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Corn Fungicides: To Spray or Not to Spray?

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Abstract
Across the state of Iowa, much of the crop is reaching V5 to V6 and thoughts of an early fungicide application have probably crossed some people's minds. Every year, we evaluate and compare registered fungicides applied at either V5 to V6, R1 alone, or At V5 to V6 plus R1 for foliar disease management and effects on yield. In 2014, we tested 8 products at 6 locations in Iowa (Table 1). A randomized complete block design with 4 replications was used. At each location, two non-sprayed checks were included.

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Corn Fungicides: To Spray or Not to Spray?

By Alison Robertson, professor, and John Shriver, research assistant, with the Department of Plant Pathology and Microbiology

Across the state of Iowa, much of the crop is reaching V5 to V6 and thoughts of an early fungicide application have probably crossed some people's minds.

Every year, we evaluate and compare registered fungicides applied at either V5 to V6, R1 alone, or At V5 to V6 plus R1 for foliar disease management and effects on yield. In 2014, we tested 8 products at 6 locations in Iowa (Table 1). A randomized complete block design with 4 replications was used. At each location, two non-sprayed checks were included.

The 2014 growing season was predominantly cool and wet with above average rainfall in June, August, and September. Northern corn leaf blight (NCLB) was reported prior to tasseling in southwest and central Iowa, which was considerably earlier than usual. Over the past decade, NCLB has been reported after silking at various locations across the state. Different hybrids were grown at each location in the trial, but all had moderate resistance to NCLB.

Results by location

Northwest Research Farm in Sutherland, Iowa: NCLB severity in the upper canopy (ear leaf and all leaves above) two non-sprayed controls was 8.4% and 7.8% (Table 1). Although an application of Priaxor at V6 did not reduce NCLB severity compared to the non-sprayed controls ($P < 0.1$), applications of Custodia, Fortix and Stratego YLD at V6 did reduce disease. All treatments that included an application of fungicide at R1 reduced NCLB severity ($P < 0.1$),;however, applications at V5 followed by R1 were not different from application at R1 only. In general, treatments that were applied at R1 resulted in greater yields than the untreated check and V5 applications alone ($P < 0.1$) (Table 2).

Northern Research Farm in Kanawha, Iowa: NCLB severity in the two non-sprayed controls was 10.5% and 9.3% (Table 1). A reduction in NCLB severity was detected from all fungicides applied at all timings. No difference between application timings was detected, that is, applications made at V5 were as effective as applications made at R1, and at V5 plus R1. This is likely due to the fact that NCLB development started early prior to the crop tasseling. There was significant lodging in the plots due to a wind storm that occurred mid-July. No evidence of an effect of fungicide on yield was detected (Table 2).

Northeast Research Farm near Nashua, Iowa: NCLB severity was less than 1%. In this part of the state, precipitation was normal to below normal. In general, an application of fungicide at V6 reduced NCLB compared to the non-sprayed controls. Applications of Fortix at R1, Headline Amp at R1, Quilt Xcel at R1, Stratego YLD at V5 + R1, Stratego YLD at R1 all increased yield

compared to the non-sprayed control (P < 0.1) (Table 2).

Ag Engineering/Agronomy Farm in Boone, Iowa: In the two non-sprayed control, NCLB severity was 14% and 16% (Table 1). In general, an application of fungicide at V5 did not reduce disease severity, apart from an application of Aproach. An application of fungicide at R1 and double applications of fungicide (V5 plus R1) reduced disease severity. Greater yields occurred with applications of Fortix at R1, Headline AMP at R1, Stratego YLD at R1 and Stratego YLD at V5 plus R1 (P < 0.1) (Table 2).

Southwest Research Farm in Lewis, Iowa: Disease severity in the two non-sprayed controls was 10.5% and 9.3% (Table 1). No effect of an application of fungicide at V6 on NCLB severity was detected, except for Priaxor (3oz/A) (P < 0.1). An application of fungicide at R1 significantly reduced NCLB severity. Double applications of fungicide (at V5 plus R1) were not different from the single application at R1. No evidence of an effect of fungicide on yield was detected (Table 2).

Southeast Research Farm in Crawfordsville, Iowa: NCLB severity in the two non-sprayed controls was 7.8% and 8.4% (Table 1). All applications of fungicide reduced disease severity except for applications of Priaxor or Stratego YLD at V5, and Aproach at V5 plus Aproach Prima at R1. Greater yields compared to the non-sprayed control occurred with Fortix, Headline AMP Quilt Xcel and Stratego YLD all applied at R1, and with a two applications of Stratego YLD made at V5 and R1 (P < 0.1) (Table 2).

Summary

All fungicides effectively reduced NCLB at all locations in Iowa in 2014. Although applications at either V5 or at R1 reduced disease, applications at R1 were most effective at reducing disease. No additional disease control occurred with applications at V5 and again at R1.

With El Niño in effect, it looks like 2015 has a chance to be cool and wet. Since the NCLB fungus overwinters in corn residue, NCLB could be a disease risk in 2015. It will be important to scout fields, particularly those planted to hybrids that are rated susceptible or moderately susceptible to NCLB. If disease is present anywhere on more than 50% of the plants in a field, a fungicide application could be a prudent decision. Applications made between VT and R2 should protect the crop. Avoid applications between V12 and V18; since, this increases the risk of arrested ear development.

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Table 1. Effect of foliar fungicides on northern corn leaf blight at five locations in Iowa in 2014.

Treatment, rate/A, application timing	Northern corn leaf blight severity (%) Percent upper canopy (ear leaf and above) diseased at ¾ milk line				
	NWRF	NRF	SWRF	Boone	SERF
Non-sprayed control 1	8.4	10	10.5	14	7.8
Custodia, 6 fl oz, V5	4.6	3	5.3	14	7.5
Fortix, 5 fl oz, V5	7.3	3	4.3	7	1.3
Priaxor, 3 fl oz, V5	7.5	4.8	4	12	2.4
Stratego YLD, 2 fl oz, V5	4.7	1.9	8	11	4.7
Aproach, 6 fl oz, R1	4.5	1.5	7.5	7	2.1
Custodia, 12.8 fl oz, R1	2.5	6	7.5	8	2.5
Fortix, 5 fl oz, R1	1.8	5.3	3.3	8	1.4
Headline Amp, 10 fl oz, R1	2.4	4.5	8	7	2.3
Quilt Xcel, 10.5 fl oz, R1	1.4	7	8	8	4.5
Stratego YLD, 4 fl oz, R1	2.5	4	9.3	12	7.3
Aproach, 3 + 6 fl oz, V6 + R1	2.3	2	5	9	2.5
Fortix, 5 + 5 fl oz, V6 + R1	2.5	4	5.5	7	1.8
Priaxor, 3 fl oz, V5; Headline AMP, 10 fl oz, R1	1.3	3	10.8	14	4.6
Stratego YLD, 2 + 4 fl oz, V6 + R1	2.1	6	4.3	9	2.5
Non-sprayed control 2	7.6	8.3	9.5	16	8.4
Aproach, 3 fl oz + Aproach Prima, 6.8 fl oz, V6 + R1	0.9	5.3	.	10	.
Aproach Prima, 6.8 fl oz, R1	1.8	4.5	.	10	.
LSD (0.01)	1.8	2.25	3.74	5.0	2.7
P-value	<0.0001	<0.0001	0.0276	0.0192	<0.0001

NWRF, ISU Northwest Research Farm, Sutherland; NRF, ISU Northern Research Farm, Kanawha; NERF, ISU Northeast Research Farm; SERF, ISU Southeast Research Farm, Crawfordsville

Table 2. Effect of foliar fungicides on yield of corn at six locations in Iowa in 2014.

Treatment, rate/A, application timing	Yield (bu/A) corrected to 15.5% moisture content					
	NWRF	NRF	NERF	SWRF	Boone	SERF
Non-sprayed control 1	205.7	159.1	213.6	205.7	186.8	215.7
Custodia, 6 fl oz, V5	202.8	164.9	212.9	209.7	198.7	214.0
Fortix, 5 fl oz, V5	218.4	153.5	219.5	207.6	182.8	220.3
Priaxor, 3 fl oz, V5	219.8	161.7	220.7	202.8	188.9	218.7
Stratego YLD, 2 fl oz, V5	210.8	173.1	213.9	210.8	210.6	215.1
Aproach, 6 fl oz, R1	222.8	170.5	223.1	210.2	210.9	216.6
Custodia, 12.8 fl oz, R1	219.4	171.1	221.2	219.2	180.7	219.7
Fortix, 5 fl oz, R1	217.2	161.3	221.9	223.3	206.3	218.4
Headline Amp, 10 fl oz, R1	207	157.3	218.9	219.8	198.0	218.0
Quilt Xcel, 10.5 fl oz, R1	210.2	168.9	215.0	217.2	197.3	217.7
Stratego YLD, 4 fl oz, R1	207.6	175.4	214.2	219.4	202.1	211.4
Aproach, 3 + 6 fl oz, V6 + R1	216.7	181.5	214.5	207.0	217.4	224.8
Fortix, 5 + 5 fl oz, V6 + R1	223.3	167.3	219.9	216.7	202.7	205.0
Priaxor, 3 fl oz, V5; Headline AMP, 10 fl oz, R1	209.7	177.2	212.4	218.4	188.1	208.4
Stratego YLD, 2 + 4 fl oz, V6 + R1	219.2	177.71	214.0	222.8	210.5	213.9
Non-sprayed control 2	197.3	172.2	212.0	197.3	204.0	212.6
Aproach, 3 fl oz + Aproach Prima, 6.8 fl oz, V6 + R1	212.1	167.1	213.6	.	192.8	.
Aproach Prima, 6.8 fl oz, R1	216.4	164	212.9	.	209.5	.
LSD (0.01)	7.6	NA	7.0	NA	19.9	NA
P-value	<0.001	0.871	0.011	0.365	0.090	0.365

NWRF, ISU Northwest Research Farm, Sutherland; NRF, ISU Northern Research Farm, Kanawha; NERF, ISU Northeast Research Farm; SWRF, ISU Southwest Research Farm, Lewis; SERF, ISU Southeast Research Farm, Crawfordsville.

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