

Comparative efficacy of fungicides for management of white mold in soybeans:

Results from field studies conducted in Carrington and Oakes, ND from 2019 to 2023.

Testing was conducted with fungicide spray droplet size calibrated relative to canopy characteristics.

- **Testing was conducted in soybeans seeded to 14 or 21” rows.**
- **Teejet nozzles:** fine droplets were utilized if average canopy closure was <80%, medium droplets were utilized if average canopy closure was 80-90%, and coarse droplets were utilized if average canopy closure was >90%.
- **Wilger nozzles:** coarse droplets were utilized if average canopy closure was <90%, and very coarse droplets were utilized if average canopy closure was >90%.
- No testing was conducted in soybeans seeded to wide (28 or 30”) rows.
- Note that due to increased plant density within the row in soybeans seeded to wide rows, it may be necessary to calibrate droplet size relative to canopy density within the row when wide rows are used. This will be tested in 2024.

Results from field trials conducted in Carrington indicate that calibrating fungicide droplet size relative to canopy characteristics improves the consistency of fungicide performance against white mold and increases the yield gain conferred by fungicides in soybeans under white mold pressure.

Calibrating droplet size appears to be particularly important for fungicides with intermediate efficacy against white mold. In field trials in which fungicide spray droplet size has been calibrated versus canopy closure, the differences in the relative efficacy of fungicides against white mold in soybeans have narrowed. The most effective fungicides are still the same, but the difference between the most effective fungicides and the fungicides with intermediate efficacy has decreased.

Impact of optimizing fungicide droplet size: efficacy of the fungicide Endura

Each circle: yield gain conferred by a single application of Endura (5.5 oz) in a replicated field study.

Carrington and Oakes, ND (2018-2023); hand-applied and tractor-applied studies.

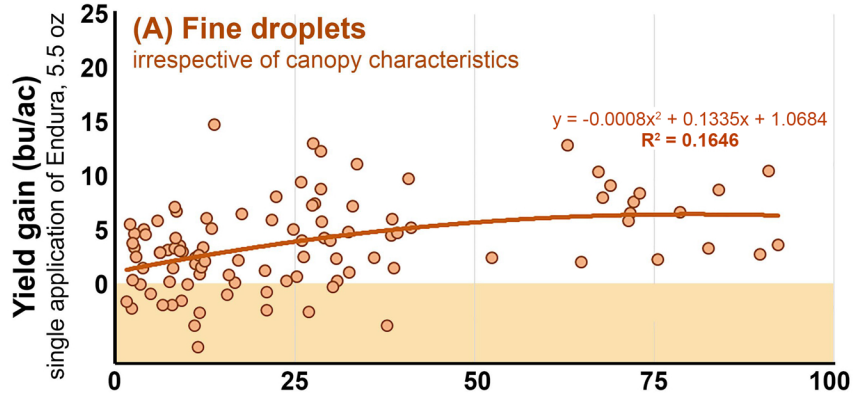
Testing conducted in soybeans seeded to 14" or 21" rows.

CALIBRATION in studies where TeeJet nozzles were used: Fine droplets when average canopy closure < 80%, medium droplets when ave. canopy closure 80-90%, coarse droplets when ave. canopy closure >90%.

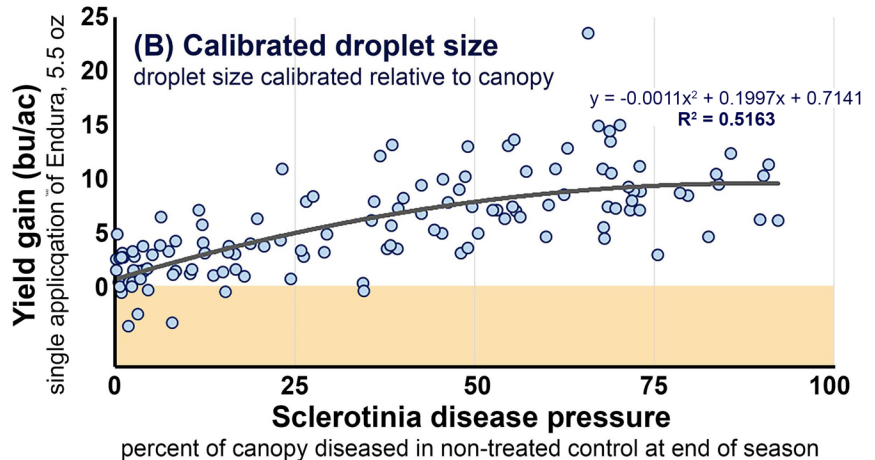
CALIBRATION, Wilger nozzles: Coarse droplets when canopy closure <90%, very coarse when canopy closure >90%.

In soybeans seeded to wide (28-30") rows, plant spacing within the row is much higher, and fungicide spray droplet size might need to be calibrated versus canopy density within the row, not canopy closure. This will be tested in 2024.

(A) When Endura was applied with fine droplets irrespective of canopy characteristics, the yield gain conferred by the fungicide at any given level of disease pressure was highly variable.



(B) When Endura was applied with spray droplet size calibrated relative to canopy characteristics, the yield gain conferred by the fungicide at any given level of disease pressure was much more consistent.



Each circle: the yield gain observed from applying Endura at 5.5 oz/ac in one replicated study.

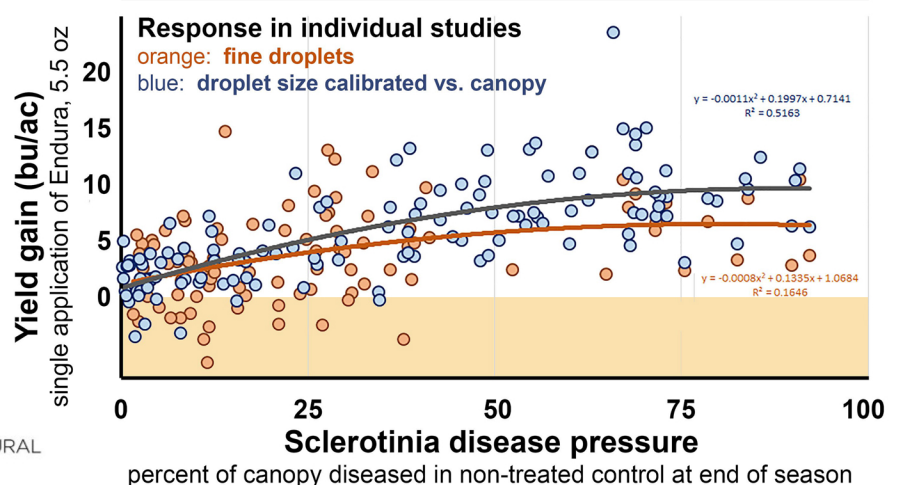
(C) When Endura was applied with spray droplet size calibrated relative to canopy characteristics, the average yield gain conferred by the fungicide Endura (5.5 oz/ac) at any given level of white mold disease pressure increased.

Average response
Yield gain (bu/ac) conferred by single application of Endura, 5.5 oz
fine droplets vs. calibrated droplet size



Bars: average response across all studies conducted at each range of disease pressure.

Circles: yield gain conferred by Endura (applied at 5.5 oz/ac) in one replicated study.



Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

Delaro Complete 8 fl oz - single application

prothioconazole (FRAC 3), 1.47 lbs ai/gal; trifloxystrobin (FRAC 11), 1.29 lbs ai/gal; fluopyram (FRAC 7), 1.07 lbs ai/gal

year	2020	2021	2021	2022	2023	
location	Carrington	Carrington	Carrington	Carrington	Carrington	
funding	Bayer	BASF	Gowan	Bayer	Bayer	
variety	DSR-0418	DSR-0807	DSR-0807	AG09Xf0	P06T04E	
brand, maturity	Dairyland, 0.4	Dairyland, 0.8	Dairyland, 0.8	Asgrow, 0.9	Pioneer, 0.6	
row spacing	21 inches	21 inches	21 inches	14 inches	14 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	spring wheat	spring wheat	spring wheat	dry bean	chickpeas	
planting date	May 18	May 12	May 12	May 27	May 24	
disease assessment date	Oct. 16	Oct. 4	Oct. 4	Oct. 19	Oct. 12	
rows assessed for disease	1	1	1	1	1	
harvest date	Oct. 19	Oct. 6	Oct. 7	Oct. 21	Oct. 17	
date fungicide was applied	July 17	July 26	July 26	July 23	July 22	
growth stage, 1st application	100% R2	R3	R3	100% R2	100% R2	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
canopy closure, 1st application	75-90%	1	1	99-100%	95-100%	
nozzles, pressure, 1st application	AIXR110015, 60 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 1st application	medium	coarse	coarse	coarse	coarse	
adjuvant	Induce 0.125% v/v	Masterlock 6.4 fl oz	Induce 0.25%	Induce 0.125% v/v	Induce, 0.125% v/v	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	

Sclerotinia incidence (% of plants)					
UNTREATED	38 a	34 a	35 a	74 b	63 b
DELARO COMPLETE 8 fl oz/ac	42 a	17 a	20 a	49 a	50 ab
PROPULSE 6 fl oz/ac	45 a			53 a	57 ab
PROPULSE 8 fl oz/ac	31 a			48 a	51 ab
ENDURA 5.5 or 6.0 oz/ac			20 a	60 ab	42 a
CV:	19.7	35.6	20.3	18.2	22.2

Sclerotinia disease severity index (% of canopy)					
UNTREATED	15 a	24 a	23 a	63 b	43 b
DELARO COMPLETE 8 fl oz/ac	17 a	12 a	12 a	34 a	30 ab
PROPULSE 6 fl oz/ac	23 a			36 a	37 ab
PROPULSE 8 fl oz/ac	8 a			33 a	32 ab
ENDURA 5.5 or 6.0 oz/ac			12 a	41 a	24 a
CV:	23.2	19.8	26.9	24.6	31.2

Yield (bu/ac)					
UNTREATED	49 ab	53 a	56 a	30 b	47 b
DELARO COMPLETE 8 fl oz/ac	48 b	62 a	61 a	43 a	54 a
PROPULSE 6 fl oz/ac	49 ab			39 a	51 ab
PROPULSE 8 fl oz/ac	53 a			42 a	52 ab
ENDURA 5.5 or 6.0 oz/ac			62 a	38 a	56 a
CV:	5.1	8.6	9	8.2	6.5

Delaro Complete (8 fl oz/ac) versus ProPulse (6 or 8 fl oz/ac) COMBINED ANALYSIS, 3 studies					
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield		
UNTREATED	58 a	40 a	42 a	Single fungicide application at R2 or R3 The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.	
DELARO COMPLETE 8 fl oz/ac	47 a	27 a	48 a		
PROPULSE 6 fl oz/ac	52 a	32 a	47 a		
PROPULSE 8 fl oz/ac	43 a	24 a	49 a		
CV:	13.8	26.1	6.8		

Delaro Complete (8 fl oz/ac) versus Endura (5.5 or 6.0 oz/ac) COMBINED ANALYSIS, 3 studies					
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield		
UNTREATED	57 b	43 b	44 b	Single fungicide application at R2 or R3 The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.	
DELARO COMPLETE 8 fl oz/ac	40 a	25 a	52 a		
ENDURA 5.5 or 6.0 oz/ac	41 a	26 a	52 a		
CV:	11.1	16.1	5.1		

Delaro Complete (8 fl oz/ac) versus non-treated COMBINED ANALYSIS, 5 studies					
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield		
UNTREATED	49 a	33 a	47 a	Single fungicide application at R2 or R3	
DELARO COMPLETE 8 fl oz/ac	36 a	21 a	53 a		
CV:	11.1	16.1	5.1		
	27% reduction	38% reduction	14% increase		

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

Delaro Complete 8 fl oz - two sequential applications

prothioconazole (FRAC 3), 1.47 lbs ai/gal; trifloxystrobin (FRAC 11), 1.29 lbs ai/gal; fluopyram (FRAC 7), 1.07 lbs ai/gal

year	2021	2021	2022	2023	2023
location	Carrington	Carrington	Carrington	Carrington	Carrington
funding	BASF	Gowan	BASF	Corteva	BASF
variety	DSR-0807	DSR-0807	AG09Xf0	P06T04E	21Xf07
brand, maturity	Dairyland, 0.8	Dairyland, 0.8	Asgrow, 0.9	Pioneer, 0.6	Peterson Farms, 0.7
row spacing	21 inches	21 inches	14 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	spring wheat	spring wheat	dry bean	chickpeas	chickpeas
planting date	May 12	May 12	May 27	May 24	May 24
disease assessment date	Oct. 4	Oct. 4	Oct. 19	Oct. 12	Oct. 12
rows assessed for disease	1	1	1	1	1
harvest date	Oct. 6	Oct. 7	Oct. 21	Oct. 17	Oct. 17
dates, applications	1 and 2 July 26, Aug. 6	July 26, Aug. 6	July 23, Aug. 1	July 22, Aug. 2	July 22, Aug. 2
interval between applications	11 days	11 days	9 days	11 days	11 days
growth stage, 1st application	R3	R3	100% R2	100% R2	100% R2
canopy closure, 1st application	100%	100%	99-100%	95-100%	98-100%
nozzles, pressure, 1st application	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi
droplet size, 1st application	coarse	coarse	coarse	coarse	coarse
canopy closure, 2nd application	100%	100%	100%	100%	100%
nozzles, pressure, 2nd application	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 40 psi	AIXR110015, 40 psi
droplet size, 2nd application	coarse	coarse	coarse	coarse	coarse
adjuvant	Masterlock 6.4 fl oz/ac	Induce 0.25%, some tr	Masterlock, 6.4 fl oz/ac	Induce, 0.125% v/v	Masterlock, 6.4 fl oz/ac
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom

The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.

Sclerotinia incidence (% of plants)

Non-treated control	42 a	35 a	82 b	50 b	54 b
ENDURA 6 oz/ac	36 a	20 a	53 a		33 ab
PROPULSE 6 fl oz/ac			49 a		35 ab
DELARO COMPLETE 8 fl oz/ac	21 a	20 a	41 a	25 a	38 ab
ENDURA 8 oz/ac				17 a	28 a
CV:	38.8	20.3	14.4	33.7	35.6

Sclerotinia disease severity index (% of canopy)

Non-treated control	27 a	23 a	70 b	31 b	31 b
ENDURA 6 oz/ac	19 a	12 a	40 a		18 ab
PROPULSE 6 fl oz/ac			35 a		18 ab
DELARO COMPLETE 8 fl oz/ac	9 a	12 a	31 a	14 a	20 ab
ENDURA 8 oz/ac				7 a	11 a
CV:	25	26.9	17.5	49.2	47.4

Yield (bu/ac)

Non-treated control	51 a	56 a	25 b	56 b	50 a
ENDURA 6 oz/ac	55 a	62 a	42 a		50 a
PROPULSE 6 fl oz/ac			43 a		56 a
DELARO COMPLETE 8 fl oz/ac	60 a	61 a	47 a	59 ab	53 a
ENDURA 8 oz/ac				63 a	62 a
CV:	13	9	10.7	6.8	15

Delaro Complete (8 fl oz/ac) versus Endura (6.0 oz/ac) COMBINED ANALYSIS, 4 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	53 b	38 b	46 a	Two sequential applications: R2 or R3 + 9-11 days later
DELARO COMPLETE 8 fl oz/ac	30 a	18 a	55 a	
ENDURA 6 oz/ac	36 a	22 ab	52 a	
CV:	19.1	28.3	9.0	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.

Delaro Complete (8 fl oz/ac) versus Endura (8.0 oz/ac) COMBINED ANALYSIS, 2 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	52 b	31 b	53 a	Two sequential applications: R2 + 11 days later
DELARO COMPLETE 8 fl oz/ac	32 a	17 a	56 a	
ENDURA 8 oz/ac	22 a	9 a	62 a	
CV:	9.0	12.5	3.4	

Delaro Complete (8 fl oz/ac) versus non-treated COMBINED ANALYSIS, 5 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	53 b	37 b	48 a	Two sequential applications: R2 or R3 + 9-11 days later
DELARO COMPLETE 8 fl oz/ac	29 a	17 a	56 a	
CV:	18.3	30.7	10.5	
	45% reduction	53% reduction	17% increase	

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

Miravis Neo 13.7 or 20.8 fl oz - single fungicide application

pydiflumetofen (FRAC 7), 0.63 lbs ai/gal; azoxystrobin (FRAC 11), 0.83 lbs ai/gal; propiconazole (FRAC 3), 1.04 lbs ai/gal

year	2019	2020	2020	2021	2021	
location	Carrington	Carrington	Carrington	Carrington	Carrington	
funding	Syngenta	Syngenta	BASF	Syngenta	Gowan	
variety	17X04N	DSR-0418	DSR-0418	DSR-0807	DSR-0807	
brand, maturity	Peterson Farms, 0.7	Dairyland, 0.4	Dairyland, 0.4	Dairyland, 0.8	Dairyland, 0.8	
row spacing	21 inches	21 inches	21 inches	21 inches	21 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	lentils	spring wheat	spring wheat	spring wheat	spring wheat	
planting date	May 9	May 18	May 18	May 12	May 12	
disease assessment date	Oct. 30	Oct. 16	Oct. 15	Oct. 4	Oct. 4	
rows assessed for disease	1	1	1	1	1	
harvest date	Oct. 31, Nov. 2	Oct. 19	Oct. 16	Oct. 6	Oct. 7	
date fungicide was applied	July 28	July 17	July 14	July 22	July 26	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
growth stage, 1st applic.	100% R3	100% R2	100% R2	100% R2	R3	
canopy closure, 1st applic	90-100% (ave. 97%)	75-90%	65-95%	95-100%	1	
nozzles, pressure, 1st applic.	AIXR110015, 50 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	XR11010, 30 psi	AIXR110015, 50 psi	
droplet size, 1st applic.	coarse	medium	medium	coarse	coarse	
adjuvant	none	Induce 0.25% v/v	none	NIS 0.25% v/v	Induce 0.25%	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	tractor, 6.5 mph	hand-held boom	

Sclerotinia incidence (% of plants)					
UNTREATED	78 a	48 a	26 b	24 a	35 a
MIRAVIS NEO 13.7 fl oz/ac	72 a		20 b		23 a
MIRAVIS NEO 20.8 fl oz/ac	74 a	52 a		25 a	
ENDURA 5.5 or 6.0 oz/ac		38 a	3 a	21 a	20 a
CV:	10.9	26.3	30.7	30.5	20.3

Sclerotinia severity index (% of canopy)					
UNTREATED	58 a	21 a	10 b	16 a	23 a
MIRAVIS NEO 13.7 fl oz/ac	52 a		8 ab		14 a
MIRAVIS NEO 20.8 fl oz/ac	48 a	21 a		14 a	
ENDURA 5.5 or 6.0 oz/ac		13 a	1 a	12 a	12 a
CV:	16.1	34.6	39.5	32.8	26.9

Yield					
UNTREATED	25 a	33 a	45 a	55 a	56 a
MIRAVIS NEO 13.7 fl oz/ac	31 a		46 a		64 a
MIRAVIS NEO 20.8 fl oz/ac	31 a	34 a		58 a	
ENDURA 5.5 or 6.0 oz/ac		36 a	49 a	58 a	62 a
CV:	19.4	7.2	15.1	4.2	9

Miravis Neo (13.7 fl oz/ac) versus Endura (6.0 oz/ac)				Single fungicide application at R2 or R3
COMBINED ANALYSIS, 2 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
Non-treated control	30 a	17 a	51 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 13.7 fl oz/ac	21 a	11 a	55 a	
ENDURA 6 oz/ac	12 a	7 a	55 a	
CV:	24.1	23.5	5.1	

Miravis Neo (13.7 fl oz/ac) versus non-treated				Single fungicide application at R2 or R3
COMBINED ANALYSIS, 3 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	46 a	31 a	42 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 13.7 fl oz/ac	38 a	24 a	47 a	
CV:	5.6	9.6	6.2	
	17% reduction	21% reduction	12% increase	

Miravis Neo (20.8 fl oz/ac) versus Endura (5.5 oz/ac)				Single fungicide application at R2 or R3
COMBINED ANALYSIS, 2 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
Non-treated control	36 a	18 a	44 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 20.8 fl oz/ac	38 a	17 a	46 a	
ENDURA 5.5 oz/ac	29 a	13 a	47 a	
CV:	9.6	13.9	2.1	

Miravis Neo (20.8 fl oz/ac) versus non-treated				Single fungicide application at R2 or R3
COMBINED ANALYSIS, 3 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	50 a	32 a	37 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 20.8 fl oz/ac	50 a	28 a	41 a	
CV:	5.7	13.4	4.7	
	0% reduction	13% reduction	10% increase	

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

Miravis Neo 13.7 or 20.8 fl oz - two sequential fungicide applications

pydiflumetofen (FRAC 7), 0.63 lbs ai/gal; azoxystrobin (FRAC 11), 0.83 lbs ai/gal; propiconazole (FRAC 3), 1.04 lbs ai/gal

year	2019	2020	2020	2021	2021	2022	
location	Carrington	Carrington	Carrington	Carrington	Carrington	Carrington	
funding	Syngenta	Syngenta	ADAMA	Syngenta	Gowan	BASF	
variety	17X04N	DSR-0418	DSR-0418	DSR-0807	DSR-0807	AG09XF0	
brand, maturity	Peterson Farms, 0.7	Dairyland, 0.4	Dairyland, 0.4	Dairyland, 0.8	Dairyland, 0.8	Asgrow, 0.9	
row spacing	21 inches	21 inches	21 inches	21 inches	21 inches	14 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	lentils	spring wheat	spring wheat	spring wheat	spring wheat	dry bean	
planting date	May 9	May 18	May 18	May 12	May 12	May 27	
disease assessment date	Oct. 30	Oct. 16	Oct. 15	Oct. 4	Oct. 4	Oct. 19	
rows assessed for disease	1	1	1	1	1	1	
harvest date	Oct. 31, Nov. 2	Oct. 19	Oct. 16	Oct. 6	Oct. 7	Oct. 21	
dates, applications 1 and 2	July 28, Aug. 8	July 17, 28	July 14, 28	July 22, Aug. 2	July 26, Aug. 6	July 23, Aug. 1	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
interval between applications	11 days	11 days	14 days	11 days	11 days	9 days	
growth stage, 1st application	100% R3	100% R2	100% R2	100% R2	R3	100% R2	
canopy closure, 1st application	90-100% (ave. 97%)	75-90%	65-95%	95-100%	100%	99-100%	
nozzles, pressure, 1st application	AIXR110015, 50 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	XR11010, 30 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 1st application	coarse	medium	medium	coarse	coarse	coarse	
canopy closure, 2nd application	100%	100%	100%	100%	100%	100%	
nozzles, pressure, 2nd application	AIXR110015, 50 psi	AIXR110015, 40 psi	AIXR110015, 40 psi	XR11010, 30 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 2nd application	coarse	coarse	coarse	coarse	coarse	coarse	
adjuvant	none	Induce 0.25% v/v	none	Activator 90 NIS 0.25%	Induce 0.25%, some tn	Masterlock, 6.4 fl oz/ac	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	tractor, 6.5 mph	hand-held boom	hand-held boom	

Sclerotinia incidence (% of plants)

Non-treated control	78 b	48 a	34 a	24 a	35 a	82 b
MIRAVIS NEO 13.7 fl oz/ac	63 a				23 a	68 ab
MIRAVIS NEO 20.8 fl oz/ac	69 ab	38 a	30 a	22 a		
ENDURA 6 oz/ac					20 a	53 a
CV:	10.9	26.3	30.3	30.5	20.3	14.4

Sclerotinia severity index (% of canopy)

Non-treated control	58 b	21 a	13 a	16 a	23 a	70 b
MIRAVIS NEO 13.7 fl oz/ac	43 a				14 a	56 ab
MIRAVIS NEO 20.8 fl oz/ac	48 ab	12 a	12 a	13 a		
ENDURA 6 oz/ac					12 a	40 a
CV:	16.1	34.6	39.9	32.8	26.9	17.5

Soybean yield

Non-treated control	25 a	33 a	42 a	55 b	56 a	25 b
MIRAVIS NEO 13.7 fl oz/ac	35 a				64 a	34 a
MIRAVIS NEO 20.8 fl oz/ac	30 a	34 a	39 a	60 a		
ENDURA 6 oz/ac					62 a	42 a
CV:	19.4	7.2	11	4.2	9	10.7

Miravis Neo (13.7 fl oz/ac) versus Endura (6.0 oz/ac)

COMBINED ANALYSIS, 2 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Two fungicide applications: R2 or R3 + 9-14 days later
Non-treated control	58 a	47 a	41 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 13.7 fl oz/ac	45 a	35 a	49 a	
ENDURA 6 oz/ac	37 a	26 a	52 a	
CV:	12.3	19.8	8.7	

Miravis Neo (13.7 fl oz/ac) versus non-treated

COMBINED ANALYSIS, 3 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Two fungicide applications: R2 or R3 + 9-14 days later
UNTREATED	65 a	51 a	35 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 13.7 fl oz/ac	51 a	37 a	44 a	
	21% reduction	26% reduction	26% increase	
CV:	2	5	1.6	

Miravis Neo (20.8 fl oz/ac) versus non-treated

COMBINED ANALYSIS, 4 studies	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Two fungicide applications: R2 or R3 + 9-14 days later
UNTREATED	46 a	27 a	39 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
MIRAVIS NEO 20.8 fl oz/ac	40 a	21 a	41 a	
	13% reduction	21% reduction	5% increase	
CV:	5.7	13.4	4.7	

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

ProPulse 6 fl oz - single application

prothioconazole (FRAC 3), 1.67 lbs ai/gal; fluopyram (FRAC 7), 1.67 lbs ai/gal

year	2020	2022	2023	2023
location	Carrington	Carrington	Carrington	Carrington
funding	Bayer	Bayer	ND Soybean Council	Bayer
variety	DSR-0418	AG09Xf0	21Xf07	P06T04E
brand, maturity	Dairyland, 0.4	Asgrow, 0.9	Peterson Farms, 0.7	Pioneer, 0.6
row spacing	21 inches	14 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	spring wheat	dry bean	chickpeas	chickpeas
planting date	May 18	May 27	May 24-25	May 24
disease assessment date	Oct. 16	Oct. 19	Oct. 12-13	Oct. 12
rows assessed for disease	1	1	1	1
harvest date	Oct. 19	Oct. 21	Oct. 17	Oct. 17
date fungicide was applied	July 17	July 23	July 22	July 22
growth stage, 1st application	100% R2	100% R2	100% R2	100% R2
canopy closure, 1st application	75-90%	99-100%	98-100%	95-100%
nozzles, pressure, 1st application	AIXR110015, 60 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi
droplet size, 1st application	medium	coarse	coarse	coarse
adjuvant	Induce 0.125% v/v	Induce 0.125% v/v	none	Induce, 0.125% v/v
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)

UNTREATED	38 a	74 b	62 a	63 b
PROPULSE 6 fl oz/ac	45 a	53 a	61 a	57 ab
PROPULSE 8 fl oz/ac	31 a	48 a		51 ab
ENDURA 5.5 oz/ac		60 ab		42 a
CV:	19.7	18.2	26.4	22.2

Sclerotinia severity index (% of canopy)

UNTREATED	15 a	63 b	42 a	43 b
PROPULSE 6 fl oz/ac	23 a	36 a	41 a	37 a
PROPULSE 8 fl oz/ac	8 a	33 a		32 a
ENDURA 5.5 oz/ac		41 a		24 a
CV:	23.2	24.6	35.9	31.2

Yield

UNTREATED	49 a	30 b	44 a	47 b
PROPULSE 6 fl oz/ac	49 a	39 a	48 a	51 ab
PROPULSE 8 fl oz/ac	53 a	42 a		52 ab
ENDURA 5.5 oz/ac		38 a		56 a
CV:	5.1	8.2	12.5	6.5

ProPulse (6 fl oz/ac) versus Endura (5.5 oz/ac)

COMBINED ANALYSIS, 2 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at 100% R2
UNTREATED	69 a	53 a	38 a	
PROPULSE 6 fl oz/ac	55 a	36 a	45 a	
ENDURA 5.5 oz/ac	51 a	33 a	47 a	
CV:	13.4	19.8	5.1	

ProPulse (6 fl oz/ac) versus ProPulse (8 fl oz/ac)

COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at 100% R2
UNTREATED	58 a	40 a	42 a	
PROPULSE 6 fl oz/ac	52 a	32 a	47 a	
PROPULSE 8 fl oz/ac	43 a	24 a	49 a	
CV:	14.3	28.3	6.3	

ProPulse (6 fl oz/ac) versus non-treated

COMBINED ANALYSIS, 4 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single applic. at 100% R2
UNTREATED	59 a	41 a	42 a	
PROPULSE 6 fl oz/ac	54 a	34 a	47 a	
CV:	14.8	27.9	6.4	

9%

reduction

16%

reduction

11%

increase

Fungicide efficacy: MANAGEMENT OF WHITE MOLD IN SOYBEANS

ProPulse 6 fl oz - two sequential applications

prothioconazole (FRAC 3), 1.67 lbs ai/gal; fluopyram (FRAC 7), 1.67 lbs ai/gal

	year 2022	2023	2023
location	Carrington	Carrington	Carrington
funding	BASF	ND Soybean Council	BASF
variety	AG09Xf0	21Xf07	21Xf07
brand, maturity	Asgrow, 0.9	Peterson Farms, 0.7	Peterson Farms, 0.7
row spacing	14 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	dry bean	chickpeas	chickpeas
planting date	May 27	May 24-25	May 24
disease assessment date	Oct. 19	Oct. 12-13	Oct. 12
rows assessed for disease	1	1	1
harvest date	Oct. 21	Oct. 17	Oct. 17
dates, applications 1 and 2	July 23, Aug. 1	July 22, Aug. 2	July 22, Aug. 2
interval between applications	9 days	11 days	11 days
growth stage, 1st application	100% R2	100% R2	100% R2
canopy closure, 1st application	99-100%	98-100%	98-100%
nozzles, pressure, 1st application	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi
droplet size, 1st application	coarse	coarse	coarse
canopy closure, 2nd application	100%	100%	100%
nozzles, pressure, 2nd application	AIXR110015, 50 psi	AIXR110015, 40 psi	AIXR110015, 40 psi
droplet size, 2nd application	coarse	coarse	coarse
adjuvant	Masterlock, 6.4 fl oz/ac	none	Masterlock, 6.4 fl oz/ac
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)

Non-treated control	82 b	62 a	54 b
PROPULSE 6 fl oz/ac	49 a	51 a	35 ab
ENDURA 6 oz/ac	53 a		33 ab
ENDURA 8 oz/c			28 a
CV:	14.4	26.4	35.6

Sclerotinia severity index (% of canopy)

Non-treated control	70 b	42 a	31 b
PROPULSE 6 fl oz/ac	35 a	32 a	18 ab
ENDURA 6 oz/ac	40 a		18 ab
ENDURA 8 oz/c			11 a
CV:	17.5	35.9	47.4

Soybean yield

Non-treated control	25 b	44 b	50 a
PROPULSE 6 fl oz/ac	43 a	53 a	56 a
ENDURA 6 oz/ac	42 a		50 a
ENDURA 8 oz/c			62 a
CV:	10.7	12.5	15

ProPulse (6 fl oz/ac) versus Endura (6.0 oz/ac)

COMBINED ANALYSIS, 2 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Two sequential applications: full R2 + 9-11 days later
UNTREATED	68 a	51 a	38 a	
PROPULSE 6 fl oz/ac	42 a	27 a	50 a	
ENDURA 6 oz/ac	43 a	29 a	46 a	
CV:	9.8	23.2	13.6	

ProPulse (6 fl oz/ac) versus non-treated

COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	66 a	48 a	40 a	
PROPULSE 6 fl oz/ac	45 a	28 a	51 a	27%
CV:	14.2	25	9.5	reduction increase

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

ProPulse 8 fl oz - single application

prothioconazole (FRAC 3), 1.67 lbs ai/gal; fluopyram (FRAC 7), 1.67 lbs ai/gal

year	2020	2022	2023
location	Carrington	Carrington	Carrington
funding	Bayer	Bayer	Bayer
variety	DSR-0418	AG09Xf0	P06T04E
brand, maturity	Dairyland, 0.4	Asgrow, 0.9	Pioneer, 0.6
row spacing	21 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	spring wheat	dry bean	chickpeas
planting date	May 18	May 27	May 24
disease assessment date	Oct. 16	Oct. 19	Oct. 12
rows assessed for disease	1	1	1
harvest date	Oct. 19	Oct. 21	Oct. 17
date fungicide was applied	July 17	July 23	July 22
growth stage, 1st applic.	100% R2	100% R2	100% R2
canopy closure, 1st applic	75-90%	99-100%	95-100%
nozzles, pressure, 1st applic.	AIXR110015, 60 psi	AIXR110015, 50 psi	AIXR110015, 50 psi
droplet size, 1st applic.	medium	coarse	coarse
adjuvant	Induce 0.125% v/v	Induce 0.125% v/v	Induce, 0.125% v/v
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)			
UNTREATED	38 a	74 b	63 b
PROPULSE 6 fl oz/ac	45 a	53 a	57 ab
PROPULSE 8 fl oz/ac	31 a	48 a	51 ab
ENDURA 5.5 oz/ac		60 ab	42 a
CV:	20	18	22

Sclerotinia severity index (% of canopy)			
UNTREATED	15 a	63 b	43 b
PROPULSE 6 fl oz/ac	23 a	36 a	37 ab
PROPULSE 8 fl oz/ac	8 a	33 a	32 ab
ENDURA 5.5 oz/ac		41 a	24 a
CV:	23	25	31

Yield			
UNTREATED	49 a	30 b	47 b
PROPULSE 6 fl oz/ac	49 a	39 a	51 ab
PROPULSE 8 fl oz/ac	53 a	42 a	52 ab
ENDURA 5.5 oz/ac		38 a	56 a
CV:	5.1	8.2	6.5

ProPulse (6 and 8 fl oz/ac) versus Endura (5.5 oz/ac)				COMBINED ANALYSIS, 2 studies	
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at 100% R2	
UNTREATED	69 a	53 a	38 a		
PROPULSE 6 fl oz/ac	55 a	36 a	45 a		
PROPULSE 8 fl oz/ac	49 a	33 a	47 a		
ENDURA 5.5 oz/ac	51 a	33 a	47 a		
CV:	13.3	19.5	6.4		

ProPulse (8 fl oz/ac) versus non-treated				COMBINED ANALYSIS, 4 studies			
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at 100% R2			
UNTREATED	58 a	40 a	42 a				
PROPULSE 8 fl oz/ac	43 a	24 a	49 a			26% reduction	39% reduction
						17% increase	
CV:	13.7	26.5	7.6				

Fungicide efficacy: MANAGEMENT OF WHITE MOLD IN SOYBEANS

Revytek 8 fl oz - single fungicide application

mefentrifluconazole (FRAC 3), 1.11 lbs ai/gal; pyraclostrobin (FRAC 11), 1.48 lbs ai/gal; fluxapyroxad (FRAC 7), 0.74 lbs ai/gal

year	2020	2021	2021	
location	Carrington	Carrington	Carrington	
funding	BASF	BASF	Gowan	
variety	DSR-0418	DSR-0807	DSR-0807	
brand, maturity	Dairyland, 0.4	Dairyland, 0.8	Dairyland, 0.8	
row spacing	21 inches	21 inches	21 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	spring wheat	spring wheat	spring wheat	
planting date	May 18	May 12	May 12	
disease assessment date	Oct. 15	Oct. 4	Oct. 4	
rows assessed for disease	1	1	1	
harvest date	Oct. 16	Oct. 6	Oct. 7	
date fungicide was applied	July 14	July 26	July 26	
growth stage, 1st applic.	100% R2	R3	R3	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
canopy closure, 1st applic	65-95%	1	1	
nozzles, pressure, 1st applic.	AIXR110015, 60 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 1st applic.	medium	coarse	coarse	
adjuvant	none	Masterlock 6.4 fl oz	Induce 0.25%	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	

Sclerotinia incidence (% of plants)

UNTREATED	26 b	34 a	35 a
REVYTEK 8.0 fl oz/ac	30 b	35 a	33 a
ENDURA 6.0 oz/ac	3 a		20 a
CV:	30.7	35.6	20.3

Sclerotinia severity index (% of canopy)

UNTREATED	10 b	24 a	23 a
REVYTEK 8.0 fl oz/ac	13 b	23 a	21 a
ENDURA 6.0 oz/ac	1 a		12 a
CV:	39.5	19.8	26.9

Yield

UNTREATED	45 a	53 a	56 a
REVYTEK 8.0 fl oz/ac	47 a	55 a	57 a
ENDURA 6.0 oz/ac	49 a		62 a
CV:	15.1	8.6	9

Revytek (8 fl oz/ac) versus Endura (6.0 oz/ac)

COMBINED ANALYSIS, 2 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at R2 or R3 The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
UNTREATED	30 a	17 b	51 a	
REVYTEK 8.0 fl oz/ac	31 a	17 b	52 a	
ENDURA 6.0 oz/ac	12 a	7 a	55 a	
CV:	21.1	11.3	2.3	

Revytek (8 fl oz/ac) versus non-treated

COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	Single fungicide application at R2 or R3
REVYTEK 8.0 fl oz/ac	32 a	19.3 a	51 b	
ENDURA 6.0 oz/ac	33 a	18.9 a	53 a	
CV:	6.3	8.8	0.7	

0% reduction
2% reduction
3% increase

Fungicide efficacy: MANAGEMENT OF WHITE MOLD IN SOYBEANS

Revytek 8 fl oz - two fungicide applications

mefentrifluconazole (FRAC 3), 1.11 lbs ai/gal; pyraclostrobin (FRAC 11), 1.48 lbs ai/gal; fluxapyroxad (FRAC 7), 0.74 lbs ai/gal

	year 2021	2021	2022	
location	Carrington	Carrington	Carrington	
funding	BASF	Gowan	BASF	
variety	DSR-0807	DSR-0807	AG09Xf0	
brand, maturity	Dairyland, 0.8	Dairyland, 0.8	Asgrow, 0.9	
row spacing	21 inches	21 inches	14 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	spring wheat	spring wheat	dry bean	
planting date	May 12	May 12	May 27	
disease assessment date	Oct. 4	Oct. 4	Oct. 19	
rows assessed for disease	1	1	1	
harvest date	Oct. 6	Oct. 7	Oct. 21	
dates, applications 1 and 2	July 26, Aug. 6	July 26, Aug. 6	July 23, Aug. 1	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
interval between applications	11 days	11 days	9 days	
growth stage, 1st application	R3	R3	100% R2	
canopy closure, 1st application	100%	100%	99-100%	
nozzles, pressure, 1st application	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 1st application	coarse	coarse	coarse	
canopy closure, 2nd application	100%	100%	100%	
nozzles, pressure, 2nd application	AIXR110015, 50 psi	AIXR110015, 50 psi	AIXR110015, 50 psi	
droplet size, 2nd application	coarse	coarse	coarse	
adjuvant	Masterlock 6.4 fl oz	Induce 0.25%	Masterlock 6.4 fl oz	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	

Sclerotinia incidence (% of plants)

Non-treated control	42 a	35 a	82 b
REVYTEK 8 fl oz/ac	43 a	33 a	67 a
ENDURA 6 oz/ac	36 a	20 a	53 a
CV:	38.8	20.3	14.4

Sclerotinia severity index (% of canopy)

Non-treated control	27 a	23 a	70 b
REVYTEK 8 fl oz/ac	26 a	21 a	51 a
ENDURA 6 oz/ac	19 a	12 a	40 a
CV:	25	26.9	17.5

Soybean yield (bushels/acre)

Non-treated control	51 a	56 a	25 b
REVYTEK 8 fl oz/ac	51 a	57 a	33 b
ENDURA 6 oz/ac	55 a	62 a	42 a
CV:	13	9	10.7

Revytek (8 fl oz/ac) versus Endura (6.0 oz/ac) COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
Non-treated control	53 a*	40 a*	44 a*	Two sequential applications: R2 or R3 + 9-11 days later
REVYTEK 8 fl oz/ac	47 a	33 a	47 a	
ENDURA 6 oz/ac	37 a	24 a	53 a	The first fungicide application was delayed until R3 when weather did not favor white mold earlier in bloom.
CV:	13.8	20.6	7.2	

Revytek (8 fl oz/ac) versus non-treated COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	53 a	40 a	44 b	Two sequential applications: R2 or R3 + 9-11 days later
REVYTEK 8 fl oz/ac	47 a	33 a	47 a	
CV:	6.3	8.8	0.7	

11% reduction

18% reduction

6% increase

Fungicide efficacy: **MANAGEMENT OF WHITE MOLD IN SOYBEANS**

Topsin/generic 20 fl oz - single fungicide application

thiophanate-methyl (FRAC 1), 4.5 lbs ai/gal

year	2020	2020	2020	2020	2020	2023
location	Oakes	Oakes	Carrington	Carrington	Carrington	Carrington
funding	ND Soybean Council	ND Soybean Council	ND Soybean Council	Gowan	BASF	ND Soybean Council
variety	GH0543X	14R09N	14R09N	DSR-0418	DSR-0418	21XF07
brand, maturity	Golden Harvest, 0.5	Peterson Farms, 0.9	Peterson Farms, 0.9	Dairyland, 0.4	Dairyland, 0.4	Peterson Farms, 0.7
row spacing	22.5 inches	22.5 inches	21 inches	21 inches	21 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	sunflowers	sunflowers	dry bean	spring wheat	spring wheat	chickpeas
planting date	May 12	May 12	May 18	May 18	May 18	May 24-25
disease assessment date	Aug. 26. 28	Sept. 25	Oct. 12-15	Oct. 16	Oct. 15	Oct. 12-13
rows assessed for disease	1	1	1	1	1	1
harvest date	Oct. 8-9	Oct. 8-9	Oct. 15-16	Oct. 19	Oct. 16	Oct. 17
date fungicide was applied	July 8	July 8	July 10	July 16	July 14	July 22
growth stage, 1st applic.	65% R2, 35% R3	79% R2, 21% R3	89% R2, 100% bloom	100% R2	100% R2	100% R2
canopy closure, 1st applic	91% average	87% average	87% average	75-85%	65-95%	98-100%
nozzles, pressure, 1st applic.	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 50 psi
droplet size, 1st applic.	medium	medium	medium	medium	medium	coarse
adjuvant	none	none	none	none	none	none
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)						
UNTREATED	4 a	2 a	18 ab	25 a	26 b	79 a
TOPSIN or generic 20 fl oz/ac	4 a	4 a	25 b	26 a	16 ab	69 a
ENDURA 5.5 or 6.0 oz/ac	2 a	2 a	12 a	31 a	3 a	
CV:	55	46	43	53	31	13

Sclerotinia severity index (% of canopy)						
UNTREATED	2 a	1 a	11 ab	8 a	10 b	60 b
TOPSIN or generic 20 fl oz/ac	2 a	2 a	17 b	8 a	5 ab	48 a
ENDURA 5.5 or 6.0 oz/ac	1 a	0 a	7 a	10 a	1 a	
CV:	46	49	53	68	40	15

Yield						
UNTREATED	77 a	76 a	53 a	46 a	45 a	32 a
TOPSIN or generic 20 fl oz/ac	79 a	76 a	50 a	45 a	46 a	38 a
ENDURA 5.5 or 6.0 oz/ac	77 a	79 a	54 a	42 a	49 a	
CV:	3.5	3.8	6.8	8.2	15.1	17

Topsin/generic (20 fl oz/ac) versus Endura (5.5 or 6.0 oz/ac)				COMBINED ANALYSIS, 5 studies		
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield			
UNTREATED	15 a	6 a	59 a	Single fungicide application at early to full R2		
TOPSIN or generic 20 fl oz/ac	15 a	7 a	59 a			
ENDURA 5.5 or 6.0 oz/ac	10 a	4 a	60 a			
CV:	44.3	52.6	2.9			

Topsin/generic (20 fl oz/ac) versus non-treated				COMBINED ANALYSIS, 6 studies		
	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield			
UNTREATED	26 a	15 a	55 a	Single fungicide application at early to full R2		
TOPSIN or generic 20 fl oz/ac	24 a	13 a	56 a			
CV:	20.2	31.2	3.1			
		7% reduction		13% reduction	2% increase	

Fungicide efficacy: MANAGEMENT OF WHITE MOLD IN SOYBEANS

Topsin/generic 20 fl oz - two sequential applications

thiophanate-methyl (FRAC 1), 4.5 lbs ai/gal

	2020	2020	2020	2023	
year	2020	2020	2020	2023	
location	Oakes	Oakes	Carrington	Carrington	
funding	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	
variety	GH0543X	14R09N	14R09N	21Xf07	
brand, maturity	Golden Harvest, 0.5	Peterson Farms, 0.9	Peterson Farms, 0.9	Peterson Farms, 0.7	
row spacing	22.5 inches	22.5 inches	21 inches	14 inches	
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	
previous crop	sunflowers	sunflowers	dry bean	chickpeas	
planting date	May 12	May 12	May 18	May 24-25	
disease assessment date	Aug. 26. 28	Sept. 25	Oct. 12-15	Oct. 12-13	
rows assessed for disease	1	1	1	1	
harvest date	Oct. 8-9	Oct. 8-9	Oct. 15-16	Oct. 17	
dates, applications 1 and 2	July 8, 15	July 8, 15	July 10, 20	July 22, Aug. 2	The first fungicide application was delayed until late R2 when weather did not favor white mold earlier in bloom.
interval between applications	7 days	7 days	10 days	11 days	
growth stage, 1st application	65% R2, 35% R3	79% R2, 21% R3	89% R2, 100% bloom	100% R2	
canopy closure, 1st application	91% average	87% average	87% average	98-100%	
nozzles, pressure, 1st application	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 60 psi	AIXR110015, 50 psi	
droplet size, 1st application	medium	medium	medium	coarse	
canopy closure, 2nd application	95% average	94% average	98% average	100%	
nozzles, pressure, 2nd application	AIXR110015, 40 psi	AIXR110015, 40 psi	AIXR110015, 40 psi	AIXR110015, 40 psi	
droplet size, 2nd application	coarse	coarse	coarse	coarse	
adjuvant	none	none	none	none	
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	

Sclerotinia incidence (% of plants)

Non-treated control	4 b	2 b	18 b	79 b
TOPSIN or generic 20 fl oz/ac	3 ab	3 b	11 ab	68 a
ENDURA 5.5 oz/ac	1 a	0 a	6 a	
CV:	55.1	45.6	43.5	12.6

Sclerotinia severity index (% of canopy)

Non-treated control	2 b	1 b	11 b	60 b
TOPSIN or generic 20 fl oz/ac	1 ab	1 b	7 ab	47 a
ENDURA 5.5 oz/ac	0 a	0 a	3 a	
CV:	45.9	48.8	53.0	15.4

Soybean yield

Non-treated control	77 a	76 a	53 a	32 a
TOPSIN or generic 20 fl oz/ac	79 a	76 a	55 a	40 a
ENDURA 5.5 oz/ac	77 a	79 a	57 a	
CV:	3.5	3.8	6.8	17

Topsin/generic (20 fl oz/ac) versus Endura (5.5 oz/ac) COMBINED ANALYSIS, 3 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	8 b	5 b	69 a	Two sequential applications: early to late R2 + 7-11 days later
TOPSIN or generic 20 fl oz/ac	6 b	3 ab	70 a	
ENDURA 5.5 oz/ac	2 a	1 a	71 a	
CV:	13.2	20.7	2.2	

Topsin/generic (20 fl oz/ac) versus non-treated COMBINED ANALYSIS, 4 studies

	Sclerotinia incidence (%)	Sclerotinia DSI (%)	Yield	
UNTREATED	26 a	18 a	60 a	
TOPSIN or generic 20 fl oz/ac	21 a	14 a	63 a	5% increase
CV:	8.5	11.6	4	18% reduction

Fungicide efficacy: MANAGEMENT OF WHITE MOLD (Sclerotinia stem rot) OF SOYBEANS

Topsin/generic 40 fl oz - single application

thiophanate-methyl (FRAC 1), 4.5 lbs ai/gal

year	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022	2022
location	Oakes	Oakes	Oakes	Carrington	Carrington	Carrington	Carrington	Carrington	Carrington	Carrington	Oakes	Oakes	Oakes
funding	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council
variety	AG06X8	AG09Xf0	AG11X8	AG009X8	AG06X8	AG09Xf0	AG06X8	XO0602E	XO0731E	AG09Xf0	DSR1120	AG11X8	AG09Xf0
brand, maturity	Asgrow, 0.6	Asgrow, 0.9	Asgrow, 1.1	Asgrow, 0.09	Asgrow, 0.6	Asgrow, 0.9	Asgrow, 0.6	Xitavo, 0.6	Xitavo, 0.7	Asgrow, 0.9	Dairyland, 1.1	Asgrow, 1.1	Asgrow, 0.9
row spacing	21 inches	21 inches	21 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	various crops	various crops	various crops	sunflowers	sunflowers	sunflowers	dry bean	dry bean	dry bean	dry bean	various	various	various
planting date	May 4	May 4	May 4	May 17	May 17	May 17	May 27	May 27	May 27	May 27	June 2	June 2	June 2
disease assessment date	Sept. 30	Sept. 30	Sept. 30	Oct. 4-5	Oct. 4-5	Oct. 4-5	Oct. 14-19	Oct. 14-19	Oct. 14-19	Oct. 14-19	Oct. 21	Oct. 21	Oct. 21
rows assessed for disease	1	1	1	1	1	1	1	1	1	1	1	1	1
harvest date	Oct. 7-8	Oct. 7-8	Oct. 7-8	Oct. 15-16	Oct. 15-16	Oct. 15-16	Oct. 20	Oct. 20	Oct. 20	Oct. 20	Oct. 21-22	Oct. 21-22	Oct. 21-22
date fungicide was applied	July 5	July 5	July 5	July 23	July 23	July 23	July 21	July 21	July 21	July 21	July 24	July 24	July 24
growth stage, 1st applic.	81% R2 100% bloom	66% R2 100% bloom	70% R2 100% bloom	100% R2	100% R2	100% R2	100%R2	100% R2	98% R2 100% bloom	100%R2	100%R2	100%R2	100%R2
canopy closure, 1st applic	90-100%	95-100%	95-100%	90-95%	95-100%	95-100%	99-100%	0.95	98-100%	97-100%	95-100%	95-100%	95-100%
nozzles, pressure, 1st applic.	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi
droplet size, 1st applic.	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse
adjuvant	none	none	none	none	none	none	none	none	none	none	none	none	none
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)													
UNTREATED	55 a	43 b	51 a	8 b	77 b	62 a	92 a	80 b	91 b	79 b	3 a	12 a	8 a
TOPSIN or generic 40 fl oz/ac	61 a	37 ab	52 a	2 a	62 ab	55 a	83 a	65 a	74 a	65 a	2 a	4 a	5 a
ENDURA 5.5 oz/ac	54 a	27 a	44 a	3 a	51 a	42 a	81 a	63 a	79 ab	65 a	2 a	4 a	3 a
CV:	29.9	38.4	37.4	91.7	27.9	32.0	13.0	13.2	11.3	12.9	105.9	78.5	73.2

Sclerotinia severity index (% of canopy)													
UNTREATED	38 a	29 a	34 a	4 b	49 b	37 b	86 a	72 b	84 b	70 b	1 a	5 a	3 a
TOPSIN or generic 40 fl oz/ac	42 a	26 a	36 a	1 a	37 ab	31 ab	73 a	55 a	64 a	53 a	1 a	2 a	1 a
ENDURA 5.5 oz/ac	40 a	18 a	30 a	2 ab	30 a	19 a	71 a	53 a	68 a	55 a	1 a	1 a	1 a
CV:	36.2	52.1	17.1	117.1	39.4	49.0	15.3	16.5	13.0	15.5	133.6	98.2	84.8

Yield													
UNTREATED	60 a	67 a	68 a	58 a	42 b	41 a	25 b	29 b	21 b	25 b	67 a	73 a	71 a
TOPSIN or generic 40 fl oz/ac	58 a	66 a	68 a	60 a	48 ab	43 a	34 a	40 a	32 a	34 a	67 a	75 a	71 a
ENDURA 5.5 oz/ac	64 a	72 a	68 a	59 a	55 a	53 a	37 a	37 a	31 a	40 a	70 a	75 a	72 a
CV:	14.7	8	11.5	6.1	9.1	9	12.1	10.6	13.3	10.6	4.8	5.8	4.8

Topsin/generic (40 fl oz/ac) versus Endura (5.5 oz/ac)			
COMBINED ANALYSIS, 13 studies			
	Sclerotinia incidence % of plants	Sclerotinia severity index % of canopy	Yield bu/ac
Single fungicide application at early to full R2	UNTREATED 51 b	39 b	50 b
	TOPSIN or generic 40 fl oz/ac 44 a	32 a	53 a
	ENDURA 5.5 oz/ac 40 a	30 a	56 a
CV:	10.4	14.5	6.3

Topsin/generic (40 fl oz/ac) versus non-treated			
COMBINED ANALYSIS, 13 studies			
	Sclerotinia incidence % of plants	Sclerotinia severity index % of canopy	Yield bu/ac
Single fungicide application at early to full R2	UNTREATED 51 a	39 a	50 a
	TOPSIN or generic 40 fl oz/ac 44 a	32 a	53 a
	CV: 8.5	11.6	4
	reduction	reduction	increase

Fungicide efficacy: MANAGEMENT OF WHITE MOLD (Sclerotinia stem rot) OF SOYBEANS

Topsin 40 fl oz/ac followed by Endura 5.5 oz/ac versus Endura 5.5 oz/ac applied twice sequentially

	TOPSIN: thiophanate-methyl (FRAC 1), 4.5 lbs ai/gal						ENDURA: boscalid (FRAC 7), 70% by weight						
year	2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022	2022
location	Oakes	Oakes	Oakes	Carrington	Carrington	Carrington	Carrington	Carrington	Carrington	Carrington	Oakes	Oakes	Oakes
funding	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council	ND Soybean Council
variety	AG06X8	AG09XF0	AG11X8	AG009X8	AG06X8	AG09XF0	AG06X8	XO0602E	XD00731E	AG09XF0	DSR1120	AG11X8	AG09XF0
brand, maturity	Asgrow, 0.6	Asgrow, 0.9	Asgrow, 1.1	Asgrow, 0.09	Asgrow, 0.6	Asgrow, 0.9	Asgrow, 0.6	Xitavo, 0.6	Xitavo, 0.7	Asgrow, 0.9	Dairyland, 1.1	Asgrow, 1.1	Asgrow, 0.9
row spacing	21 inches	21 inches	21 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches	14 inches
seeding rate	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac	165,000 pls/ac
previous crop	various crops	various crops	various crops	sunflowers	sunflowers	sunflowers	sunflowers	dry bean	dry bean	dry bean	dry bean	various	various
planting date	May 4	May 4	May 4	May 17	May 17	May 17	May 27	May 27	May 27	May 27	June 2	June 2	June 2
disease assessment date	Sept. 30	Sept. 30	Sept. 30	Oct. 4-5	Oct. 4-5	Oct. 4-5	Oct. 14-19	Oct. 14-19	Oct. 14-19	Oct. 14-19	Oct. 21	Oct. 21	Oct. 21
rows assessed for disease	1	1	1	1	1	1	1	1	1	1	1	1	1
harvest date	Oct. 7-8	Oct. 7-8	Oct. 7-8	Oct. 15-16	Oct. 15-16	Oct. 15-16	Oct. 21	Oct. 20	Oct. 20	Oct. 20	Oct. 21-22	Oct. 21-22	Oct. 21-22
dates, applications 1 and 2	July 5, 12	July 5, 12	July 5, 19	July 23, 30	July 23, 30	July 23, 30	July 21, 28	July 21, 28	July 21, 28	July 21, 28	July 24, Aug. 5	July 24, Aug. 5	July 24, Aug. 3
interval between applications	7 days	7 days	14 days	7 days	7 days	7 days	7 days	7 days	7 days	7 days	12 days	12 days	10 days
growth stage, 1st application	81% R2, 100% bloom	66% R2, 100% bloom	70% R2, 100% bloom	100% R2	100% R2	100% R2	100%R2	100% R2	98% R2, 100% in blo	100%R2	100%R2	100%R2	100%R2
canopy closure, 1st application	90-100%	95-100%	95-100%	90-95%	95-100%	95-100%	95%	95%	98-100%	100%	95-100%	95-100%	95-100%
nozzles, pressure, 1st application	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi
droplet size, 1st application	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse
canopy closure, 2nd application	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
nozzles, pressure, 2nd application	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi	AIXR110015 50 psi
droplet size, 2nd application	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse	coarse
adjuvant	none	none	none	none	none	none	none	none	none	none	none	none	none
fungicide spray volume	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac	15 gal/ac
application method	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom	hand-held boom

Sclerotinia incidence (% of plants)													
Non-treated control	55 a	43 b	51 b	8 b	77 bc	62 b	92 b	80 b	91 b	79 b	3 a	12 a	8 a
Endura 5.5 oz applied twice	38 a	12 a	17 a	2 a	34 a	19 a	67 a	55 a	71 a	71 a	2 a	4 a	3 a
Topsin 40 fl oz / Endura 5.5 oz	38 a	24 a	29 a	3 a	62 ab	36 a	65 a	54 a	66 a	59 a	1 a	3 a	2 a
CV:	29.9	38.4	37.4	91.7	27.9	32.0	13.0	13.2	11.3	12.9	105.9	78.5	73.2

Sclerotinia severity index (% of canopy)													
Non-treated control	38 a	29 b	34 b	4 b	49 b	37 b	86 b	72 b	84 b	70 b	1 a	5 a	3 a
Endura 5.5 oz applied twice	27 a	8 a	10 a	1 a	17 a	6 a	55 a	44 a	58 a	58 a	1 a	1 a	1 a
Topsin 40 fl oz / Endura 5.5 oz	29 a	16 a	16 a	1 a	37 b	15 a	54 a	44 a	54 a	43 a	0 a	1 a	1 a
CV:	36.2	52.1	17.1	117.1	39.4	49.0	15.3	16.5	13.0	15.5	133.6	98.2	84.8

Soybean yield													
Non-treated control	60 a	67 a	68 b	58 a	42 a	41 a	25 b	29 b	21 b	25 b	67 a	73 a	71 a
Endura 5.5 oz applied twice	67 a	76 a	85 a	58 a	59 b	58 a	47 a	47 a	38 a	38 a	68 a	76 a	70 a
Topsin 40 fl oz / Endura 5.5 oz	65 a	73 a	82 a	58 a	48 a	53 a	43 a	44 a	40 a	42 a	68 a	79 a	69 a
CV:	14.7	8.0	11.5	6.1	9.1	9.0	12.1	10.6	13.3	10.6	4.8	5.8	4.8

Topsin/generic (40 fl oz/ac) followed by Endura (5.5 oz/ac) vs Endura (5.5 oz/ac) applied twice sequentially	Sclerotinia incidence % of plants	Sclerotinia severity index % of canopy	Yield bu/ac
COMBINED ANALYSIS, 13 studies	51 b	39 b	50 b
Two fungicide applications: early to full R2 + 7-14 days later	34 a	24 a	59 a
	30 a	22 a	60 a
CV:	9.9	9.9	8.5

Topsin/generic (40 fl oz/ac) followed by Endura (5.5 oz/ac) vs non-treated	Sclerotinia incidence % of plants	Sclerotinia severity index % of canopy	Yield bu/ac
COMBINED ANALYSIS, 13 studies	51 a	39 a	50 a
Two fungicide applications: early to full R2 + 7-14 days later	34 a	24 a	59 a
CV:	9	6.1	9.6

33% reduction **39% reduction** **18% increase**