

Effectiveness of Foliar Fungicides by Timing on Foliar Diseases of Hybrid Corn in Northeast Iowa

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Introduction

Foliar fungicides remain an input on hybrid corn that many farmers consider. New fungicides for use on corn are registered annually. The goal of this project is to provide data to help farmers determine the need for foliar fungicides in their production. The objectives of this project were to 1) assess the effect of timing of application of fungicides on foliar disease, 2) evaluate the yield response of hybrid corn to foliar fungicide application, 3) discern differences, if any, between fungicide products, and 4) to investigate the effect of nitrogen on fungicide yield response.

Materials and Methods

The corn hybrid Pioneer P0157AMXT, with a resistance rating of 4 for grey leaf spot (GLS) (1-9 scale, 9 = outstanding), was planted following soybean in a minimum tillage system April 25, 2020. A randomized complete block design with six replications was used. Each plot was four rows wide (30-in. row spacing) by 73 ft long. All plots were bordered by two rows on either side. All plots had 32 percent UAN preplant injected 180 lb/acre April 2, 2020, and 50 lb/acre of additional N as ammonia April 21, 2020. Two additional plots (with no fungicide or Miravis Neo (13.7 fl oz/acre) applied at R1 received 50 lb/acre of urea July 9, 2020, that was followed with 0.67 in. rain that evening. Fungicides were applied at either V12 (July 8) or at R1 (July 21) (Table 1). A CO²

pressurized 10 ft hand boom was used to spray the plots, fitted with Tee Jet flat fan sprayer nozzles (XR11003VS), spaced 20 in. apart, and delivering 20 gallons/acre at 24 psi. On September 2 (1/2 milk line), disease severity on the ear leaf and the canopy above ear leaf of each plot in replicates 1, 4, and 6 were assessed. Disease severity was assessed on a plot basis as an estimate of percent leaf area diseased. On October 10, all four rows of each plot were harvested with a John Deere 9450 combine fitted with an Avery Weigh-Tronix weigh scale and Shivvers 5010 moisture meter. All data were subjected to analysis of variance and means were compared at the 0.1 significance level using Fisher's protected least significant difference (LSD) test.

Results and Discussion

Although the growing season started off with above average precipitation, conditions during grain fill included below normal precipitation. Very little disease was observed in the trial. The most prevalent disease observed was gray leaf spot. Southern rust and tar spot were found also, but at extremely low levels. Gray leaf spot severity on the ear leaf of the untreated check was 0.4 percent on the ear leaf at tassel, and 1 percent on the ear leaf and 1 percent in the upper canopy at R5. No effects of timing on disease severity was detected ($P = 0.61$ (ear leaf) and $P = 0.46$ (upper canopy)). Yield of the control was 234.3 bushels/acre. Yields of the fungicide treatments ranged from 220.9 to 240.9. No effect of fungicide on yield was detected ($P = 0.1305$). No effect of N on yield response was detected ($P = 0.21$).

Table 1. Effect of fungicide and timing of fungicide applications on foliar disease severity and yield of corn at Nashua, Iowa, in 2020.

| Fungicide rate/ac, application timing ^z | N application rate and timing | Disease severity (%) ^y | | Yield (bu/ac) ^x |
|---|---|-----------------------------------|-----------------|-------------------------------|
| | | Ear leaf | Upper canopy | |
| Non-treated control | 230 lb/ac preplant | 1.0 | 1.0 | 234.3 |
| Non-treated control | 230 lb/ac preplant + 50 lb/ac side dress | 0.9 | 1.0 | 225.1 |
| Miravis Neo, 13.7 fl oz, R1 | 230 lb/ac preplant | 0.5 | 0.0 | 236.1 |
| Miravis Neo, 13.7 fl oz, R1 | 230 lb/ac preplant + 50 lb/ac side dress | 1.0 | 0.0 | 229.9 |
| USF0411, 8 fl oz, V12 | 230 lb/ac preplant | 0.5 | 0.0 | 231.4 |
| Trivapro, 13.7 fl oz, V12 | 230 lb/ac preplant | 0.5 | 0.3 | 233.7 |
| Miravis Neo, 13.7 fl oz, V12 | 230 lb/ac preplant | 0.0 | 0.3 | 235.8 |
| Veltyma, 7 fl oz, V12 | 230 lb/ac preplant | 0.0 | 0.3 | 236.5 |
| Topguard EQ, 5 fl oz, R1 | 230 lb/ac preplant | 0.7 | 0.7 | 239.4 |
| Lucento, 5 fl oz, R1 | 230 lb/ac preplant | 0.7 | 0.0 | 240.9 |
| Trivapro, 13.7 fl oz, R1 | 230 lb/ac preplant | 0.3 | 0.3 | 237.3 |
| Veltyma, 7 fl oz, R1 | 230 lb/ac preplant | 1.0 | 0.3 | 229.6 |
| USF0411, 8 fl oz, R1 | 230 lb/ac preplant | 1.1 | 0.0 | 236.5 |
| Veltyma, 7 fl oz, R1 | 230 lb/ac preplant 50 lb/ac side dress | 0.5 | 0.7 | 230.1 |
| Headline AMP, 10 fl oz, R1 | 230 lb/ac preplant | 0.2 | 0.0 | 220.9 |
| Non-treated control | 230 lb/ac preplant | 0.9 | 0.0 | 223.7 |
| P-value | | 0.4220 | 0.4845 | 0.1305 |

^zV12=12-leaf stage, R1=silking.

^yPercent canopy diseased at 1/2 milk line (September 2). Gray leaf spot was the most prevalent disease.

^xCorrected to 15.0% moisture content.

^wMeans followed by same letter do not significantly differ (P = 0.1, LSD).