Wisconsin Field Crops Pathology Fungicide Test and Disease Management Summary

2023

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Trial 1: Evaluation of hybrid and foliar fungicides for control of tar spot of dent corn in Arlington, Wisconsin, 2023-Experiment #1

DENT CORN (*Zea mays* 'W2585VT2P', 'P0589AMXT')
Tar spot; *Phyllachora maydis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrids 'W2585VT2P'(susceptible) and 'P0589AMXT'(resistant) were chosen for this trial. Corn preceded this crop. Corn was planted on 28 April in a field consisting of Plano silt loam (0 to 6% slopes). The experimental design was a 2 x 6 factorial arranged in a randomized complete block with 3 replicates. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys between plots. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of one non-treated check and six fungicide treatments for each hybrid. Fungicides were applied using a CO_2-pressurized backpack sprayer equipped with 8002XR TurboJet flat fan nozzles on a 10-ft boom calibrated to deliver 20 GPA at 40 psi. Treatments were applied at growth stages V10 on 14 Jul, R1 (silk) on 31 Jul, and R2 (blister) on 16 Aug, and R4 (dough) on 28 Aug. Two treatments were applied at V10 and R1 with guidance of the Tarspotter smartphone application. Natural sources of pathogen inoculum were relied upon for disease. Tar spot severity was rated at late R5 on 27 Sep. Tar spot was visually assessed by estimating average severity (% stroma on five ear leaves) per plot with the aid of standardized area diagrams. Yield (corrected to 15.5% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge. Data were analyzed using a mixed model analysis of variance and treatment means were separated within each hybrid using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. The unfavorable conditions led to very low levels of tar spot observed in this trial. Applications of Delaro Complete at V10, R1, R4, and Model had significantly lower tar spot severity compared to the non-treated check for the W2585VT2P hybrid (Table1). There was no significant interaction in fungicide application timing and hybrids for canopy greening, however, P0589AMXT hybrid had significantly higher canopy greening than the hybrid W2585VT2P. Regardless of hybrid, there was no significant differences in yield among any treatments. Phytotoxicity was not observed for any treatment.

Table 1. Tar spot severity, canopy greening, and yield for dent corn treated with fungicide or not treated with fungicide in Wisconsin in 2023.

Hybrid	Treatment and rate/A (growth stage at application)	Tar spot Severity (%)^{z,y}	Canopy Greening (%)^{x}	Yield (bu/A)
W2585VT2P	Non-treated Check	0.05 b	70.0	267.2
	Delaro Complete 3.83SC 8.0 fl oz (V10)	0.01 a	56.7	250.7
	Delaro Complete 3.83SC 8.0 fl oz (R1)	0.00 a	60.0	254.8
	Delaro Complete 3.83SC 8.0 fl oz (R2)	0.05 b	60.0	247.1
	Delaro Complete 3.83SC 8.0 fl oz (R4)	0.00 a	66.7	249.8
	Delaro Complete 3.83SC 8.0 fl oz (Model)^{w}	0.00 a	56.7	255.5
P0589AMXT	Non-treated Check	0.01 a	73.3	238.0
	Delaro Complete 3.83SC 8.0 fl oz (V10)	0.01 a	73.3	237.8
	Delaro Complete 3.83SC 8.0 fl oz (R1)	0.00 a	80.0	248.9
	Delaro Complete 3.83SC 8.0 fl oz (R2)	0.03 a	80.0	247.2
	Delaro Complete 3.83SC 8.0 fl oz (R4)	0.00 a	83.3	239.1
	Delaro Complete 3.83SC 8.0 fl oz (Model)^{w}	0.01 a	73.3	242.8
	P-value	<0.05	ns^{v}	ns

^{z}Tar spot severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.
^{y}Means followed by the same letter are not significantly different within each hybrids based on Fisher's Least Significant Difference (LSD; α=0.05).
^{x}Canopy greening effect determined by rating the percentage green foliage still present in each plot at black layer.
^{w}Model application sprays were determined using the Tarspotter smartphone application which recommended applications at V10 and again at R1.
^{v}ns = not significant (α=0.05).

Trial 2: Evaluation of in-furrow and foliar fungicides for control of tar spot of dent corn in Arlington, Wisconsin, 2023- Experiment #2

DENT CORN (*Zea mays* 'CP3899VT2P/RIB')
Tar spot; *Phyllachora maydis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'CP3899VT2P/RIB' was planted 27 Apr, behind corn, no-till, in a field consisting of a Plano silt loam soil (2 to 6% slopes). The trial was arranged in a randomized complete block design with four replications. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 11 fungicide treatments. Some treatments applied at R1 were mixed with the non-ionic surfactant, Induce 90SL, at 0.125% and 0.25% v/v. Foliar fungicides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles on a 10 ft boom calibrated to deliver 20 GPA at 40 psi. At-plant application equipment was calibrated to deliver 5 GPA at 16 psi. Treatments were applied at plant on 27 Apr and R1 (silk) on 28 Jul. One treatment was applied at V10 on 14 Jul followed by R1. Natural sources of pathogen inoculum were relied upon for disease. Tar spot severity was rated late R5 on 27 Sep. Tar spot was visually assessed by estimating average severity (% stroma on ear leaf) per plot with the aid of standardized area diagrams. Yield (corrected to 15.5% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. The unfavorable conditions led to very low levels of tar spot observed in this trial. There were no significant differences in canopy greening, Tar Spot severity, yield among all treatments (Table 2). Phytotoxicity was not observed for any treatment.

Table 2. Canopy greening, tar spot severity, and yield for dent corn treated with fungicide or not treated with fungicide in Wisconsin in 2023.

Treatment and rate/A (growth stage at application)	Canopy Greening (%)[z]	Tar Spot Severity (%)[y]	Yield (bu/A)
Non-treated control	31.3	0.01	215.3
Xyway LFR 15.2 fl oz (Furrow jet at plant)	31.3	0.02	244.1
Lucento 4.17SC 5.0 fl oz (R1)[x]	37.5	0.02	251.8
Adastrio 4.0SC 8.0 fl oz (R1)[x]	37.5	0.02	256.4
Topguard 1.04SC 10 fl oz (V10) Adastrio 4.0SC 8.0 fl oz (R1)[x]	32.5	0.03	235.9
Topguard EQ 4.29SC 5.0 fl oz (R1)[x]	38.8	0.03	239.7
Delaro Complete 3.83SC 8.0 fl oz (R1)[w]	40.0	0.01	253.4
Regev 8.5 fl oz (R1)[x]	33.8	0.04	225.8
Timorex ACT 29.8 fl oz (R1)[x]	41.3	0.03	240.5
Affiance 1.5SC 10.0 fl oz (R1)	40.0	0.02	228.1
Veltyma 3.34SC 7.0 fl oz (R1)	38.8	0.02	251.4
Miravis Neo 2.5SE 13.7 fl oz (R1)	33.8	0.01	227.2
P-value	ns[v]	ns	ns

[z] Canopy greening effect determined by rating the percentage green foliage still present in each plot at black layer.
[y]Tar spot severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[x]Induce 90% SL (Non-ionic surfactant) at 0.25% v/v was added to fungicide treatments.
[w]Induce 90% SL (Non-ionic surfactant) at 0.125% v/v was added to fungicide treatments.
[v]ns= not significant (α=0.05).

Trial 3: Evaluation of foliar fungicides for control of tar spot of dent corn in Arlington, Wisconsin, 2023- Experiment #3

DENT CORN (*Zea mays* 'CP3899VT2P/RIB')
Tar spot; *Phyllachora maydis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'CP3899VT2P/RIB' was planted 9 May, behind corn, no-till, in a field consisting of a Plano silt loam soil (2 to 6% slopes). The trial was arranged in a randomized complete block design with four replications. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 11 fungicide treatments. Treatments were mixed with the non-ionic surfactant, Induce 90SL, at 0.25% v/v. Foliar fungicides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles on a 10 ft boom calibrated to deliver 20 GPA at 40 psi. Treatments were applied at growth stages R1 (silk) on 27 Jul and R3 (milk) on 16 Aug. Natural sources of pathogen inoculum were relied upon for disease. Tar spot severity was rated late R5 on 27 Sep. Tar spot was visually assessed by estimating average severity (% stroma on ear leaf) on five leaves per plot with the aid of standardized area diagrams. Yield (corrected to 15.5% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. The unfavorable conditions led to very low levels of tar spot observed in this trial. There were no significant differences among treatments for canopy greening, Tar Spot severity, and yield (Table 3). Phytotoxicity was not observed for any treatment.

Table 3. Canopy greening, tar spot severity, and yield for dent corn treated with fungicide or not treated with fungicide in Wisconsin in 2023.

Treatment and rate/A (growth stage at application)[z]	Canopy Greening (%)[y]	Tar Spot Severity (%)[x]	Yield (bu/A)
Non-treated control	26.3	0.00	226.8
Veltyma 3.34S 7.0 fl oz (R1)	31.3	0.01	204.8
Miravis Neo 2.5SE 13.7 fl oz (R1)	35.0	0.01	232.0
Delaro Complete 3.83SC 8.0 fl oz (R1)	32.5	0.01	212.4
Headline AMP 1.68SC 10.0 fl oz (R1)	31.3	0.00	226.1
Veltyma 3.34S 7.0 fl oz (R1) Headline AMP 1.68SC 10.0 fl oz (R3)	35.0	0.00	216.2
Miravis Neo 2.5SE 13.7 fl oz (R1) Headline AMP 1.68SC 10.0 fl oz (R3)	33.8	0.00	209.8
Delaro Complete 3.83SC 8.0 fl oz (R1) Headline AMP 1.68SC 10.0 fl oz (R3)	33.8	0.00	219.4
Headline AMP 1.68SC 10.0 fl oz (R1) Veltyma 3.34S 7.0 fl oz (R3)	32.5	0.01	220.3
Headline AMP 1.68SC 10.0 fl oz (R1) Miravis Neo 2.5SE 13.7 fl oz (R3)	36.3	0.01	271.6
Headline AMP 1.68SC 10.0 fl oz (R1) Delaro Complete 3.83SC 8.0 fl oz (R3)	36.3	0.00	224.8
Headline AMP 1.68SC 10.0 fl oz (R1) Headline AMP 1.68SC 10.0 fl oz (R3)	31.3	0.00	201.0
P-value	ns[w]	ns	ns

[z]Induce 90% SL (Non-ionic surfactant) at 0.25% v/v was added to all fungicide treatments.
[y]Canopy greening effect determined by rating the percentage green foliage still present in each plot at black layer.
[x]Tar spot severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[w]ns=not significant (α=0.05).

Trial 4: Evaluation of foliar fungicides for control of tar spot of dent corn in Arlington, Wisconsin, 2023- Experiment #4

DENT CORN (*Zea mays* 'CP3899VT2P/RIB')
Tar spot; *Phyllachora maydis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'CP3899VT2P/RIB' was planted 28 Apr, behind corn, no-till, in a field consisting of a Plano silt loam soil (2 to 6% slopes). The trial was arranged in a randomized complete block design with four replications. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of a non-treated control and 10 fungicide treatments. Foliar fungicides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles on a 10 ft boom calibrated to deliver 20 GPA at 40 psi. Treatments were applied at growth stage R1 (silk) on 27 Jul. Natural sources of pathogen inoculum were relied upon for disease. Tar spot severity was rated late R5 on 27 Sep. Tar spot was visually assessed by estimating average severity (% stroma on ear leaf) per plot with the aid of standardized area diagrams. Yield (corrected to 15.5% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. The unfavorable conditions led to very low levels of tar spot observed in this trial. There were no significant differences among treatments for canopy greening, Tar Spot severity, and yield (Table 4). Phytotoxicity was not observed for any treatment.

Table 4. Canopy greening, tar spot severity, and yield for dent corn treated with fungicide or not treated with fungicide in Wisconsin in 2023.

Treatment and rate/A (growth stage at application)	Canopy Greening (%)[z]	Tar Spot Severity (%)[y]	Yield (bu/A)[y]
Non-treated control	29.4	0.04	258.9
Veltyma 3.34SC 7.0 fl oz (R1)	32.5	0.01	261.9
Delaro Complete 3.83SC 8.0 fl oz (R1)	31.3	0.00	249.9
Aproach Prima 2.34SC 6.8 fl oz (R1)	26.3	0.01	255.5
Adastrio 4.0SC 8.0 fl oz (R1)	28.8	0.02	256.5
Miravis Neo 2.5SE 13.7 fl oz (R1)	33.8	0.00	255.1
Trivapro 2.21SC 13.7 FL OZ/A (R1)	31.3	0.00	256.0
Headline AMP 1.68SC 10.0 fl oz (R1)	25.0	0.01	257.7
Proline 480SC 5.7 fl oz (R1)	32.5	0.02	263.5
Quadris 2.08SC 6.0 fl oz (R1)	27.5	0.01	262.1
Tilt 3.6EC 4.0 fl oz (R1)	32.5	0.01	270.3
P-value	ns[x]	ns	ns

[z]Canopy greening effect determined by rating the percentage green foliage still present in each plot at black layer.
[y]Tar spot severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[x]ns= not significant (α=0.05).

Trial 5: Evaluation of foliar fungicides for control of tar spot and ear rot on silage corn in Arlington, Wisconsin, 2023.

SILAGE CORN (*Zea mays* 'B10B77SX')
Ear rot; *Gibberella zeae*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'B10B77SX' (110-day relative maturity brown midrib hybrid) was chosen for this trial. Soybean preceded this crop. Corn was planted on 3 May in a field consisting of a Plano silt loam soil (0 to 2% slopes) and Joy silt loam soil (0 to 4% 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 corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of one non-treated check and 14 fungicide treatments. Fungicides were applied using a CO_2-pressurized backpack sprayer equipped TeeJet XR 8002-VS flat fan nozzles on a 10-ft boom calibrated to deliver 20 GPA at 40 psi. Treatments were applied at growth stages V5 (16 Jun) followed by R1 (26 Jul), V14 (21 Jul), and R1 alone. Plots were infested at a rate of 25 lbs/A of *Fusarium graminearum*-colonized corn grain at VT. Ear rot was rated at the R5.5 growth stage (20 Sep). Tar spot was visually assessed by estimating average severity (% ear leaf with symptoms) on 5 leaves per plot with the aid of a standardized area diagram. Ear rot severity was assessed by visually rating five ears per plot in the center two rows with the aid of a standardized area diagram. Yield was determined by harvesting the center two rows of each plot using a small plot silage chopper with an onboard platform weigh system. Chopped sub-samples were collected from each plot and analyzed for quality total-tract neutral detergent fiber digestibility (TTNDFD), deoxynivalenol (DON) content, Fumonisin B1, and T2 toxin. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. Due to unfavorable conditions, no ear rot was observed in this trial. There were no significant differences in yield, TTNDFD, DON, Fumonisin B1, and T2 toxin among all treatments (Table 5). Phytotoxicity was not observed for any treatment.

Table 5. Yield, TTNDFD, deoxynivalenol (DON), fumonisin B1, and T2 toxin silage corn treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment and rate/A (growth stage at application)	Yield (tons dry matter/A)	TTNDFD[z]	DON (ppm)[y]	Fumonisin B1 (ppm)[x]	T2 Toxin (ppb)[w]
Non-treated check	12.2	33.7	0.3	0.3	60.4
Miravis Neo 2.5SE 13.7 fl oz (V14)	11.9	35.4	0.1	0.2	43.7
Trivapro 2.21EC 13.7 fl oz (V14)	12.1	36.3	0.2	0.4	40.2
Miravis Neo 2.5SE 13.7 fl oz (R1)[v]	12.3	36.2	0.4	0.2	44.5
Trivapro 2.21EC 13.7 fl oz (R1)[v]	11.3	31.6	0.2	0.4	37.5
Veltyma 3.34SC 7.0 fl oz (R1)[v]	11.7	31.8	0.3	0.2	49.1
Delaro Complete 3.83SC 8.0 fl oz (R1)[v]	11.4	35.5	0.1	0.2	41.1
Miravis Neo 2.5SE 13.7 fl oz (V5 + R1)[v]	11.8	38.1	0.2	0.2	58.6
Proline 5.7 fl oz (R1)[v]	11.5	34.7	0.2	0.3	42.0
Delaro Complete 3.83SC 12.0 fl oz (R1)[v]	12.0	38.6	0.4	0.2	51.9
Prosaro Pro 400SC 10.3 fl oz (R1)[v]	11.5	32.8	0.2	0.4	40.2
Headline AMP 14.4 fl oz (R1)[v]	11.8	32.7	0.2	0.3	39.2
Revytek 3.33LC 8.0 fl oz (R1)[v]	11.0	33.0	0.1	0.3	45.1
Quilt Xcel 2.2SE 14.0 fl oz (R1)[v]	11.5	34.2	0.2	0.4	45.3
Headline AMP 14.4 fl oz (R1)[v] + Proline 5.7 fl oz (R1)[v]	12.3	34.5	0.2	0.3	36.5
P-value	ns[u]	ns	ns	ns	ns

[z]Total-Tract Neutral Detergent Fiber Digestibility
[y]Deoxynivalenol (DON) content were analyzed for each plot; means for each plot were used in the analysis.
[x]Fumonisin B1 content were analyzed for each plot; means for each plot were used in the analysis.
[w]T2 Toxin content were analyzed for each plot; means for each plot were used in the analysis.
[v]Treatments including the non-ionic surfactant Induce 90SL at 0.25 %v/v
[u]ns = not significant (α=0.05)

Trial 6: Evaluation of in-furrow and foliar fungicides for control of ear rot on silage corn in Arlington, Wisconsin, 2023.

SILAGE CORN (*Zea mays* 'B10B77SX')
Ear rot; *Gibberella zeae*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrid 'B10B77SX' (110-day relative maturity brown midrib hybrid) was chosen for this trial. Soybean preceded this crop. Corn was planted on 3 May in a field consisting of a Plano silt loam soil (0 to 2% slopes) and Joy silt loam soil (0 to 4% 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 corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of one non-treated check and 10 fungicide treatments. Fungicides were applied using a CO_2-pressurized backpack sprayer equipped TeeJet XR 8002-VS flat fan nozzles on a 10-ft boom calibrated to deliver 20 GPA at 40 psi. At-plant application equipment was calibrated to deliver 5 GPA at 16 psi. Treatments were applied at plant on 3 May, at plant followed by V8 on 30 May or R1 on 26 Jul, V8 followed by R1, and V8 or R1 alone. Plots were infested at a rate of 25 lbs/A of *Fusarium graminearum*-colonized corn grain at VT. Ear rot was rated at the R5.5 growth stage (20 Sep). Ear rot severity was assessed by visually rating five ears per plot in the center two rows with the aid of a standardized area diagram. Yield was determined by harvesting the center two rows of each plot using a small plot silage chopper with an onboard platform weigh system. Chopped sub-samples were collected from each plot and analyzed for quality total-tract neutral detergent fiber digestibility (TTNDFD), deoxynivalenol (DON) content, Fumonisin B1, and T2 toxin. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. Due to unfavorable conditions, no ear rot was observed in this trial. There were no significant differences in yield, TTNDFD, DON, Fumonisin B1, and T2 toxin among all treatments (Table 6). Phytotoxicity was not observed for any treatment.

Table 6. Yield, TTNDFD, deoxynivalenol (DON), fumonisin B1, and T2 toxin silage corn treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment and rate/A (growth stage at application)	Yield (tons dry matter/A)	TTNDFD[z]	DON (ppm)[y]	Fumonisin B1 (ppm)[x]	T2 Toxin (ppb)[w]
Non-treated check	12.3	32.1	0.8	0.4	39.5
Xyway LFR 15.2 fl oz (Furrow jet at plant)	12.3	32.3	0.5	0.4	44.8
Xyway LFR 9.5 fl oz (In-Furrow at plant) Adastrio 4.0SC 7.0 fl oz (R1)[v]	12.5	38.7	0.1	0.3	24.7
Topguard 1.04SC 10.5 fl oz (V8)[v] Adastrio 4.0SC 7.0 fl oz (R1)[v]	12.9	36.4	0.8	0.4	40.3
Xyway LFR 9.5 fl oz (In-Furrow at plant) Topguard 1.04SC 10.5 fl oz (V8)[v]	12.2	39.1	0.2	0.4	33.0
Topguard 1.04SC 14.0 fl oz (V8)[v]	12.7	37.1	0.3	0.4	44.4
Adastrio 4.0SC 8.0 fl oz (R1)[v]	12.6	36.5	0.4	0.5	29.8
Trivapro 2.21SC 13.7 fl oz (R1)[v]	12.5	39.3	0.2	0.4	29.5
Miravis Neo 2.5SE 13.7 fl oz (R1)[v]	12.5	39.5	0.2	0.6	49.8
Veltyma 3.34SC 7.0 fl oz (R1)[v]	12.4	36.6	0.2	0.4	45.7
P-value	ns[u]	ns	ns	ns	ns

[z]Total-Tract Neutral Detergent Fiber Digestibility
[y]Deoxynivalenol (DON) content were analyzed for each plot; means for each plot were used in the analysis.
[x]Fumonisin B1 content were analyzed for each plot; means for each plot were used in the analysis.
[w]T2 Toxin content were analyzed for each plot; means for each plot were used in the analysis.
[v]Treatments including the non-ionic surfactant Induce 90SL at 0.25 %v/v
[u]ns = not significant (α=0.05)

Trial 7: Evaluation of hybrids and foliar fungicides for control of tar spot of sweet corn in Arlington, Wisconsin, 2023

SWEET CORN (*Zea mays* 'GSS3071','GSS2259P','GH6462', 'GH9335')
Tar spot; *Phyllachora maydis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrids 'GSS3071'(susceptible), 'GSS2259P'(resistant), 'GH6462' (susceptible) and 'GH9335'(resistant) were planted (5 May) for this trial in a field consisting of a Plano silt loam soil (0 to 2% slopes) and Joy silt loam (0 to 4% slopes). The experimental design was a 4 x 5 factorial arranged in a randomized complete block with 4 replicates. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of one non-treated check and four fungicide treatments for each hybrid. Treatment applications included Veltyma (7 fl oz/a) at V10 on 6 Jul followed by Headline AMP (10 fl oz/a) at R1 (silk) on 17 Jul, Miravis Neo (13.7 fl oz/a) at V10 followed by Miravis Neo (13.7 fl oz/a) at R1, Tarspotter guided applications of Veltyma (7 fl oz/a) at V10 followed by Headline AMP (10 fl oz/a) at R1 (silk), and Miravis Neo (13.7 fl oz/a) at V10 followed by Miravis Neo (13.7 fl oz/a) at R1. Foliar fungicides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles on a 10 ft boom calibrated to deliver 20 GPA at 40 psi. Natural sources of pathogen inoculum were relied upon for disease. Tar spot severity was rated on 10 Aug. Tar spot was visually assessed by estimating average severity (% stroma on ear leaf) on five leaves per plot with the aid of standardized area diagrams. Marketable ears were harvested by hand from one center row (17.5 ft) of each plot on 10 Aug. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. Due to unfavorable conditions, no tar spot was observed in this trial. There were no significant differences in treatments within each hybrid, however, significant differences in yield among hybrids was observed (Table 7). GH6462 hybrid had significantly higher yield than hybrids GSS3071 and GSS2259P. Phytotoxicity was not observed for any treatment.

Table 7. Tar spot severity and yield for sweet corn hybrids in Wisconsin, 2023.

Hybrid	Tar spot Severity[z]	Marketable yield (Ton/A)[y]
GSS3071	0.0	6.3 b
GSS2259P	0.0	6.6 b
GH6462	0.0	8.1 a
GH9335	0.0	7.2 ab
P-value	ns[x]	<0.01

[z]Tar spot severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.
[y]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05).
[x]ns = not significant (α=0.05).

Trial 8: Evaluation of late planted hybrids and foliar fungicides for control of northern corn leaf blight of sweet corn in Arlington, Wisconsin, 2023

SWEET CORN (*Zea mays* 'GSS3071','GSS2259P','GH6462', 'GH9335')
Northern corn leaf blight; *Setosphaeria turcica*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The corn hybrids 'GSS3071' (susceptible), 'GSS2259P' (resistant), 'GH6462'(susceptible) and 'GH9335' (resistant) were planted (28 Jun) for this trial in a field consisting of a Plano silt loam soil (0 to 2% slopes) and Joy silt loam (0 to 4% slopes). The experimental design was a 4 x 5 factorial arranged in a randomized complete block with 4 replicates. Plots consisted of four 30-in spaced rows, 20 ft long and 10 ft wide with 5-ft alleys. Standard corn production practices as described by the University of Wisconsin Cooperative Extension Service were followed. Treatments consisted of one non-treated check and four fungicide treatments for each hybrid. Foliar fungicides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles on a 10 ft boom calibrated to deliver 20 GPA at 40 psi. Treatments were applied at growth stages V10 on 17 Aug followed by R1 (silk) on 29 Aug or with guidance of the Tarspotter smartphone application at V10 and R1. Natural sources of pathogen inoculum were relied upon for disease. Northern corn leaf blight (NCLB) was visually assessed by estimating average severity (% ear leaf with symptoms) on five leaves per plot with the aid of standardized area diagrams on 29 Sep. Marketable ears were harvested by hand from one center row (17.5 ft) of each plot on 29 Sep. Data were analyzed using a mixed model analysis of variance and means were separated using Fisher's Least Significant Difference (LSD; α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season, however, cooler temperatures and adequate moisture late in the season aided in disease development. Lower levels of NCLB were observed in this trial due to late disease development. There was a significant hybrid by treatment interaction for NCLB severity. For GH6462 the Miravis Neo treatment applied at V10+R1 had severity levels not different from the nontreated check (Table 8). All other treatments within this hybrid had lower levels of NCLB. For all other hybrids, there were no treatment differences in NCLB level. GH6462 hybrid had significantly higher yield (8.7 tons/a) compared to the hybrids GSS3071 (7.6 tons/a), GSS2259P (7.7 tons/a), and GH9335 (7.7 tons/a). Phytotoxicity was not observed for any treatment.

Table 8. Northern corn leaf blight and yield for sweet corn treated with fungicide or not treated with fungicide in Wisconsin in 2023.

Hybrid	Treatment and rate/A (growth stage at application)	NCLB Severity (%)^{y,x}	Yield (Ton/A)
GSS3071	Non-treated control	0.0 a	7.6 a
	Veltyma 3.34S 7.0 fl oz (V10) Headline AMP 1.68SC 10.0 fl oz (R1)	0.0 a	
	Veltyma 3.34S 7.0 fl oz (Model)^{z} Headline AMP 1.68SC 10.0 fl oz (Model)^{z}	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (V10 + R1)	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (Model)^{z}	0.0 a	
GSS2259P	Non-treated control	0.0 a	7.7 a
	Veltyma 3.34S 7.0 fl oz (V10) Headline AMP 1.68SC 10.0 fl oz (R1)	0.0 a	
	Veltyma 3.34S 7.0 fl oz (Model)^{z} Headline AMP 1.68SC 10.0 fl oz (Model)^{z}	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (V10 + R1)	0.3 a	
	Miravis Neo 2.5SE 13.7 fl oz (Model)^{z}	0.0 a	
GH6462	Non-treated control	4.2 b	8.7 b
	Veltyma 3.34S 7.0 fl oz (V10) Headline AMP 1.68SC 10.0 fl oz (R1)	0.0 a	
	Veltyma 3.34S 7.0 fl oz (Model)^{z} Headline AMP 1.68SC 10.0 fl oz (Model)^{z}	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (V10 + R1)	3.7 b	
	Miravis Neo 2.5SE 13.7 fl oz (Model)^{z}	0.4 a	
GH9335	Non-treated control	0.0 a	7.7 a
	Veltyma 3.34S 7.0 fl oz (V10) Headline AMP 1.68SC 10.0 fl oz (R1)	0.0 a	
	Veltyma 3.34S 7.0 fl oz (Model)^{z} Headline AMP 1.68SC 10.0 fl oz (Model)^{z}	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (V10 + R1)	0.0 a	
	Miravis Neo 2.5SE 13.7 fl oz (Model)^{z}	0.3 a	
P-value		<0.05	

^{z}Model application sprays were determined using the Tarspotter smartphone application which recommended applications at V10 and again at R1.

^{y}NCLB severity was visually assessed as the average % ear leaf symptomatic per plot with the aid of a standard area diagram; means for each plot were used in the analysis.

^{x}Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05).

Trial 9: Evaluation of foliar fungicide treatments for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023- Experiment #1

SOYBEAN (*Glycine max* 'Xitavo XO 2501E')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

The trial was established at the Hancock Agricultural Research Station located in Hancock, WI. The soybean cultivar 'Xitavo XO 2501E' was chosen for this study. Soybeans were planted on 23 May in a field with a Plainfield sand (2 to 6% slopes) with a Friendship loam intrusion (0 to 3 % slopes). The trial was planted in a field with history of severe Sclerotinia stem rot. The field was overhead irrigated as needed to prevent drought stress. 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 11 fungicide treatments. Pesticides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles calibrated to deliver 20 GPA at 30 psi. Pesticides were applied at growth stages R1 (20 Jul) or R3 (3 Aug) or at both R1 and R3. Two treatments were applied at R1 and R3 based on guidance from the Sporecaster smartphone application. Sclerotinia stem rot incidence and severity were rated at R6 on 15 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 main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were multiplied by their scale values, totaled, and divided by 0.9. Disease incidence was scored as percentage of symptomatic plants relative to the total stand. The DI and DSI were then combined to calculate the disease index (DIX) where DIX=DI*(Average DSI/3). Yield (corrected to 13% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge on 11 Oct. All disease and yield data were analyzed with SAS PROC GLIMMIX using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Above average temperatures and late canopy closure led to low disease pressure in this trial. No significant differences were observed for Sclerotinia stem rot incidence, DSI, DIX, and yield among all treatments (Table 9). Phytotoxicity was not observed for any treatment.

Table 9. Sclerotinia stem rot disease incidence, Sclerotinia stem rot disease severity index (DSI), DIX, and yield for soybean treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment and rate/A (crop stage at application)	Disease Incidence (%)[z]	Sclerotinia Stem Rot DSI (0-100)[y]	DIX[x]	Yield (bu/A)
Non-treated check	3.2	17.5	3.1	40.7
Affiance 1.5SC 14.0 fl oz (R1)	5.2	35.9	5.0	41.6
Affiance 1.5SC 14.0 fl oz (R3)	2.1	13.9	2.1	41.8
Affiance 1.5SC 10.0 fl oz (R1)	3.0	18.9	3.0	41.3
Affiance 1.5SC 10.0 fl oz (R3)	1.3	11.7	1.4	38.7
Oxidate 5.0L 1.0 % v/v (Model)[w]	2.9	19.6	2.8	45.1
Affiance 1.5SC 10.0 fl oz (Model)[w] Oxidate 5.0L 1.0 % v/v (Model)[w]	2.4	16.4	2.2	44.5
Affiance 1.5SC 10.0 fl oz (R3) Experimental 1 2.5 fl oz (R3)	1.3	9.3	1.3	44.5
Experimental 1 6.0 fl oz (R3) Experimental 2 4.0 fl oz (R3)	5.0	24.9	4.8	42.2
Experimental 1 6.0 fl oz (R3) Experimental 2 6.0 fl oz (R3)	3.7	25.4	3.6	46.1
Affiance 1.5SC 10.0 fl oz (R1) Affiance 1.5SC 10.0 fl oz (R3) Siapton 24.0 fl oz (R3)	7.3	38.7	7.3	44.5
Domark 230ME, 6.0 fl oz (R3) Siapton 24.0 fl oz (R3)	1.4	7.7	1.4	40.7
P-value	ns[v]	ns	ns	ns

[z] Percentage of symptomatic plants relative to the total stand.

[y] 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 main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were totaled for each class and divided by 0.9.

[x] DIX=DI*(Average DSI/3)

[w] Model application sprays at R1 and R3 were determined using the Sporecaster smartphone application.

[v] ns = not significant according to Fisher's least significant difference (α=0.05).

Trial 10: Evaluation of foliar fungicide treatments for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023- Experiment #2

SOYBEAN (*Glycine max* 'Xitavo XO 2501E')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

The trial was established at the Hancock Agricultural Research Station located in Hancock, WI. The soybean cultivar 'Xitavo XO 2501E' was chosen for this study. Soybeans were planted on 23 May in a field with a Plainfield sand (2 to 6% slopes). The trial was planted in a field with history of severe Sclerotinia stem rot. The field was overhead irrigated as needed to prevent drought stress. 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 five fungicide treatments. Treatments were mixed with the non-ionic surfactant, Induce 90SL, at 0.25% v/v. Pesticides were applied using a CO_2-pressurized backpack sprayer equipped TeeJet XR 8002-VS flat fan nozzles calibrated to deliver 20 GPA at 30 psi. Pesticides were applied at R3 on 3 Aug. Sclerotinia stem rot incidence and severity were rated at R6 on 15 Sep. Sclerotinia stem rot severity index (DSI) was determined by rating 30 arbitrarily selected plants in each plot and scoring plants on a 0 to 3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were multiplied by their scale values, totaled, and divided by 0.9. Disease incidence (DI) was scored as percentage of symptomatic plants relative to the total stand. The DI and DSI were then combined to calculate the disease index (DIX) where DIX=DI*(Average DSI/3). Yield (corrected to 13% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge on 11 Oct. All disease and yield data were analyzed with SAS PROC GLIMMIX using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Above average temperatures and late canopy closure led to low disease pressure in this trial. No significant differences were observed for Sclerotinia stem rot incidence, DSI, DIX, and yield among all treatments (Table 10). Phytotoxicity was not observed for any treatment.

Table 10. Sclerotinia stem rot disease incidence, Sclerotinia stem rot disease severity index (DSI), DIX, and yield for soybean treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment and rate/A (crop stage at application)[z]	Disease Incidence (%)[y]	Sclerotinia Stem Rot DSI (0-100)[x]	DIX[w]	Yield (bu/A)
Non-Treated Check	4.3	25.6	4.3	42.2
Regev HBX 8.5 fl oz (R3)	2.2	15.6	2.2	43.5
AVIV 28.0 fl oz (R3)	0.4	3.3	0.4	37.8
Delaro Complete 3.83SC 8.0 fl oz (R3)	0.5	3.1	0.4	39.6
Omega 500F 12.0 fl oz (R3)	1.8	10.0	1.8	38.3
Endura 70WDG 8.0 oz (R3)[v]	1.4	9.8	1.4	44.3
P-value	ns[v]	ns	ns	ns

[z] Induce 90% SL (Non-ionic surfactant) at 0.25% v/v was added to fungicide treatments
[y] Percentage of symptomatic plants relative to the total stand.
[x] Sclerotinia stem rot DSI was generated by rating 30 arbitrarily selected plants in each plot and scoring plants with on a 0 to 3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were totaled for each class and divided by 0.9.
[w] DIX=DI*(Average DSI/3)
[v] ns = not significant (α=0.05).

Trial 11: Evaluation of an herbicide and fungicides for control of Sclerotinia stem rot of soybean in Hancock, Wisconsin, 2023- Experiment #3

SOYBEAN (*Glycine max* 'Xitavo XO 2472E')
Sclerotinia stem rot; *Sclerotinia sclerotiorum*

The trial was established at the Hancock Agricultural Research Station located in Hancock, WI. The soybean cultivar 'Xitavo XO 2501E' was chosen for this study. Soybeans were planted on 23 May in a field with a Sparta loamy sand (0 to 2% slopes). The trial was planted in a field with history of severe Sclerotinia stem rot. The field was overhead irrigated as needed to prevent drought stress. 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 15 fungicide or herbicide treatments. Most fungicide treatments applied at R1 and R3 were mixed with the non-ionic surfactant, Induce 90SL, at 0.25% v/v. Pesticides were applied using a CO_2-pressurized backpack sprayer equipped with TeeJet XR 8002-VS flat fan nozzles calibrated to deliver 20 GPA at 30 psi. Some treatments were applied with TeeJet XR 80015-VS flat fan nozzles placed on a 360-drop nozzle body calibrated to 20 GPA. Pesticides were applied as a seed treatment or at growth stages V4 (1 Jun), R1 (19 Jun), and R3 (22 Jul), both V4 and R3 or both R1 and R3 growth stages. One treatment was applied at R1 and R3 based on guidance from the Sporecaster smartphone application. Sclerotinia stem rot incidence and severity were rated at R6 (15 Sep). Sclerotinia stem rot severity index (DSI) was determined by rating 30 arbitrarily selected plants in each plot and scoring plants on a 0 to 3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were multiplied by their scale values, totaled, and divided by 0.9. Disease incidence (DI) was scored as percentage of symptomatic plants relative to the total stand. The DI and DSI were then combined to calculate the disease index (DIX) where DIX=DI*(Average DSI/3). Yield (corrected to 13% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge on 11 Oct. All disease and yield data were analyzed with SAS PROC GLIMMIX using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. However, due to overhead irrigation throughout the season and history of severe Sclerotinia stem rot, conditions were favorable for disease development, and pressure was high in this trial. Applications of Endura applied at R1 + R3, Endura at R1 + R3 using the Sporecaster app, Omega applied at R1 + R3 with 360-drop nozzles using the Sporecaster app, Omega at R1 followed by Miravis Neo at R3, Miravis Neo at R3, and Endura at R3 significantly reduced Sclerotinia stem rot incidence and DIX compared to the non-treated check (Table 11). There were no significant differences in yield among all treatments. Phytotoxicity was observed in plots where Cobra 2EC was applied and lasted approximately two weeks post-application. Phytotoxicity was not observed in any other treatments.

Table 11. Sclerotinia stem rot disease incidence, Sclerotinia stem rot disease severity index (DSI), DIX, and yield for soybean treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment and rate/A (crop stage at application)	Disease Incidence (%)[z,y]	Sclerotinia Stem Rot DSI (0-100)[x,y]	DIX[w,y]	Yield (bu/A)
Endura 70WDG 8.0 oz (R1+R3)[v]	2.7 f	17.1 e	2.7 g	60.6
Endura 70WDG 8.0 oz (Model)[v,t]	3.4 ef	22.3 de	3.1 fg	56.2
Omega 500F 16.0 oz (Model)[v,u,t]	6.6 de	43.5 b-d	6.5 d-g	60.2
Omega 500F 12.0 oz (R1)[v] Miravis Neo 2.5SE 13.7 fl oz (R3)[v]	7.0 c-e	43.8 b-d	6.8 c-f	54.1
Miravis Neo 2.5SE 16.0 fl oz (R3)[v]	7.8 c-e	37.1 cd	7.0 c-f	54.8
Endura 70WDG 8.0 oz (R3)[v]	9.7 b-d	49.3 a-c	8.1 b-e	55.3
Delaro Complete 3.83SC 8.0 fl oz (R3)[v]	12.7 a-d	67.6 a-c	12.5 a-d	62.3
Topsin-M 4.5F 20.0 fl oz (R3)	12.7 a-d	55.9 a-c	12.6 a-d	52.3
Omega 500F 16.0 oz (R3)[v,u]	13.1 a-d	57.8 a-c	12.9 a-d	55.4
Delaro Complete 3.83SC 8.0 fl oz (R3)[v,u]	16.9 a-c	73.6 a-c	16.5 a-c	58.2
Cobra 2.0EC 8.0 fl oz (V4)	20.1 ab	69.9 a-c	17.7 a-e	56.8
Omega 500F 16.0 oz (R3)[v]	19.2 ab	89.2 ab	19.3 ab	53.6
Headsup (Seed Treatment)	22.7 ab	85.0 ab	22.7 a	54.0
Cobra 2.0EC 8.0 fl oz (V4) Domark 230ME, 5.0 fl oz (R3)[v]	23.0 ab	93.6 a	23.0 a	57.4
Non-Treated Check	24.1 a	81.9 ab	23.7 a	52.3
Headsup (Seed Treatment) Domark 230ME 5.0 fl oz (R3)[v]	24.0 a	85.2 ab	24.1 a	57.7
P-value	<0.01	<0.01	<0.01	ns[s]

[z] Percentage of symptomatic plants relative to the total stand.
[y] Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05).
[x] Sclerotinia stem rot DSI was generated by rating 30 arbitrarily selected plants in each plot and scoring plants with on a 0 to 3 scale: 0 = no infection; 1 = infection on branches; 2 = infection on main stem with little effect on pod fill; 3 = infection on main stem resulting in death or poor pod fill. The scores of the 30 plants were totaled for each class and divided by 0.9.
[w] DIX=DI*(Average DSI/3)
[v] Induce 90% SL (Non-ionic surfactant) at 0.25% v/v was added to fungicide treatments
[u] 360 drop nozzles were used to apply treatments at 20 GPA.
[t] Model application sprays at R1 and R3 were determined using the Sporecaster smartphone application.
[s] ns = not significant (α=0.05).

Trial 12: Evaluation of conventional soybean cultivars and planting populations in a rye/roller-crimping system for comparisons of yield in Arlington, Wisconsin, 2023

SOYBEAN: (*Glycine max* 'Sauk', 'Rock', 'Marathon', 'Columbia', 'Dwight')

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The conventional soybean cultivars 'Sauk', 'Rock', 'Marathon', 'Columbia', 'Dwight' were chosen for this study. Soybeans were planted on 5 Jun in a field with a Plano silt loam (2 to 6% slopes). The experimental design was 5 x 3 factorial arranged in a randomized complete block with four replicates. Cultivar and planting populations were randomized together within each replicate. 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. Plots consisted of five cultivars with three seeding rates planted into roller crimped rye (crimped on the day of planting). Yield (corrected to 13% moisture) was determined by harvesting the center two rows of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic grain gauge. Yield data were analyzed using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Temperatures were above average and unseasonably dry throughout the growing season. Late planting and unfavorable soil conditions resulted in poor emergence leading to low yields. Yield was driven by cultivar and seeding rate with no cultivar by seeding rate interaction. Generally, all varieties yielded similarly across all seeding rates except for Dwight which had significantly lower yield at 100,000 seeds/acre compared to the other seeding rates. Rock had significantly higher yield compared to all other varieties except Columbia. These data suggest that higher seeding rates might be recommended in late-planted, roller-crimped trials when using these soybean varieties (Table 12).

Table 12. Yield for conventional soybean cultivars in a roller-crimper system in Wisconsin, 2023.

Conventional cultivar	Population (seeding rate/A)	Yield (bu/A)[y]
Sauk	100,000	21.5 a
	160,000	24.2 a
	220,000	24.6 a
Rock	100,000	27.3 a
	160,000	28.8 a
	220,000	29.5 a
Marathon	100,000	20.4 a
	160,000	24.7 a
	220,000	25.1 a
Columbia	100,000	20.2 b
	160,000	25.4 ab
	220,000	29.2 a
Dwight	100,000	19.2 b
	160,000	26.6 a
	220,000	28.5 a
P-value		<0.05[z]

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

Trial 13: Evaluation of foliar fungicides for control of tan spot of 'Harpoon' wheat in Wisconsin, 2023.

WHEAT, SOFT RED WINTER (*Triticum aestivum* 'Harpoon')
Tan spot; *Pyrenophora tritici-repentis*

The trial was established at the Arlington Agricultural Research Station located in Arlington, WI. The soft red winter wheat cultivar 'Harpoon' was chosen for this study. Wheat was planted on 22 Sep 2022 in a field with Joy silt loam (0-4% slopes) soil. The experimental design was a randomized complete block with four replicates. Plots were 20 ft long and 7.5 ft wide with 5-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 ten fungicide treatments. Fungicides were applied using a CO_2 pressurized backpack sprayer equipped with TTJ60-11002 Turbo TwinJet flat fan nozzles calibrated to deliver 20 GPA at 28 psi. Fungicides were applied at Feekes 8 on 22 May. Plots were overhead irrigated daily with a linear irrigation system delivering 0.1 in. of water during the 10.5.1 growth stage to facilitate disease development. Tan spot was evaluated by visually estimating average severity (% flag leaf with symptoms) per plot with the aid of standardized area diagrams, however, no disease was detected. Test weight and yield (corrected to 13.5% moisture) were determined by harvesting the center 5-ft of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic Grain gauge. All disease and yield data were analyzed using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Temperatures during the trial were above average and unseasonably dry for the growing region. Conditions for tan spot were not favorable, and no visible symptoms were observed in this trial. There were no significant differences among treatments for tan spot severity, test weight, and yield (Table 13). Phytotoxicity was not observed for any treatment.

Table 13. Tan spot severity, test weight, and yield for soft red winter wheat treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment, rate/A	Growth stage at application (Feekes)	Tan Spot Severity (%)[z]	Test Weight (lb/A)	Yield (bu/A)
Non-treated check		0	57.3	108.8
Nexicor 2.96EC 7.0 fl oz	8	0	57.1	105.7
Topguard 1.04SC 10 fl oz	8	0	57.3	112.9
Priaxor 4.17SC 4.0 fl oz	8	0	56.9	104.2
Trivapro 2.21EC 9.4 fl oz	8	0	57.2	112.7
Delaro 325SC 8.0 fl oz	8	0	57.1	108.4
Quilt Xcel 2.2SE 10.5 fl oz	8	0	57.2	108.8
Tilt 3.6EC 4.0 fl oz	8	0	56.8	102.0
Headline 2.08SC 6.0 fl oz	8	0	56.9	104.9
Prosaro 421SC 6.5 fl oz	8	0	56.9	108.5
Adastrio 4.0SC 6.0 fl oz	8	0	57.3	113.0
P-value		ns[y]	ns	ns

[z]Tan spot severity was visually assessed as the average % flag leaf symptomatic per plot
[y]ns = not significant (α=0.05).

Trial 14: Evaluation of foliar fungicides for control of Fusarium head blight of 'Kaskaskia' wheat in Wisconsin, 2023.

WHEAT, SOFT RED WINTER (*Triticum aestivum* 'Kaskaskia')
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 22 Sep 2022 in a field with Joy silt loam (0-4% slopes) soil. The experimental design was a randomized complete block with four replicates. Plots were 20 ft long and 7.5 ft wide with 5-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 11 fungicide treatments. Fungicide treatments applied at Feekes 8 and 10.5.1 were mixed with the non-ionic surfactant, Induce 90SL, 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 GPA at 28 psi. Fungicides were applied at flag leaf (Feekes 8) on 22 May, anthesis (Feekes 10.5.1) on 2 Jun or using a two-spray program with the first spray occurring at jointing (Feekes 6) on 3 May or flag leaf and the second spray applied at anthesis. Plots were infested with 25 lb/A of *F. graminearum*-colonized corn grain on 19 May and 1 Jun. Plots were overhead irrigated daily with a linear irrigation system delivering 0.1 in. of water during the 10.5.1 growth stage to facilitate disease development. Fusarium head blight (FHB) was evaluated by visually estimating average incidence (% plants with symptoms) and average severity (% area of heads with symptoms) per plot with the aid of standardized area diagrams. Concentration of deoxynivalenol (DON) was also evaluated in grain harvested from each treatment (~75 grams) at the University of Minnesota DON testing lab. Test weight and yield (corrected to 13.5% moisture) were determined by harvesting the center 5-ft of each plot using an Almaco SPC40 small-plot combine equipped with a HarvestMaster HM800 Classic Grain gauge. All disease and yield data were analyzed using a mixed model analysis of variance, and means were separated using Fisher's least significant difference (α=0.05).

Temperatures during the trial were above average and unseasonably dry for the growing region. Conditions for Fusarium head blight infection were not favorable, no visible FHB symptoms were observed, and DON levels were very low in this trial. Fungicide treatments had significant differences in test weight, however, no treatments were significantly different to the non-treated control (Table 14). There were no significant differences among treatments for FHB index, DON, and yield. Phytotoxicity was not observed for any treatment.

Table 14. Fusarium head blight (FHB) index, deoxynivalenol (DON), test weight, and yield for soft red winter wheat treated with fungicide or not treated with fungicide in Wisconsin, 2023.

Treatment, rate/A[z]	Growth stage at application (Feekes)[y]	FHB Disease Index (%)[x]	DON (ppm)	Test Weight (lb/A)[w]	Yield (bu/A)
Non-treated check		0	0.01	59.4 a-d	94.3
Trivapro 2.21EC 9.4 fl oz Miravis Ace 5.2SC 13.7 fl oz[u]	6 fb 10.5.1	0	0.01	59.8 ab	93.1
Headline 2.08SC 6.0 fl oz[u]	8	0	0.02	59.3 b-d	93.1
Adastrio 4.0SC 7.0 fl oz[u]	8	0	0.01	59.7 a-c	90.0
Headline 2.08SC 6.0 fl oz[u] Prosaro Pro 400SC 10.3 fl oz[u]	8 fb 10.5.1	0	0.01	59.5 a-d	98.8
Headline 2.08SC 6.0 fl oz Sphaerex 2.5SC 7.3 fl oz	8 fb 10.5.1	0	0.01	59.2 d	92.7
Adastrio 4.0SC 7.0 fl oz Prosaro Pro 400SC 10.3 fl oz	8 fb 10.5.1	0	0.01	59.7 a-c	94.6
Miravis Ace 5.2SC 13.7 fl oz	10.5.1	0	0.01	59.9 a	93.1
Prosaro 421SC 6.5 fl oz	10.5.1	0	0.01	59.2 d	94.6
Prosaro 421SC 8.2 fl oz	10.5.1	0	0.01	59.2 d	94.9
Prosaro Pro 400SC 10.3 fl oz	10.5.1	0	0.01	59.5 a-d	90.5
Sphaerex 2.5SC 7.3 fl oz	10.5.1	0	0.01	59.3 cd	94.6
P-value		ns[v]	ns	<0.05	ns

[z]Fungicide treatments applied at Feekes 8 and 10.5.1 were mixed with the non-ionic surfactant, Induce 90SL, at 0.125% v/v
[y]Fb = followed by.
[x]FHB Index was calculated by multiplying % disease incidence (DI) by % disease severity (DS) divided by 100 (FHB Index=DI x DS/100).
[w]Means followed by the same letter are not significantly different based on Fisher's Least Significant Difference (LSD; α=0.05)
[v]ns = not significant (α=0.05).