Wisconsin Field Crops Pathology Fungicide Tests Summary

2014

Damon Smith, UW Plant Pathology
Scott Chapman, UW Entomology and Plant Pathology
Bryan Jensen, UW IPM Program

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University of Wisconsin-Extension

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Table of Contents

Evaluation of fungicide seed treatments for control of Aphanomyces root rot of alfalfa in Wisconsin, 2014 1

Evaluation of fungicides for control of foliar diseases of alfalfa in Wisconsin, 2014 2

Evaluation of fungicides for control of diseases of dent corn in Wisconsin, 2014 3

Evaluation of fungicides for control of ear rot and mycotoxin development in corn for silage in Wisconsin, 2014 5

Evaluation of foliar fungicides for control of foliar diseases of sweet corn in Wisconsin, 2014 7

Evaluation of fungicides for control of brown spot of soybean in Wisconsin, 2014 8

Evaluation of fungicides for control of Sclerotinia stem rot of soybean in Wisconsin, 2014 10

Evaluation of 'curative' fungicide treatments for control of Sclerotinia stem rot of soybean in Wisconsin, 2014 12

Evaluation of HeadsUp Seed Treatment for control of Sclerotinia stem rot of soybean under controlled conditions 13

Evaluation of foliar fungicides for control of diseases of wheat in Wisconsin, 2014 14

Evaluation of fungicide seed treatments for control of Aphanomyces root rot of alfalfa in Wisconsin, 2014

ALFALFA (*Medicago sativa* 'DKA44-16RR')
Aphanomyces root rot; *Aphanomyces euteiches*

The trial was established at the Lancaster Agricultural Research Station located in Lancaster, WI. The alfalfa cultivar 'DKA44-16RR' was seeded at 20 lb/A on 16 May 2014 in a field with Fayette silt loam soil (6 to 10% slopes) and previously confirmed to be infested with *Aphanomyces euteiches* Race 2. The experimental design was a randomized complete block with six replicates. Plots were 20 ft long and 6 ft wide with a 5 ft non-planted border between each plot. Standard alfalfa production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of various seed treatments applied by a professional seed treatment specialist prior to planting. Alfalfa stand was assessed in each plot on 18 Jun (1 month after planting) by randomly tossing a 1 ft x 1ft square in each plot 3 times, and counting the number of alfalfa plants within each square. Stand counts were then converted to total number of plants per plot. Two harvests were conducted, one on 9 Jul and another on 13 Aug. A small-plot harvester was used to cut a 31-in wide by 20 ft long area of each plot to determine wet yield. A subsample of alfalfa was also collected from each replicate (~0.5 lb), weighed, then dried and weighed again to determine dry matter yield. Relative vigor was recorded for each plot by finding the best looking plot in each replicate and assigning 100 to that plot. All plots in the replicate were then assigned a subjective vigor rating relative to the best plot in the replicate. Vigor ratings are reported as the average across both harvests. Yield data are reported as total yield from both harvests. All stand count, relative vigor, and yield data were analyzed using a mixed model analysis of variance (α=0.05).

Weather was cool prior to the first and second harvest. As a result, overall growth of alfalfa was generally a bit lower than expected. No significant differences in stand counts were identified among treatments one month after planting (Table 1). No significant differences in average relative vigor were identified among treatments. No significant differences in total dry matter yield relative to the check treatment were observed for all treatments except the Maxim 4FS + Apron XL 3SL and Rizolex 4.17FS + Apron XL 3S treatments. Total dry matter yield was significantly lower for these latter treatments compared to the check. However, total dry matter yield for these two treatments was not significantly different from plots that were treated with Stamina 1.67FS + Apron XL 3SL or Optimize Gold Plus LCO and plots treated with Rizolex 4.17FS + Apron XL 3SL + either rate of V-10390. Phytotoxicity was not observed with any treatment. Further field evaluation should be conducted before use of any of these products is recommended for Aphanomyces root rot control.

Table 1. Stand count, relative vigor, and total dry matter of alfalfa with various seed treatments at planting

Treatment and Rate/cwt	Stand Count (Plants/Plot)[z]	Average Relative Vigor[y]	Total Dry Matter Yield (t/A)[x]
Apron XL 3SL 0.64 fl oz (Check)	906.7	92.6	2.04 a
Rizolex 4.17FS 0.30 fl oz + Intego Solo 3.2FS 0.30 fl oz + Apron XL 3SL 0.64 fl oz	860.0	93.8	2.03 a
Apron XL 3SL 0.64 fl oz + Nitragin Gold 13.4 oz	880.0	91.8	2.00 ab
Stamina 1.67FS 1.50 fl oz + Apron XL 3SL 0.64 fl oz	733.3	89.2	1.88 ac
Stamina 1.67FS 1.50 fl oz + Optimize Gold Plus LCO	960.0	87.5	1.85 ac
Rizolex 4.17FS 0.30 fl oz + V-10390 1.46 fl oz + Apron XL 3SL 0.64 fl oz	860.0	87.9	1.82 ac
Rizolex 4.17FS 0.30 fl oz + V-10390 0.73 fl oz + Apron XL 3SL 0.64 fl oz	913.3	88.3	1.76 bc
Maxim 4FS 0.08 fl oz + Apron XL 3SL 0.64 fl oz	726.7	83.3	1.66 c
Rizolex 4.17FS 0.30 fl oz + Apron XL 3SL 0.64 fl oz	733.3	87.5	1.66 c
LSD (α=0.05)	ns[w]	ns[w]	0.26

[z]Alfalfa stand was assessed in each plot on 18 Jun by randomly tossing a 1 ft x 1ft square in each plot 3 times, and counting the number of alfalfa plants within each square; Stand counts were then converted to total number of plants per plot.
[y] Average relative vigor across both harvests was recorded for each plot by finding the best looking plot in each replicate and assigning 100 to that plot. All plots in the replicate were then assigned a subjective vigor rating relative to the best plot in the replicate.
[x]Total yield across both harvests based on dry matter conversion after "green chopping" each small plot;
[w]ns = no least significant difference (α=0.05).

Evaluation of fungicides for control of foliar diseases of alfalfa in Wisconsin, 2014

ALFALFA (*Medicago sativa* 'Spring Gold')
Spring black stem; *Phoma medicaginis*
Stemphylium leaf spot; *Stemphylium botryosum*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The alfalfa cultivar 'Spring Gold' was seeded on 20 Aug 2012 in a field with a Ringwood silt loam soil (6 to 12% slopes). The experimental design was a randomized complete block with four replicates. Plots were 40 ft long and 10 ft wide. Standard alfalfa production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and five fungicide treatments. Fungicides were applied using a CO_2-pressurized backpack sprayer equipped with 8001 TurboJet flat fan nozzles calibrated to deliver 20 GPA. Fungicides were applied after each cutting of alfalfa once plants had reached a height of 6 in. Dates of fungicide application were 4 May, 23 Jun, and 18 Jul 2014. Natural sources of pathogen inoculum were relied upon for disease. Disease severity and defoliation was evaluated at harvest for the first two cuttings by visually estimating both parameters with the aid of standard area diagrams. A small-plot harvester was used to cut a 31-in wide by 37.4 ft long area of each plot to determine wet yield. A subsample of alfalfa was also collected from each replicate (~0.50 lb.), weighed, then dried and weighed again to determine dry matter yield. Harvest was performed on 3 Jun, 8 Jul, and 7 Aug. All disease, defoliation, and yield data were analyzed using a mixed model analysis of variance (P=0.05). Disease and defoliation data were reported as the average for both foliar diseases across the first two ratings. Disease ratings were not performed on the third cutting because disease levels were extremely low. Yield was reported as the total annual yield from three harvests.

Weather was very wet and cool prior to the first and second harvest. Based on these weather patterns the primary disease present at the first harvest was spring black stem in the first cutting and Stemphylium leaf spot and spring black stem in the second cutting (Table 2). Average foliar disease severity was highest in the non-treated control. Plots that received fungicide had significantly less average foliar disease than the non-treated control. However, there was no significant difference in defoliation for the first two cuttings. Yield was significantly higher than the non-treated control in all plots that received fungicide. Highest yield was recorded in plots that were treated with Headline 2.08SC. Only plots treated with Quadris 2.08F had significantly lower yields than plots treated with Headline 2.08SC. Phytotoxicity was not observed with any treatment.

Table 2. Foliar disease severity, defoliation, and dry matter yield of alfalfa treated with various foliar fungicides

Treatment and Rate/Acre	Foliar Diseases Severity (%)[y,x]	Defoliation (%)[y,x]	Dry Matter Yield (lbs/a)[x,w]
Non-treated Control	9.4 a	7.8	7471.4 c
Quadris 2.08F 6.0 fl oz/a + Warrior II with Zeon Technology 1.6 fl oz/a[z]	5.2 b	6.0	7899.6 b
Quadris 2.08F 6.0 fl oz/a[z]	4.1 b	6.3	7915.1 b
BAS 70004F 2.2 fl oz/a[z]	4.4 b	5.0	8005.9 ab
Aproach 2.08SC 12.0 fl oz/a[z]	4.2 b	4.7	8012.6 ab
Aproach 2.08SC 6.0 fl oz/a	4.2 b	5.0	8058.5 ab
Aproach 2.08SC 6.0 fl oz/a[z]	5.5 b	6.0	8082.5 ab
Aproach 2.08 12.0 fl oz/a	6.0 b	5.4	8229.0 ab
Priaxor 4.17SC 4.0 fl oz/a[z]	5.0 b	5.7	8276.9 ab
Headline 2.08SC 6.0 fl oz/a[z]	3.5 b	5.0	8307.6 a
LSD (α=0.05)	3.1	ns[v]	381.5

[z]Induce 90% SL (Non-ionic surfactant) at 0.25% v/v was added to the fungicide treatment.
[y]Values are based on the average disease severity or defoliation prior to harvest on 3 Jun and 8 Jul.
[x]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05).
[w]Total annual yield based on harvests on 3 Jun, 8 Jul, and 7 Aug.
[v]ns = no least significant difference (α=0.05).

Evaluation of fungicides for control of diseases of dent corn in Wisconsin, 2014

DENT CORN (*Zea mays* 'DKC55-09RIB')
Eyespot; *Kabatiella zeae*
Northern corn leaf blight; *Exserohilum turcicum*
Gibberella ear rot; *Gibberella zeae*
Gibberella stalk rot; *Gibberella zeae*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'DKC-09RIB' was chosen for this study. Corn was planted on 19 May 2014 in a field consisting of a Plano silt loam soil (2 to 6 percent slopes) with a small Saybrook silt loam intrusion. The experimental design was a randomized complete block with four replicates. Plots consisted of four 30-in. spaced rows, 20 ft long and 10 ft wide with 7-ft alleys between plots. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 23 fungicide, herbicide, and/or insecticide treatments. Pesticides were applied using a CO_2-pressurized backpack sprayer equipped with 8001 TurboJet flat fan nozzles calibrated to deliver 20 GPA. Pesticides were applied at growth stages V6, V8, VT, or V6 and VT. Natural sources of pathogen inoculum were relied upon for disease. Eyespot was rated on 19 Aug. Northern corn leaf blight (NCLB) and ear diseases were evaluated on 8 Sep. All foliar and ear diseases were visually assessed by inspecting ear leaves or ears on 10 plants in each plot with the aid of standardized area diagrams. Stalk rot was assessed on five plants in each plot at R6 by cutting stalks with a knife and rating using the Illinois 0-5 scale where 0=no stalk rot and 5=severe stalk rot with lodging. Yield was determined by harvesting the center 2 rows of each plot using a small-plot combine. All foliar and ear disease and yield data were analyzed using a mixed model analysis of variance (ANOVA; P=0.05). Means were separated using Fisher's test of least significant difference (LSD). Stalk rot data were analyzed using non-parametric analysis due to the ordinal nature of the ratings (P=0.05)

Weather was very wet at planting and continued to be cool and wet for the entire season. Severity of all diseases was low in this trial (Table 3). Significant treatment effects were noted only for northern corn leaf blight (NCLB) ratings. All plots treated with pesticide had the same level of NCLB except plots treated with Quadris at V6 and Headline AMP + Abundit Extra at V6. Plots treated with the latter treatments had marginally higher levels of NCLB than the non-treated controls. Yield was not significantly different among all treatments. Phytotoxicity was noted at the V8 growth stage in plots where Aproach was applied at V6 only. Plants soon recovered from the phytotoxicity and yield was not impacted.

Table 3. Disease severity and yield of dent corn treated with various foliar fungicides

Treatment and Rate/Acre (Crop Growth Stage at Application)[z]	Eyespot Severity (%)[y]	NCLB Severity (%)[y]	Ear Rot Severity (%)[x]	Stalk Rot (Illinois 0-5 Scale)[w]	Yield (bu/a)
Quadris 2.08F 6.0 fl oz (V6)	0.3	3.4 a[v]	0.6	1.5	191.4
Headline AMP 1.68SC 10.0 fl oz + Abundit Extra 32.0 fl oz (V6)	0.4	2.2 ab	0.3	1.1	186.9
Stratego YLD 500SC 4.0 fl oz (VT)	0.5	1.6 bc	0.5	1.1	195.4
Stratego YLD 500SC 2.0 fl oz (V6)	0.0	1.3 bc	0.1	1.2	201.8
Priaxor 4.17SC 3.0 fl oz (V6)	0.0	1.2 bc	0.1	1.5	199.0
Fortix 3.22SC 4.0 fl oz (VT)	0.3	1.1 bc	0.5	1.4	182.4
Aproach 2.08SC 3.0 fl oz + Abundit Extra 32.0 fl oz (V6)					
Aproach 2.08SC 6.0 fl oz (VT)	0.0	1.0 bc	3.3	1.5	194.7
Fortix 3.22SC 5.0 fl oz + Abundit Extra 32.0 fl oz (V6)	0.1	0.9 bc	0.7	1.3	195.1
Fortix 3.22SC 5.0 fl oz (VT)	0.0	0.9 bc	0.5	0.8	198.3
Headline AMP 1.68SC 10.0 fl oz (V8)	0.1	0.8 bc	0.0	1.4	205.0
Headline AMP 1.68SC 10.0 fl oz (VT)	0.3	0.8 bc	0.4	1.2	182.1
Stratego YLD 500SC 2.0 fl oz (V6)					
Stratego YLD 500SC 4.0 fl oz (VT)	0.1	0.8 bc	0.0	0.8	199.8
Fortix 3.22SC 5.0 fl oz (V8)	0.1	0.6 c	0.1	1.0	190.1
Non-treated control	0.5	0.6 c	0.0	1.9	199.2
Aproach 2.08SC 3.0 fl oz (V6)	0.6	0.6 c	0.4	1.5	191.4
Abundit Extra 32.0 fl oz (V6)	0.3	0.5 c	1.5	1.3	198.6
Quadris 2.08F 6.0 fl oz (V6)					
Quilt Xcel 2.2SE 10.5 fl oz (VT)	0.1	0.5 c	5.1	1.8	182.5
Aproach 2.08SC 6.0 fl oz (VT)	0.3	0.4 c	0.3	1.4	187.6
Aproach 2.08SC 3.0 fl oz + Abundit Extra 32.0 fl oz (V6)					
Aproach Prima 2.34SC 6.8 fl oz + Asana XL 9.6 fl oz (VT)	0.3	0.4 c	0.0	1.6	179.2
Quilt Xcel 2.2SE 10.5 fl oz (VT)	0.1	0.3 c	0.0	1.4	182.0
Priaxor 4.17SC 3.0 fl oz (V6)					
Headline AMP 1.68SC 10.0 fl oz (VT)	0.1	0.3 c	0.0	1.4	181.6
Aproach Prima 2.34SC 6.8 fl oz + Asana XL 9.6 fl oz (VT)	0.0	0.3 c	0.8	1.3	193.6
Fortix 3.22SC 5.0 fl oz (V6)					
Fortix 3.22SC 5.0 fl oz (VT)	0.1	0.2 c	5.4	1.4	191.7
Aproach 2.08SC 6.0 fl oz + Asana XL 9.6 fl oz (VT)	0.3	0.1 c	0.6	1.6	202.9
LSD (α=0.05)	ns	1.6	ns	ns	ns

[z]All treatments included the non-ionic surfactant Induce 90SL at 0.25% v/v.
[y]Foliar disease ratings were assessed on 10 ear leaves in each plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[x]Ear rot was assessed on 10 plants in each plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[w]Stalk rot was assessed on five plants in each plot using the Illinois 1-5 scale where 0=no stalk rot and 5=severe stalk rot with lodging; means for each plot were used in the analysis.
[v]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05)

Evaluation of fungicides for control of ear rot and mycotoxin development in corn for silage in Wisconsin, 2014

SILAGE CORN (*Zea mays* 'PEG3722RR' and 'PEG3665GT)
Ear rot (*Fusarium* spp.)

Trials were located at Sunburst Dairy, Inc. located near Belleville, WI and at Mystic Valley Dairy, LLC near Roxbury, WI. At Sunburst Dairy, Inc. the hybrid PEG3665GT was planted on 25 May 2014. At Mystic Valley Dairy, LLC, the hybrid PEG3722RR was planted on 10 May 2014. Corn was bulk planted in commercial fields at both locations and maintained according to recommendations by Ag Site Crop Consulting, LLC. Replicated strips (4 replicates) were established for each treatment by applying fungicide in alternating strips with no fungicide applied. Fungicide was applied using a commercial ground application unit with a 90-ft boom calibrated to deliver 20 GPA. Fungicide was applied at growth stage R1 (silking). Natural sources of pathogen inoculum were relied upon for disease. Disease ratings were conducted at silage harvest (18 Sep). Ear diseases were visually assessed by inspecting 10 plants in each plot with the aid of standardized area diagrams. Stalk rot was assessed on 10 plants in each plot by cutting stalks with a knife and rating using the Illinois 0-5 scale where 0=no stalk rot and 5=severe stalk rot with lodging. Yield was determined by first harvesting 17.5 ft of row in each plot and weighing wet stalks. A subsample of chopped silage from each plot was weighed, then dried and weighed again to determine dry matter yield. Yield was then corrected to 35,000 plants per acre. Level of deoxynivalenol (DON) was also evaluated in separate subsamples from each plot. All disease, DON, and yield data were analyzed using a mixed model analysis of variance (ANOVA; P=0.05). Means were separated using Fisher's test of least significant difference (LSD).

Results were similar at both locations (Tables 4 and 5). There was no significant difference in level of disease between the treated and Proline-treated plots. DON was detected in all plots, however there were no significant treatment effects and levels were below threshold for milking cows (2ppm). Plots treated with Proline did appear to have symptoms of phytotoxicity near harvest. Yield was not significantly different from the non-treated control in plots treated with fungicide; however, yield was numerically less in plots that received fungicide. In 2014, at both research locations, the application of fungicide did not result in a significant reduction in the level of DON or increase overall yield compared to the non-treated control in freshly harvested silage. These experiments should be repeated in 2015.

Table 4. Disease, mycotoxin levels, and dry matter yield of corn silage treated with Proline fungicide or not treated at Sunburst Dairy, Inc. Belleville, Wisconsin

Treatment and Rate/Acre (Crop Growth Stage at Application)	Ear Mold (%)[z]	Stalk Rot (Illinois 0-5 Scale)[y]	DON content (ppm)[x]	Dry Matter Yield (t/A)[x]
Non-treated control	0.05	0.00	1.20	8.82
Proline 480SC 5.7 fl oz (R1)	0.00	0.00	1.00	8.38
LSD (α=0.05)	ns	ns	ns	ns

[z]Ear mold was assessed on 10 plants in each plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[y]Stalk rot was assessed on 10 plants in each plot using the Illinois 1-5 scale where 0=no stalk rot and 5=severe stalk rot with lodging; means for each plot were used in the analysis.
[x]Mean deoxynivalenol content measured as an average of 3 subsamples taken from the silage harvester in each plot.
[w]Yield was determined by harvesting all plants in a 17.5-ft length of row, weighing, determining dry matter weight, and correcting the final yield to 35,000 plants per acre.

Table 5. Disease, mycotoxin levels, and dry matter yield of corn silage treated with Proline fungicide or not treated at Mystic Valley Dairy, LLC, Roxbury, Wisconsin

Treatment and Rate/Acre (Crop Growth Stage at Application)	Ear Mold (%)[z]	Stalk Rot (Illinois 0-5 Scale)[y]	DON content (ppm)[x]	Dry Matter Yield (t/A)[x]
Non-treated control	0.00	0.00	1.00	15.17
Proline 480SC 5.7 fl oz (R1)	0.00	0.00	0.90	14.34
LSD (α=0.05)	ns	ns	ns	ns

[z]Ear mold was assessed on 10 plants in each plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[y]Stalk rot was assessed on 10 plants in each plot using the Illinois 1-5 scale where 0=no stalk rot and 5=severe stalk rot with lodging; means for each plot were used in the analysis.
[x]Mean deoxynivalenol content measured as an average of 3 subsamples taken from the silage harvester in each plot.
[w]Yield was determined by harvesting all plants in a 17.5-ft length of row, weighing, determining dry matter weight, and correcting the final yield to 35,000 plants per acre.

Evaluation of foliar fungicides for control of foliar diseases of sweet corn in Wisconsin, 2014

SWEET CORN (*Zea mays* 'Sweet G90')
Eyespot; *Kabatiella zeae*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The sweet corn variety 'Sweet G90' was chosen for this study. Sweet corn was planted on 25 Jun 2014 in a field with a Plano silt loam soil (0 to 2 percent slopes). The experimental design was a randomized complete block with four replicates. Plots consisted of six 30-in. spaced rows, 50 ft long and 15 ft wide with 6-ft alleys between plots. Standard sweet corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and nine fungicide treatments. Initial fungicide treatments were applied using a CO_2 pressurized, self propelled high-clearance sprayer equipped with 8002 XR TurboJet flat fan nozzles, spaced 20 in. apart, and calibrated to deliver 20 gal/A at 40 PSI. Second fungicide applications were made with a CO_2 pressurized backpack sprayer with an overhead boom equipped with 8002 XR TurboJet flat fan nozzles, spaced 20 in. apart, and calibrated to deliver 20 gal/A at 30 PSI. Fungicides were applied at the V9-10 (8 Aug) and VT-R1 (26 Aug) growth stages. Leaf disease severity (0-100%) was rated on 10 ear leaves in each plot at brown silk (Sep 4) using a standard area diagram. Marketable ears were harvested by hand from one center row of each plot. All disease and yield data were analyzed using a mixed model analysis of variance (P=0.05).

The 2014 season was cool and wet from planting to harvest. Unfavorable weather conditions resulted in lower yields than expected (Table 6). Common rust and eyespot were the only diseases observed in plots. Common rust severity was less than 1% in all treatments. Levels of eyespot were high in non-treated plots. All plots treated with fungicide had significantly less eyespot and higher yields than plots not treated with fungicide with the exception of plots treated with Viathon 4.1SC. Plots treated with the experimental fungicide A15457 + Quadris 2.08SC + Tilt 3.6EC at both application timings had the lowest eyespot severity and yield comparable to the best yielding treatment. Plots treated with Prosaro 421SC at V9-10 followed by Stratego YLD 500SC at VT-R1 had the highest yields and low to moderate eyespot severity. All other plots treated with fungicide had moderate levels of eyespot and yield comparable to plots treated with Prosaro 421SC followed by Stratego YLD. Phytotoxicity was not observed in any plot.

Table 6. Eyespot severity and yield of sweet corn treated with various foliar fungicides

Treatment and Rate/Acre (Crop Growth Stage at Application)	Eyespot Severity (%)	Yield, Marketable Ears (lbs/A)
Non-treated check	54.8 a	3562.5 c
Viathon 4.1SC 2.5 pt (V9-10, VT-R1)[z]	42.8 a	5237.5 bc
Quilt Xcel 2.2SE 14.0 fl oz (V9-10)[y]		
Tilt 3.6EC 4.0 fl oz (VT-R1)	18.3 bd	5762.5 ab
A18126 5.0 fl oz (V9-10)[y]		
Tilt 3.6EC 4.0 fl oz (VT-R1)	14.3 cd	6212.5 ab
A15457 2.7 fl oz + Tilt 3.6EC 4.0 fl oz (V9-10, VT-R1)[y]	20.6 bd	6325.0 ab
Priaxor 4.17SC 4.0 fl oz (V9-10, VT-R1)[z]	23.6 bd	6800.0 ab
Headline AMP 1.68SC 10 fl oz (V9-10, VT-R1)[z]	16.1 bd	7062.5 ab
Quilt Xcel 2.2SE 11 fl oz (V9-10, VT-R1)[z]	28.3 b	7450.0 a
Stratego YLD 500SC 4.0 fl oz (V9-10)[z]		
Prosaro 421SC 6.5 fl oz (VT-R1)[z]	26.8 b	7495.0 a
A15457 4.1 fl oz + Quadris 2.08SC 6.0 fl oz + Tilt 3.6EC 4.0 fl oz		
(V9-10, VT-R1)[y]	12.6 d	7537.5 a
Prosaro 421SC 6.5 fl oz (V9-10)[z]		
Stratego YLD 500SC 4.0 fl oz (VT-R1)[z]	26.4 bc	7600.0 a
LSD (α=0.05)	12.3	1885.9

[z]Induce 90% SL (Non-ionic surfactant) at 0.125% v/v was added to the fungicide treatment.
[y]Crop oil concentrate at 1% v/v was added to the fungicide treatment.

Evaluation of fungicides for control of brown spot of soybean in Wisconsin, 2014

SOYBEAN (*Glycine max* '92Y51')
Brown spot; *Septoria glycines*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The soybean cultivar '92Y51' was chosen for this study. Soybeans were planted on 21 May 2014 in a field with a Joy silt loam soil (2 to 4 percent slopes). The experimental design was a randomized complete block with four replicates. Plots consisted of four 30-in. spaced rows, 20 ft long and 10 ft wide with 5-ft alleys between plots. Standard soybean production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 20 fungicide and/or insecticide treatments. Pesticides were applied using a CO_2-pressurized backpack sprayer equipped with 8001 TurboJet flat fan nozzles, spaced 15 in. apart, and calibrated to deliver 20 gal/A at 28 PSI. Pesticides were applied at growth stages R1 (7 Jul), R3 (21 Jul), both R1 and R3, or R3 and R4 (5 Aug). Natural sources of pathogen inoculum were relied upon for disease. Disease was evaluated at growth stage R6 by visually assessing leaf disease severity using a standardized area diagram. Yield was determined by harvesting the center 2 rows of each plot using a small-plot combine. All disease and yield data were analyzed using a mixed model analysis of variance and means were separated using Fisher's least significant difference (P=0.05).

Weather was unseasonably cool and wet from planting to harvest. Brown spot persisted in plots for the entire growing season due to weather. Application of fungicide resulted in a significant decrease in brown spot severity except in plots treated with Aproach at R3, Topguard at R1 then R3, and Aproach Prima at both R3 and R3 then R4 (Table 7). Lowest levels of brown spot were recorded in plots that were treated with Headline at R1 then R3. Despite a significant reduction in brown spot severity with application of certain fungicide programs, yield was not significantly different among all treatments. No phytotoxicity was observed in this trial.

Table 7. Brown spot severity and yield of soybeans treated with various foliar fungicides

Treatment and Rate/Acre (Crop Growth Stage at Application)	Brown Spot Severity[z]	Yield (bu/a)
Non-treated Check	28.1 a[y]	45.6
Aproach 2.08SC 6.0 fl oz + Induce 90SL 0.25% v/v (R3)	23.5 ab	48.2
Topguard 1.04SC 7.0 fl oz + Induce 90SL 0.25% v/v (R1, R3)	21.4 ad	55.1
Aproach Prima 2.34SC 6.8 fl oz + Induce 90SL 0.25% v/v (R1, R4)	20.4 acd	46.3
Aproach Prima 2.34SC 6.8 fl oz + Induce 90SL 0.25% v/v (R3)	20.3 acd	48.8
Quilt Xcel 2.2SE 20.5 fl oz + Induce 90SL 0.25% v/v (R1)	19.3 bcd	47.8
Fortix 3.22SC 5.0 fl oz (R1)	16.8 bde	44.9
Topguard 1.04SC 7.0 fl oz + Induce 90SL 0.25% v/v (R1)	15.6 bde	52.6
Fortix 3.22SC 5.0 fl oz (R3)	13.9 df	53.0
Topguard 1.04SC 7.0 fl oz + Induce 90SL 0.25% v/v (R3)	13.6 dg	48.9
Stratego YLD 500SC 5.0 fl oz + Induce 90SL 0.25% v/v (R3)	12.4 cefgh	49.2
Quilt Xcel 2.2SE 20.5 fl oz + Induce 90SL 0.25% v/v (R3)	10.3 efgi	52.4
Headline 2.08SC 12.0 fl oz + Induce 90SL 0.25% v/v (R1)	6.6 fgi	49.7
Stratego YLD 500SC 4.0 fl oz (R3)	5.8 gi	51.3
Quilt Xcel 2.2SE 20.5 fl oz + Induce 90SL 0.25% v/v (R1, R3)	4.6 hij	49.1
Priaxor 4.17SC 8.0 fl oz + Induce 90SL 0.25% v/v (R1)	4.4 hij	53.1
Stratego YLD 500SC 5.0 fl oz + Leverage 360SC 3.2 fl oz + Induce 90SL 0.25% v/v (R3)	2.5 ij	54.4
Headline 2.08SC 12.0 fl oz + Induce 90SL 0.25% v/v (R3)	1.5 j	52.7
Priaxor 4.17SC 8.0 fl oz + Induce 90SL 0.25% v/v (R3)	0.8 j	51.3
Priaxor 4.17SC 8.0 fl oz + Induce 90SL 0.25% v/v (R1, R3)	0.3 j	54.7
Headline 2.08SC 12.0 fl oz + Induce 90SL 0.25% v/v (R1, R3)	0.1 j	49.2
LSD (α=0.05)	8.0	ns

[z]Brown spot severity was visually assessed using a standard area diagram. Scale is from 0% to 100% coverage of leaves by brown spot lesions

[y]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05)

Evaluation of fungicides for control of Sclerotinia stem rot of soybean in Wisconsin, 2014

SOYBEAN (*Glycine max* 'AG2031')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The soybean cultivar 'AG2031' was chosen for this study. Soybeans were planted on 21 May 2014 in a field with a Plano silt loam soil (2 to 6 percent slopes). The experimental design was a randomized complete block with four replicates. Plots consisted of 6 15-in. spaced rows, 21 ft long and 7.5 ft wide with 4-ft alleys between plots. Standard soybean production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control, 31 fungicide and/or herbicide foliar treatments or seed treatments. Foliar pesticides were applied using a CO_2-pressurized backpack sprayer equipped with 8001 TurboJet flat fan nozzles, spaced 15 in. apart, and calibrated to deliver 20 gal/A at 28 PSI. Pesticides were applied at growth stages V1, V5, R1, R3, R4 or a combination of V5 and R1, V5 and R3, and R1 and R3. Natural sources of pathogen inoculum were relied upon for disease. Supplemental inoculum was also sprayed on plants using a mister blower sprayer to apply pathogen mycelial fragments at R3. Plots were mist-irrigated for 5-10 minutes every hour between 8pm and 12am each day during growth stages R1 to R4. Disease was evaluated at growth stage R6 using the Sclerotinia stem rot severity index (DSI). DSI was determined by rating 30 arbitrarily selected plants in each plot and scoring plants on a 0-3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on mainstem with little effect on pod fill; 3 = infection on mainstem resulting in death or poor pod fill. The scores of the 30 plants were totaled and divided by 0.9. Yield was determined by harvesting the center 4 rows of each plot using a small-plot combine. All disease and yield data were analyzed using a mixed model analysis of variance and means were separated using Fisher's least significant difference (P=0.05).

Weather was very wet at planting and then turned very dry during flowering, which resulted in very low levels of Sclerotinia stem rot. No significant differences in DSI were identified among all treatments (Table 8). Lowest yield was recorded in plots treated with Cobra at R1. Yield was similar in plots treated with Cercobin at R3 and Endura at R1 (8 oz); however, these treatments were not significantly different from plots not treated. All other treatments resulted in yield significantly higher than plots treated with Cobra at R1, but were not different from the non-treated check. Phytotoxicity was identified in plots treated with Cobra. Significant leaf damage was noted 1 week after application, but plants eventually grew out of the damage.

Table 8. Sclerotinia stem rot severity and yield of soybeans treated with various foliar and seed applied fungicides

Treatment and Rate (Crop Growth Stage at Application)	Sclerotinia stem rot DSI (R6)[z]	Yield (bu/a)
Cobra 2EC 6.0 fl oz/a + COC 1.0% v/v (R1)	0.0	45.1 g[y]
Cercobin 31.0 fl oz/a (R3)	0.0	51.4 fg
Endura 70WG 8.0 oz/a + Induce 90SL 0.25% v/v (R1)	0.0	52.3 efg
Cobra 6.0 2EC fl oz/a + Endura 8.0 oz/a + COC 1.0% v/v (R1)	0.0	54.5 def
Endura 70WG 6.0 oz/a + Induce 90SL 0.25% v/v (R1)	0.8	55.3 def
Aproach 2.08SC 9.0 fl oz/a + Induce 90SL 0.25% v/v (V5) Endura 70WG 8.0 oz/a (R1)	1.4	55.9 cf
HeadsUp Foliar Application 2.6 oz/a (V1)	2.2	56.5 cf
HeadsUp Seed Treatment 0.005 oz/cwt (seed)	1.7	56.5 cf
Omega 500F 0.75 pt/a + Induce 90 SL 0.25% v/v (R1)	0.0	56.6 cf
HeadsUp Seed Treatment 0.01 oz/cwt (seed)	0.0	56.8 cf
HeadsUp Seed Treatment 0.02 oz/cwt OVER CruiserMaxx 2.95 fl oz/cwt (seed)	0.0	57.2 bf
Topsin 4.5FL 21.3 fl oz/a (R3)	0.0	57.4 bf
HeadsUp Seed Treatment 0.0.005 oz/cwt + CruiserMaxx 2.95 fl oz/cwt (seed)	0.0	57.8 bf
CruiserMaxx 2.95 fl oz/cwt (seed)	0.0	58.0 bf
HeadsUp Seed Treatment 0.01 oz/cwt + CruiserMaxx 2.95 fl oz/cwt	0.8	58.9 bf
Endura 70WG 8.0 oz/a + Induce 90SL 0.25% v/v (R5)	0.0	59.0 bf
Aproach 2.08SC 9.0 fl oz/a + Induce 90SL 0.25% v/v (R1)	0.8	59.1 bf
Non-treated check	0.0	60.0 bf
Proline 480SC 5.0 fl oz/a (R1) Stratego YLD 5.0 fl oz/a + Induce 90SL 0.25% v/v (R3)	2.2	60.7 abce
Aproach 2.08SC 9.0 fl oz/a + Induce 90SL 0.25% v/v (V5) Endura 8.0 oz/a (R3)	4.7	61.1 abce
HeadsUp Seed Treatment 0.02 oz/cwt (seed)	0.8	61.5 abcd
Endura 8.0 oz/a + Induce 90SL 0.25% v/v (R4)	0.0	61.8 abcd
Cercobin 4.1FL 23.4 fl oz/a + Topguard 1.04SC 10.0 fl oz/a (R3)	1.7	61.9 abcd
Endura 6.0 fl oz/a + Induce 90SL 0.25% v/v (R1) Priaxor 4.17SC 4.0 fl oz/a + Induce 90SL 0.25% v/v (R3)	0.8	62.0 abcd
Proline 480SC 3.0 fl oz/a (R1) Stratego YLD 5.0 fl oz/a + Induce 90SL 0.25% v/v (R3)	1.7	62.1 abcd
Topsin 4.5FL 28.4 fl oz/a (R3)	0.0	62.2 abcd
Omega 500F 0.75 pt/a + Induce 90SL 0.25% v/v (R1) Quilt Xcel 2.2SE 10.5 fl oz/a + Induce 90SL 0.25% v/v (R3)	0.0	62.6 abcd
Aproach 2.08SC 9.0 fl oz/a + Induce 90SL 0.25% v/v (R3)	2.0	64.5 abc
Endura 6.0 oz/a + Priaxor 4.17SC 4.0 fl oz/a + Induce 90SL 0.25 % v/v (R1)	2.0	64.8 abc
Endura 8.0 oz/a + Induce 90SL 0.25 % v/v (R3)	0.0	65.3 abc
Cercobin 4.1FL 23.4 fl/oz/a (R3)	0.0	65.4 abc
Cercobin 4.1FL 31.0 fl oz/a (R1)	0.0	66.2 ab
LSD (α=0.05)	ns	9.0

[z]Sclerotinia stem rot DSI was generated by rating 30 arbitrarily selected plants in each plot and scoring plants with on a 0-3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on mainstem with little effect on pod fill; 3 = infection on mainstem resulting in death or poor pod fill. The scores of the 30 plants were totaled and divided by 0.9.

[y]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05)

Evaluation of 'curative' fungicide treatments for control of Sclerotinia stem rot of soybean in Wisconsin, 2014

SOYBEAN (*Glycine max* 'AG2031')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

The trial was established at the Hancock Agricultural Research Station located in Hancock, WI. The soybean cultivar 'AG2031' was chosen for this study. Soybeans were planted in mid-May 2014 in a field with a Sparta loamy sand soil (0 to 2 percent slopes). The field was overhead irrigated as needed to prevent wilt. The experimental design was a randomized complete block with four replicates. Plots consisted of four 30-in. spaced rows, 20 ft long and 10 ft wide with no alleys between plots. Standard soybean production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and two fungicide treatments. Fungicides were applied using a CO_2-pressurized backpack sprayer equipped with 8001 TurboJet flat fan nozzles, spaced 15 in. apart, and calibrated to deliver 20 GPA. Sclerotinia stem rot severity was rated at growth stage R5 on 21 Aug and fungicides were applied on the same day. Sclerotinia stem rot severity was again evaluated at growth stage R6 (4 Sep). Sclerotinia stem rot severity index (DSI) was determined by rating 30 arbitrarily selected plants in each plot and scoring plants on a 0-3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on mainstem with little effect on pod fill; 3 = infection on mainstem resulting in death or poor pod fill. The scores of the 30 plants were totaled and divided by 0.9. Natural sources of pathogen inoculum were relied upon for disease. Yield was determined by harvesting the center two rows of each plot using a small-plot combine. All disease and yield data were analyzed using a mixed model analysis of variance (P=0.05).

Weather was very wet and cool for the entire season. Levels of Sclerotinia stem rot were moderate at the time of fungicide application (Table 9). No fungicide application resulted in a significant reduction in Sclerotinia stem rot at the R6 growth stage. No significant differences in yield were identified among treatments. Applying fungicide at the R5 growth stage did not result in any control of Sclerotinia stem rot or a yield advantage in this trial. Phytotoxicity was not observed with any treatments in this trial.

Table 9. Sclerotinia stem rot severity and yield of soybean treated with Aproach and Endura fungicides

Treatment and Rate/Acre (Crop Growth Stage at Application)	Sclerotinia Stem Rot DSI (R5)[z]	Sclerotinia Stem Rot DSI (R6)[z]	Yield (bu/a)
Non-treated check	42.3	55.3	40.3
Aproach 2.08SC 9.0 fl oz (R5)	56.7	70.6	40.1
Endura 70WDG 8.0 fl oz (R5)	52.8	63.6	38.7
LSD (α=0.05)	--	ns	ns

[z]Sclerotinia stem rot DSI was generated by rating 30 arbitrarily selected plants in each plot and scoring plants with on a 0-3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on mainstem with little effect on pod fill; 3 = infection on mainstem resulting in death or poor pod fill. The scores of the 30 plants were totaled and divided by 0.9.

Evaluation of HeadsUp Seed Treatment for control of Sclerotinia stem rot of soybean under controlled conditions

SOYBEAN (*Glycine max* 'AG2031')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

This trial was established in a walk-in growth chamber located in Russell Laboratories on the campus of the University of Wisconsin-Madison. Seed treatments were applied to the soybean cultivar 'AG2031' prior to planting. All treatments were planted in 6-in. plastic pots containing soilless growing media. Plants were grown to the V4 growth stage prior to inoculation. Inoculum was applied on 29 Oct 2014. Inoculation consisted of cutting the petiole of the second trifoliate leaf to a length of 1 in. Inoculum was then applied to the cut petiole using an inverted 1000-ml pipette tip that had been pressed into a Petri dish containing Potato dextrose agar with 3-day old growth of *Sclerotinia sclerotiorum.* Plants were maintained at 22C with a 14hr/10hr light/dark period. Plants were monitored for mainstem lesion formation for 9 days after inoculation. Visible lesions on mainstems were measured using a digital caliper. Lesion length data over time were used to calculate the area under the disease progress curve (AUDPC). AUDPC and final lesion length (day 9) data were analyzed using a mixed model analysis of variance and means were separated using Fisher's least significant difference (α=0.05).

No significance differences in AUDPC or final lesion length were identified among all treatments. No phytotoxicity was identified for any treatments (Table 10).

Table 10. Area under the disease progress curve (AUDPC) and final lesion length on soybeans with seed treatment and inoculated with *Sclerotinia sclerotiorum*

Treatment and Rate	AUDPC (disease-hours)[z]	Final Lesion Length (mm)[y]
HeadsUp Seed Treatment 0.02 oz/cwt	4058.8	60.1
HeadsUp Seed Treatment 0.02 oz/cwt OVER CruiserMaxx 2.95 fl oz/cwt	4999.1	71.1
HeadsUp Seed Treatment 0.01 oz/cwt + CruiserMaxx 2.95 fl oz/cwt	5639.4	80.3
Non-treated check	5733.0	77.0
HeadsUp Seed Treatment 0.0.005 oz/cwt + CruiserMaxx 2.95 fl oz/cwt	6541.3	85.2
CruiserMaxx 2.95 fl oz/cwt	6921.9	95.4
HeadsUp Seed Treatment 0.01 oz/cwt	7187.2	91.0
HeadsUp Seed Treatment 0.0.005 oz/cwt	7786.2	95.4
LSD (α=0.05)	ns	ns

[z]Area under the disease progress curve (AUDPC) was calculated based on mainstem lesion measurements from days 4 to 9 after inoculation with *Sclerotinia sclerotiorum*.
[y]Final mainstem lesion length was taken on day 9 after inoculation with *Sclerotinia sclerotiorum*.

Evaluation of foliar fungicides for control of diseases of wheat in Wisconsin, 2014

WHEAT, SOFT WINTER (*Triticum aestivum* 'Kaskaskia')
Leaf blotch; *Septoria tritici*
Fusarium head blight; *Fusarium graminearum*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The soft red winter wheat cultivar 'Kaskaskia' was chosen for this study. Wheat was planted on 26 Sep 2013 in a field with a Plano silt loam soil (2 to 6 percent slopes). The experimental design was a randomized complete block with four replicates. Plots were 21 ft long and 7.5 ft wide with 4-ft alleys between plots. Standard wheat production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 13 fungicide treatments. All fungicide treatments contained the non-ionic surfactant Induce 90% SL at 0.125% v/v. Fungicides were applied using a CO_2 pressurized backpack sprayer equipped with TTJ60-11002 Turbo TwinJet flat fan nozzles calibrated to deliver 20 gal/A. Fungicides were used to target general wheat disease in the area. Fungicides were applied either just before jointing (Feekes 5), at emerging flag leaf (Feekes 8), at anthesis (Feekes 10.5.1), or using two sprays with the first occurring just prior to jointing (20 May) or at emerging flag leaf (31 May) and the second spray being applied at anthesis (6 Jun). Natural sources of pathogen inoculum were relied upon for disease and plots were also inoculated with a spore suspension ($1.3x10^4$ spores/fl.oz. @ 20 gal/A) of *Fusarium graminearum* 7 Jun. Leaf disease severity (0-100%) was rated on 10 arbitrary plants in each plot on 23 Jun with the assistance of a standard area diagram. A lower leaf and flag leaf were evaluated for each plant. Fusarium head blight was evaluated at the same time by visually estimating average incidence and severity. The FHB index was calculated by multiplying incidence by severity and dividing by 100. Level of deoxynivalenol (DON) was also evaluated in grain harvest from each treatment. All disease and yield data were analyzed using a mixed model analysis of variance and means were separated using Fisher's least significant difference (P=0.05).

Weather in spring 2014 was cool and rainy before transitioning to warmer and drier conditions near wheat head emergence. Leaf disease incidence and severity was low in this trial (Table 11). No powdery mildew was observed. Septoria leaf blotch was the primary leaf disease. No significant difference in level of Septoria leaf blotch was identified among treatments in the lower canopy or on flag leaves. Visible levels of Fusarium head blight were low in the trial. No significant differences in the FHB index were identified among treatments. However, significant difference in levels of DON were identified among treatments. All plots that received fungicide at the Feekes 10.5.1 application timing had significantly lower levels of DON than plots that were not treated with fungicide, except where Stratego YLD at 5.0 fl oz was applied at Feekes 8 followed by Prosaro at 6.5 fl oz at Feekes 10.5.1. All other treatments of fungicide did not significantly reduce levels of DON compared to the non-treated control. All treatments where fungicide was applied at Feekes 10.5.1 had significantly higher yield than the non-treated control, except plots that received an application of Stratego YLD at Feekes 8 followed by Prosaro at Feekes 10.5.1. Yield in all other treatments was not significantly different from the non-treated control. These results indicate that despite lack of visible evidence of Fusarium head blight, the disease was active and caused elevated levels of DON and reduced yields. Application of fungicide at the Feekes 10.5.1 timing improved seed quality and yield at this research location in 2014. Phytotoxicity was not observed for any treatment.

Table 11. Leaf and head disease severity, DON content, test weight, and yield of wheat treated with various foliar fungicides

Treatment and Rate/Acre (Crop Growth Stage at Application)[z]	Leaf Blotch Severity Lower Canopy (%)	Leaf Blotch Severity Flag Leaf (%)	FHB Index[y]	DON content (ppm)	Test weight (lbs/bu)	Yield (bu/a)
Headline 2.08SC 6.0 fl oz (Feekes 5)	30.2	3.3	0.4	3.7 ab[x]	60.7	99.0 e[x]
Non-treated check	28.8	2.5	0.3	3.3 bd	61.0	101.3 de
Stratego YLD 500SC 5.0 fl oz (Feekes 8)	20.0	0.0	0.1	4.1 a	60.4	102.5 de
Headline 2.08SC 6.0 fl oz (Feekes 8)	23.8	1.3	0.6	3.5 bc	61.2	102.5 ce
Aproach 2.08SC 6.0 fl oz (Feekes 8)	31.3	1.9	0.3	3.4 bd	60.4	102.5 ce
Prosaro 421SC 6.5 fl oz (Feekes 8)	20.0	0.0	1.0	3.4 bd	61.5	102.8 ce
Quilt Xcel 2.2SE 10.5 fl oz (Feekes 8)	22.5	2.5	0.3	3.5 bc	61.4	103.5 bcd
Stratego YLD 500SC 5.0 fl oz (Feekes 8) fb Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	16.7	0.2	0.8	2.8 de	61.4	104.0 acd
Stratego YLD 500SC 2.0 fl oz (Feekes 5) fb Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	20.0	0.6	0.3	2.6 ef	61.6	105.3 acd
Priaxor 4.17SC 2.0 fl oz (Feekes 5) fb Caramba 90EC 13.5 fl oz (Feekes 10.5.1)	22.5	0.0	0.3	2.0 f	61.1	106.4 ac
Quilt Xcel 2.2SE 8.0 fl oz (Feekes 8) fb Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	13.3	0.2	0.1	2.7 e	61.4	107.1 ab
Headline 2.08SC 6.0 fl oz (Feekes 8) fb Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	19.6	0.0	0.0	3.0 cde	61.8	107.2 ab
Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	21.8	0.0	0.1	2.4 ef	61.2	107.3 ab
Aproach 2.08SC 6.5 fl oz (Feekes 8) fb Prosaro 421SC 6.5 fl oz (Feekes 10.5.1)	13.8	0.6	0.3	2.5 ef	61.2	107.9 a
LSD (α=0.05)	ns[w]	ns[w]	ns[w]	0.6	ns[w]	4.2

[z]Induce 90% SL (Non-ionic surfactant) at 0.125% v/v was added to all fungicide treatments.
[y]FHB index = (Fusarium head blight incidence x Fusarium head blight severity)/100
[x]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05)
[w]ns=not significant