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Alison Robertson
Iowa State University, alisonr@iastate.edu

Ken Pecinovsky
Iowa State University, kennethp@iastate.edu

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Effectiveness of Foliar Fungicides by Timing on Northern Leaf Blight on Hybrid Corn in Northeast Iowa

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Alison Robertson, associate professor
Department of Plant Pathology and
Microbiology
Ken Pecinovsky, farm superintendent

Introduction

Fungicide use on hybrid corn continues to be of interest to many farmers in Iowa. The number of fungicides registered for use on corn continues to increase, especially with the introduction of various generics. The objectives of this project were to 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.

Materials and Methods

The corn hybrid Pioneer P0157AMX, with a resistance rating of 5 for northern corn leaf blight (NCLB) (1-9 scale, 9 = outstanding), was planted following soybeans in a minimum tillage system April 25, 2016. The experimental design was a randomized complete block design with six blocks and each plot was four rows wide (30-in. row spacing) by 73 ft long. All plots were bordered by four rows on either side. Fungicides were applied at either V5 (June 10), or R1 (July 20), or both growth stages (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 gal/acre at 24 psi. On September 8 (1/4 milk line), disease severity in the upper canopy (ear leaf and above) of

each plot was assessed. Disease severity was an estimate of percent leaf area diseased. 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 on October 12. 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

Temperature conditions during the 2016 growing season were normal but precipitation was above the 30-yr average. Northern leaf corn blight (NCLB) was prevalent, and 15.3 percent of the canopy above the ear leaf was blighted in the non-sprayed check (Table 1). A fungicide treatment effect was detected on disease severity and percent of tops intact at harvest ($P < 0.0001$ and $P < 0.0001$, respectively (Table 1). Fungicide applications made at V5 did not reduce NCLB severity observed at R5, and the percent of tops intact at harvest was no different from the non-sprayed check. Applications of fungicides at R1 or at V5 plus R1, however, significantly reduced NCLB severity and the percent of intact tops was greater than the non-sprayed check (Table 1). No effect of fungicide on yield or lodging was detected ($P = 0.3778$ and $P = 0.1957$, respectively). Of the three programs in which a fungicide was applied at V5, R1, or V5 + R1, Topguard reduced NCLB severity compared with Stratego YLD and Preemptor ($P = 0.007$, Table 2). However, an effect of timing on disease severity and percent intact tops was detected ($P < 0.0001$ and $P < 0.0001$, respectively, Table 2).

Table 1. Effect of fungicide and timing of fungicide applications on northern leaf blight, lodging, and intact tops at harvest and yield of corn at Nashua, Iowa in 2016.

Treatment, rate/A, application timing^z	Northern corn leaf blight severity (%)^y	Lodging (%)	Tops intact (%)	Yield (bu/ac)^x
Non-treated control	15.3 a ^w	6.5	31.6 d	230.6
Stratego YLD, 2 fl oz, V5	15.5 a	4.8	43.3 c	234.1
Topguard EQ, 5 fl oz, V5	14.6 a	6.5	38.3 cd	225.1
Preemptor SC, 5 fl oz, V5	15.1 a	3.0	38.3 cd	232.0
Topguard EQ, 5 fl oz, V5 + Topguard EQ, 5 fl oz, R1	8.6 e	3.0	94.3 ab	239.2
Stratego YLD, 2 fl oz, V5 + Stratego YLD, 4 fl oz, R1	12.0 bc	5.0	86.5 ab	232.9
Aproach, 3 + Aproach Prima, 6.8, V5 + R1	10.3 cde	4.3	83.3 b	234.9
Preemptor SC, 5 fl oz, V5 + Preemptor SC, 5 fl oz, V5	11.3 bcd	3.3	86.6 ab	234.5
Topguard EQ, 5 fl oz, R1	10.1 cde	5.1	89.8 ab	234.8
Preemptor SC, 5 fl oz, R1	11.3 bcd	7.2	89.8 ab	233.6
Stratego YLD, 4 fl oz, R1	12.3 b	6.8	83.2 b	230.9
Aproach Prima, 6.8 fl oz, R1	9.5 de	11.8	92.3 ab	234.1
Trivapro, 10.5 fl oz + 4 fl oz, R1	9.8 de	6.0	94.5 ab	235.5
Zolera FX, 5 fl oz, R1	10.7 bcd	11.3	90.8 ab	229.9
P-value	<0.0001	0.3778	<0.0001	0.1957

^zV5, 5-leaf stage; R1, silking.

^yPercent upper canopy (ear leaf and above) diseased at ¼ milk line (Sept. 8).

^xCorrected to 15.5% moisture content.

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

Table 2. Comparison of fungicide and timing of fungicide applications on northern leaf blight, lodging, and intact tops at harvest and yield of corn at Nashua, Iowa in 2016.

Product	Northern corn leaf blight severity (%)^z	Lodging (%)	Tops intact (%)	Yield (bu/ac)^y
Stratego YLD	13.3 a ^x	5.55	71.0	232.6
Topguard EQ	11.2 b	4.88	74.1	233.0
Preemptor SC	12.6 a	4.5	71.0	233.4
P-value	0.007	0.8293	0.6985	0.9493
Timing^w				
V5	15.1 a	4.7	40.0 b	230.4
R1	11.3 b	6.4	87.6 a	233.1
V5 + R1	10.7 b	3.7	89.2 a	235.5
P-value	<.0001	0.3284	<.0001	0.0917

^zPercent upper canopy (ear leaf and above) diseased at ¼ milk line (Sept. 4).

^yCorrected to 15.5% moisture content.

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

^wV5, 5-leaf stage; R1, silking.