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Abstract
This article summarizes our 2019 corn foliar fungicide trials that were done 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 Farm (AEA) near Boone.

Disciplines
Agricultural Science | Agriculture
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This article summarizes our 2019 corn foliar fungicide trials that were done 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 Farm (AEA) near Boone.

As in years past, these trials were done to provide data to farmers to help determine if a foliar fungicide was necessary. Our objectives were 1) assess the effect of timing of application of fungicides on disease, 2) evaluate the yield response of hybrid corn to foliar fungicide application, and 3) discern differences, if any, between fungicide products.

Products used and application timings tested

Eight products at various application timings were evaluated (Table 1). Timing of application varied among products and was suggested by the companies contributing each product. Fungicides were applied at growth stage V12, R1 and R3. No surfactant was included in applications made at V12. At NERF, an application was made based on the Tarspotter App that indicated a high risk of tar spot occurring. This application occurred at approximately 1/2 milkline (R5). Disease in the trials was assessed at R5 at all locations except for SERF where the crop was at R3 due to delayed planting. Percent disease in the canopy below the ear leaf, the ear leaf, and the canopy above was estimated visually.
Diseases observed in the trials

Gray leaf spot (GLS) was observed at all locations, although severity was low (Table 1). The most severe GLS was observed at SWRF, where the mean GLS severity in the non-sprayed check was 13.8%. Other diseases observed at various locations included common rust, southern rust, northern corn leaf blight and bacterial leaf streak. All were present at very low levels (<1% of the canopy affected). No tar spot was observed in the trial at the NERF location.

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate fl oz/acre</th>
<th>App. Timing</th>
<th>SWRF%</th>
<th>SCF%</th>
<th>AEA%</th>
<th>NWR%</th>
<th>NIR%</th>
<th>NER%</th>
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<td>-</td>
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<td>213.3</td>
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<td>1.0 fg</td>
<td>221.6</td>
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Effect of product and timing on GLS

- In general, all fungicides reduced GLS.
  - At all locations except SWRF, a V12 application reduced GLS more than an application at R1 (although this was not always significant (P<0.1).
  - An application at V12 reduced GLS significantly more than an application at R3 at the NWRF, NRF and NERF (P<0.1).
  - In general, applications made at R3 reduced GLS the least.
Effect of product and timing on yield

- Yields of the non-sprayed check ranged from 216.7 bu/A at AEA to 234.6 bu/A at NWRF (Table 1).
- In general, greater yields occurred with an application of fungicide, although yield differences were only significant at NERF (P<0.1). The mean yield response for an application of fungicide at V12, R1 and R3 across all trials was 4.2 bu/A, 7.2 bu/A and 6.9 bu/A, respectively.
- Note however, that yield responses varied considerably among locations, time of application and product.

Management recommendations

- All fungicides in these trials were effective against gray leaf spot. For a list of fungicides effective against GLS and all diseases on corn, the following publication is available “Fungicide efficacy for corn diseases” from the Crop Protection Network. This publication is updated annually by corn pathologists across the U.S. and Ontario, Canada.
- Applications at V12 reduced disease, that is GLS severity, more than applications during reproductive growth. In 2017, V12 applications also reduced GLS more than applications at R1.
  - Remember GLS always starts in the lower canopy.
  - With applications at V12, fungicides are more likely to reach the lower canopy and protect the lowest leaves against infection by the gray leaf spot pathogen.
- Greater yields occurred with applications made during reproductive stages. This is consistent with what we have seen in previous years, e.g., 2015, 2017, and 2018.
  - This remains puzzling since one would expect less disease results in greater yields. Research is ongoing at ISU, but these data suggest that it may pay to wait until tasseling to spray particularly if disease severity is negligible or very low at V12.

To limit resistance to fungicide chemistries from developing, avoid spraying “just because”. Target fields that are more likely to have disease such as those planted to susceptible hybrids, low-lying fields where morning fogs occur, or fields with a history of disease. Scouting fields or keeping up-to-date with diseases occurring in your region via the ipmPIPE website, or extension pathologists and agronomists on social media can also keep you informed on the risk of disease and the need for a fungicide application.

Acknowledgements
Thank you to the farm managers and staff at each location who managed the trial and applied the fungicides. Thanks to Jyotsna Acharya for analysis of the data.

Category: Plant Diseases

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Crop:
Corn

Tags: foliar fungicide gray leaf spot corn yield fungicide application

Author:

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Dr. Alison Robertson is an associate professor of plant pathology and microbiology. She provides extension education on the diagnosis and management of corn and soybean diseases. Her research interests include Pythium seedling disease of corn and soybean and Goss's wilt. Dr. Robertson receiv...