applied at growth stage V5, V12, R1, and V5 + R1. This was the first year we have tested applications at V12. No surfactant was included in applications made at V12.

**Effect of product and timing on GLS**

Disease severity in the lower canopy (below the ear leaf) and upper canopy (ear leaf and above) was assessed around R5 (dent). The most prevalent disease in our trials was GLS,
which was present at four of our six locations (Table 1). At NRF there was no GLS; and at AEA, gray leaf was present at extremely low levels.

Table 1. Effect of fungicides on gray leaf spot in Iowa in 2017.pdf

- There were few differences in GLS control among the products.
- Significant differences (P>0.1) were observed between times of application.
  - Confirming observations from similar trials done previously, the amount of GLS observed throughout the canopy at R5 between V5 applications and the non-sprayed check did not differ.
  - R1 applications significantly reduced GLS at R5 compared to the non-sprayed check.
  - V12 applications were most effective at reducing GLS severity at R5. In some cases (e.g., at NERF), they were even better at reducing GLS than an application at R1. This was consistent across all four locations.

**Based on these data, should we be spraying at V12?**

I think the jury is still out on this, but I spent a lot of time thinking about why a V12 application was so effective at reducing GLS in 2017. Two factors come to mind:

- GLS always starts in the lower canopy. It is likely that the fungicide at V12 reached and protected the lower leaves of the canopy. When applications are made at R1, less product reaches the lower canopy which is obstructed by the leaves of the upper canopy.
- The V12 applications coincided with warm (80s) and very humid growing conditions (Figure 1). Warm temperatures (75-85°F) and high relative humidity (>85% for several hours) favor GLS infection and disease development (Rupe et al. 1982). Consequently, I would argue that the V12 applications in our trials were perfectly timed for the 2017 season and delayed GLS development in the lower canopy, and consequently throughout the season.
These data suggest that an application at V12 improved GLS control for the 2017 season, which had conditions favorable for GLS development. It will be interesting to see if V12 applications are as effective at reducing GLS in future growing seasons that are likely to have different environmental conditions throughout the season.

Also, remember there are other foliar diseases such as northern corn leaf blight or southern rust that may affect corn in Iowa. Since both of these diseases may occur anywhere in the canopy, it is possible that a V12 application may have less effect. A V12 application only protects those leaves that are present at the time of application.

**What about yield?**
No effect of product or timing was detected on yield at any location (P>0.1; (Table 2)). Yields in the trials were excellent. GLS severity in the upper canopy of the non-sprayed controls was low (<10 %) at all locations, suggesting GLS in the trials was not severe enough to influence yield.

**Table 2. Effect of fungicides on corn yield in Iowa in 2017.pdf**

**A word of caution**
In our trials we did NOT use an NIS in our V12 applications. Adding a surfactant to
fungicide applications between V12 and VT may affect ear development (Stetzel et al. 2011).

**Acknowledgements**
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**References**

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**Crop:**
Corn

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