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2001 Canola and Crambe Fungicide Trials in Minnesota and North Dakota

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Fungicide trials for Sclerotinia stem rot management were conducted on canola at eight sites in Minnesota and North Dakota.

A core of treatments, known as the uniform fungicide trial, was tested at three locations, and portions of those treatments were included in other trials.

The uniform trial included the only registered products Ronilan and Quadris as well as products that might be registered within the next several years. These products were tested at various bloom stages; some unregistered products were also tested at more than one application rate.

The trials at Carrington, Langdon and Red Lake Falls, Minn., were inoculated with a commercial source of Sclerotinia ascospores and kept under a misting system that provided periodic misting for a set number of minutes each hour to keep the plants wet and favor infection.

Most inoculations were made at around 50% bloom, and fungicides were applied at 10-20% bloom, 30-40% bloom and 50-60% bloom.

Details will be given with each individual trial.

Red Lake Falls, Minn.

Dave LeGare, University of Minnesota

The trial was seeded on 10 May with the variety 44A89 at a target seeding rate of 10 viable plants per square foot. Plots were 5 feet wide by 20 feet long and replicated four times. A border plot of Hylite 201 (apetalous) was between each treatment plot. The field was seeded to canola in 2000. The trial was sprayed with Quadris (6.2 oz / A) at the 3 leaf stage to help prevent a blackleg infestation. The trial was misted 12 times per day for 5 minutes each time from 29 June to 31 July to increase the probability of infection. There were high temperatures and very little rain during early and mid bloom (20 June to 16 July). After 16 July conditions were warm to hot and wet to very wet all the way through harvest. The plots were inoculated with spores three times with a Solo backpack mist-blower. Inoculations occurred on 29 June, 6 July and 10 July with an average concentration of 2400 spores per square foot. Natural inoculum levels were high and were noted with petal tests taken on non-inoculated plots on 26 June (35% petals infected) and 2 July (59% petals infected). Also, a range of fill that was not inoculated or misted but had mist drift on it had disease incidence levels of over 70% in the 44A89 plots. Fungicides were applied on 29 June at about 30% bloom. A $C0_2$ powered back-pack sprayer, equipped with six 8002 twin-jet nozzles on 12 inch spacings, was used to apply 17 gpa spray solution at 40 psi. Incidence (percent infected plants) reflects the percent of plants showing any infection when counting 50 plants in the middle of the plot. The 1-5 infection level was the average score of the infected plants that were counted where:

1 = superficial lesions or small branch infected;
2 = large branch dead;
3 = main stem at least 50% girdled;
4 = main stem girdled but plant produced good seed;
5 = main stem girdled, much reduced yield.

Chemical	Rate/Acre	Yield, lb/A	% Plants Infected	Infection Level (1-5)
Check	—	1275	61	3.8
Benlate	16 oz	1559	9	1.5
Ronilan	12 oz	1521	35	2.8
Topsin M	24 oz	1584	23	2.5
Topsin M	16 oz	1442	48	3.3
Mean		1476	35.5	2.75
LSD (0.05)		213.0	16.7	1.10
C.V.		9.36	30.7	25.9
Pr>F Test		0.0503	0.0002	0.0085

Canola Production Center, Thief River Falls, Minn.

Dave LeGare, University of Minnesota

The trial was seeded on 17 May with the variety 44A89 at a seeding rate of 5.5 lb / ac. Plots were 30 feet wide by 400 feet long and replicated four times. The field was seeded to wheat in 2000. Canola had never been on the field and sunflowers were on the field in 1996. There were high temperatures and very little rain during early and mid-bloom (20 June to 16 July).

After 16 July conditions were warm to hot and wet all the way through pod fill. The plots were not inoculated with spores or misted. Natural inoculum levels were low early in bloom. A petal test taken on 3 July showed only 9% infected petals. However, rains later in the flowering period may have provided increased inoculum for the later flowers to be infected.

Fungicides were applied with a tractor mounted sprayer equipped with 8002 twin-jet nozzles at 75 psi and 20 gal / A spray solution. Incidence (percent infected plants) reflects the percent of plants showing any infection. Incidence was obtained by taking three 100-plant counts along the edge of the swathed area (18 foot swather) in the plot at the front, middle and back of the 400 foot plots.

Fungicide	Rate/Acre	Timing % Bloom	Applic. Date	Yield, lb/A	% Infected Plants	Average Infection Score (1-5)	Contribution Margin ($/A)
Check	—	—	—	1468	26	4.7	3.69
Folicur*	4 fl oz	25%	3 Jul	1563	24	4.8	–3.28
Ronilan	12 oz	25%	3 Jul	1643	8	3.4	–1.79
Rovral Flo**	14.4 fl oz	25%	3 Jul	1601	7	3.9	–7.08
Rovral Flo**	14.4 fl oz	55%	9 Jul	1703	6	3.9	1.96
Topsin M	16 oz	35%	5 Jul	1685	3	2.8	1.56
Mean				1611	12	3.9	
LSD (0.10)				80.9	11.7	1.12	
C.V.				4.1	77.9	23.0	
P>F Test				0.0014	0.0125	0.0533	

Note: Contribution margins reflect differences in yield and fungicide costs, and take into account seed, fertilizer, herbicide, insecticide, and tillage costs.

* Adjuvant included Induce at 0.25% v / v
** Adjuvant included PrimeOil at 1% v / v

Uniform Trial, Langdon

Bryan Hanson, NDSU Langdon Research Extension Center

The trial was conducted at the Langdon Research Extension Center (LREC) and also in a commercial field. The LREC trial was planted on 11 May with the cultivar 'Minot RR'. Previous crop was fallow. Sclerotia were spread across the trial area just prior to planting. The trial was irrigated with an overhead sprinkler system. The commercial field was planted in May. Plot size was 3.5 ft x 16 ft with a canola border between every plot. A CO_2 pressurized backpack style sprayer with 80015 flat fan nozzles spaced at 20 inches was used to apply an 18 gpa fungicide suspension at 40 psi. The 10-20%, 30-40% and 50-60% bloom treatments at the LREC were sprayed on 29 June, 4 July and 5 July, respectively. The 4 July treatments were sprayed early morning and the 5 July treatments were sprayed late in the day. The 10-20%, 30-40% and 50-60% bloom treatments at the commercial field were sprayed 2 July, 6 July and 9 July, respectively. On 5 July at the LREC site, ascospores at a concentration of approximately 5,200 spores / ml were sprayed on all treatments at a rate of 18 gpa. From 1 June to 21 June 5.37 inches of rain was recorded at the LREC. After that wet spell only 0.05 inches was recorded from 22 June until 13 July. During this time the top few inches of soil at the commercial field became quite dry. The top layer of soil at the LREC location remained wet with the use of the irrigation system. From 14 July to 28 July rainfall was recorded on 11 days. These conditions were very favorable for disease development. The use of the irrigation system to keep the surface wet during the 21 days with little rainfall may have accounted for the higher level of disease infection at the LREC location. Twenty five stems were counted in two locations within each plot and percent girdled stems recorded for disease assessments just prior to swathing. The experimental design was a randomized complete block with three replications at the LREC and four replications at the commercial field.

	Uniform Fungicide Trial			Langdon REC		Commercial Field	
Fungicide	Adjuvant	Rate/ Acre	Timing % Bloom	% Girdled Stems	Yield, lb/A	% Girdled Stems	Yield, lb/A
Untr.	—	—	—	58.7	1303	11.5	1822
Benlate	—	1 lb	30-40	10.7	1906	1.5	1726
Rovral 4F	Aphiol*	14.4 fl oz	10-20	16.0	1702	3.5	1789
Rovral 4F	Aphiol*	14.4 fl oz	30-40	19.0	1871	2.0	1825
Rovral 4F	Aphiol*	14.4 fl oz	50-60	6.7	1999	0.8	1835
Ronilan	—	12 oz	10-20	19.3	1552	10.5	1755
Ronilan	—	12 oz	30-40	12.0	1955	4.5	1802
Ronilan	—	12 oz	50-60	11.3	1942	1.0	1875
Ronilan	—	10.7 oz	30-40	19.7	1933	6.5	1659
BAS 510	—	4.07 oz	30-40	7.0	2039	2.5	1649
BAS 510	—	5.1 oz	10-20	17.0	1884	4.5	1782
BAS 510	—	5.1 oz	30-40	26.0	1809	3.0	1805
BAS 510	—	5.1 oz	50-60	22.0	2039	0.5	1742
BAS 510	—	6.1 oz	30-40	0.7	2212	1.0	1656
Folicur	—	4 fl oz	10-20	31.7	1724	7.8	1692
Folicur	—	4 fl oz	30-40	41.3	1485	13.8	1912
Folicur	—	4 fl oz	50-60	18.7	1831	3.0	1868
Folicur	—	6 fl oz	30-40	24.7	1813	7.5	1835
Quadris	—	9.6 fl oz	10-20	44.3	1556	12.3	1632
Ronilan	LOL 9831**	12 oz	30-40	24.0	1720	6.3	1972
BAS 510	LOL 9831**	5.1 oz	30-40	8.7	1995	1.0	1865
Topsin M	—	1 lb	30-40	6.0	2035	0.3	1835
Topsin M	—	1.5 lb	30-40	—	—	0.5	1895
Topsin M	—	1 lb + 1 lb 7 da later		—	—	0.5	1848
Mean				20.2	1832	4.4	1795
C.V. %				72.3	10.5	88.9	9.1
LSD 5%				24.1	318	5.5	NS
LSD 1%				32.2	425	7.4	NS

* Aphiol at 1% v / v
** LOL 9831 at 1.25% v / v

Uniform Trial, Carrington

Gregory Endres and Bob Henson, Carrington Research Extension Center

'Minot' cultivar was planted 10 May at 15 PLS / ft^2 at the Carrington Research Extension Center (CREC). Previous crop was sunflower heavily infected with Sclerotinia wilt and head rot. Experimental design was a randomized complete block with four replications. Plot size was 5 x 25 ft and a canola border separated each plot. Fungicides were applied with a CO_2 pressurized hand-boom sprayer with 80015 flat fan nozzles, 20 inch spacing, 40 PSI and 23 GPA.

The 10-20%, 30-40% and 50-60% bloom treatments were applied on 29 June, 2 July and 5 July, respectively. Approximately 300,000 ascospores were applied / plot with the CO_2 pressurized hand boom sprayer at 30 PSI and 14 GPA on 3 July to canola at 40-50% flower. The misting system applied water 3-10 minutes / 30-minute periods continuously starting on 3 July and concluding prior to swathing with the objective of keeping the foliage wet for sclerotinia infection and development. Plant disease incidence was visually evaluated on 9 August by examining 50 plants / plot (12 or 13 plants / quadrant) and recording the percent of plants showing any sign of infection. Plot disease incidence was evaluated on 10 August by examining the whole plot and estimating the percent of visible plant material showing symptoms. The trial was swathed on 10 August and machine harvested on 17 August.

Fungicide	Rate/ Acre	Timing, % Bloom	% Plant Incidence	% Plot Incidence	Yield, lb/A
Untreated	—	—	73	53	1776.4
Benlate	16 oz	30-40	35	22	2053.5
Topsin M	16 oz	10-20	67	67	1774.6
Topsin M	16 oz	30-40	23	24	1795.7
Topsin M	16 oz	50-60	35	19	2047.8
Rovral*	14.4 fl oz	30-40	12	8	2140.5
Rovral*	14.4 fl oz	50-60	65	34	1716.0
Ronilan	12 oz	10-20	65	44	1738.1
Ronilan	12 oz	30-40	79	40	2074.0
Ronilan	12 oz	50-60	65	37	1813.5
Ronilan	10.7 oz	30-40	57	25	1967.4
BAS 510	4.07 oz	30-40	43	28	1895.8
BAS 510	5.1 oz	10-20	58	30	1724.8
BAS 510	5.1 oz	30-40	46	32	2074.2
BAS 510	5.1 oz	50-60	62	30	1872.3
BAS 510	6.1 oz	30-40	39	18	1937.9
Folicur	4 fl oz	10-20	94	76	1797.1
Folicur	4 fl oz	30-40	43	28	1979.9
Folicur	4 fl oz	50-60	71	34	1895.3
Folicur	6 fl oz	30-40	76	53	1802.7
Quadris	9.6 fl oz	10-20	63	36	1479.0
Ca Sulfate	3 lb	10-20	56	35	1752.3
CaS + Ronilan	3 lb + 6 oz	10-20	64	26	1973.7
Mean			58	36	1865.8
C.V. %			35	36	13
LSD 5%			29	19	NS

* Adjuvant included Herbimax at 1% v / v cc

Newburg, Deschamp Farm

Kent McKay, Kristie Clark, Mike Hutter, Robert Gjellstad, North Central Research Center, Minot, and Northern Ag Management (Hutter)

'Li-Bred 449' Roundup Ready cultivar was planted on 14 May; the field was last planted to canola in 1998. Fungicides were applied at 20-30% bloom on 5 July. End of flowering was recorded on 23 July. The plots were swathed on 8 August and harvested on 15 August. There were 2.78 inches of rain recorded from planting to prior to bloom. There was only one rain event during the first 10 days of bloom that totaled 0.04 of an inch of precipitation. For the most part, conditions were not favorable for petal infection of Sclerotinia during the early and middle stages of flowering. Conditions were very dry from two weeks prior to bloom (20 June) to 10 days into bloom (10 July) with only 0.07 of an inch of precipitation recorded. Wet conditions prevailed the last two weeks of bloom with 10 rain events in 14 days totaling 1.91 inches of precipitation. This resulted in a late infection of Sclerotinia which tested the length of residual of each fungicide. The untreated check had a moderate Sclerotinia incidence of 34% with incidence reflected by the percent plants showing any infection. Field severity was 23%, with severity calculated by scoring plants in one of the following categories, then averaging the scores of all plants evaluated:

0, 20% girdling, 40% girdling, 60% girdling, 80% girdling or 100% girdling.

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Fungicide	Rate/Acre	Sclerotinia % Incidence	Sclerotinia % Severity	Yield, lb/A	Test weight, lb/bu
Untreated	—	34.2	23.1	1698	50.7
Ronilan	12 oz	9.2	4.5	1911	50.9
Ronilan	10.7 oz	14.2	6.7	1865	50.8
BAS 510	5.1 oz	10.0	4.9	1886	50.8
Folicur	4 fl oz	14.2	9.2	1837	50.8
Rovral + AphOil COC	14.4 fl oz + 1.0% v/v	12.5	6.4	1799	50.8
Topsin M	1 lb	7.5	4.2	2026	50.8
LSD (P=0.05)		9.8	5.6	172.5	0.49
Std. Deviation		5.5	3.2	97	0.28
CV		37.94	37.66	5.21	0.54

Newburg, Henry Farm

Kent McKay, Kristie Clark, Robert Gjellstad, North Central Research Extension Center, Minot

'Pioneer 45A55' Roundup Ready cultivar was planted 9 May in a randomized complete block with three replications. Fungicides were applied to 10 x 30 foot plots. First flower was recorded on 26 June and fungicides were applied 2 July at 40% bloom. Fungicides were applied with a back pack sprayer delivering 20 gpa at 30 psi through 8002 Twinjet nozzles. End of flower was recorded on 18 July. Visual evaluations of Sclerotinia were taken on 30 July. The plots were swathed on 8 August and harvested on 15 August.

There were 2.78 inches of precipitation from planting to first flower. There was only 0.04 of an inch of precipitation the first 10 days of flower; however, heavy dews were common. Apothecia from an adjacent field that was canola in 2000 could be found throughout the flowering period. The most significant weather period that impacted the trial was from 10 July to 18 July. There were seven days of recorded precipitation out of eight that totaled 1.64 inches. Plants and flower petals were continuously wet during this period. The plants in the untreated plots became severely infected with Sclerotinia late in the flowering period.

The late development of Sclerotinia tested the residual of each fungicide. When the plots were evaluated on 30 July, the untreated plots had a sclerotinia incidence of 39%. The untreated plots had a sclerotinia severity rating of 26%; which indicates a potential yield loss of 26%. See previous trial for a definition of incidence and severity.

All treatments significantly reduced the sclerotinia incidence and severity compared to the untreated. Topsin M, BAS 510, and all Ronilan treatments gave the best control of Sclerotinia. All treatments significantly increased yield compared to the check except the low rate of Ronilan + silicone.

Fungicide	Rate/Acre	Sclerotinia % Incidence	Sclerotinia % Severity	Yield, lb/A	Test Weight, lb/bu
Untreated	—	38.5	25.8	2049	52.0
Ronilan	12 oz	7.5	3.8	2633	51.6
Ronilan	10.6 oz	10.0	4.7	2493	51.5
Ronilan + Silicone Adjuvant	12 oz + 0.25% v/v	8.3	4.4	2447	51.7
Ronilan + Silicone Adjuvant	10.6 oz + 0.25% v/v	7.5	4.5	2269	51.6
BAS 510	5.1 oz	4.2	2.0	2598	51.6
Folicur + Induce	4 fl oz + 0.125% v/v	19.2	11.0	2443	51.5
Topsin M	1 lb	2.7	1.5	2516	51.5
LSD (P=0.05)		5.8	3.5	251.7	0.4
CV %		27.0	27.4	5.8	0.44

Summary and Conclusions: Canola Fungicide Trials

In general, the registered product Ronilan and the unregistered products Topsin M, Rovral and BAS 510 performed well and provided reduced disease incidence and increased yield. Folicur disease management was marginal when disease was severe and yield responses were inferior to those of the products listed above. However, when disease levels were only moderate, disease management with Folicur was fairly good and yield responses were competitive with the other products, particularly at the 4 fl oz rate, which is less expensive than the other options for which a price is available. Disease management with Quadris was minimal. Quadris was tested only at the 10-20% bloom period, based on previous research results and on the recommendations of the registrant, Syngenta.

BAS 510 performed as well as Ronilan and nearly as well or as well as Topsin M. The Langdon trials showed reduced disease management and yield with the 5.1 oz rate as compared to the 4.07 or the 6.1 oz rate. This makes no sense, and was not repeated in the other trials. BAS 510 received a reduced risk status from the U.S. Environmental Protection Agency in June of 2001, and full registration is expected in February 2003, suggesting that the product should be available for use in the 2003 cropping season. This leaves one more year for extensive testing before registration and its potential use on canola.

Calcium was tested only at Carrington. Its performance was not exceptional, but neither was that of most fungicides tested. The Carrington trial was especially severe, and no product performed really well, although Topsin M and BAS 510 provided the best overall disease management and yield.

Most products tested performed best when applied at 30-40% bloom, or even at 50-60% bloom, but not at 10-20% bloom. The performance at 50-60% bloom was a bit surprising based on Canadian data. However, it should be kept in mind that the weather was warm to hot at that time of the year, and there was very little time between 30-40% and 50-60% bloom; in fact, there was about 30 hours at Langdon. This suggests that what appears to be a fairly wide window of application may, in fact, be a narrow window of application when the weather is warm to hot. The ability to effectively apply a fungicide at 50-60% bloom, however, has some obvious benefits. The producer has additional time to make a decision to spray or not to spray, providing greater precision in the decision.

Various rating scales were used for disease. The figures for incidence are most readily compared among the various trials. However, even the incidence figures were not all taken in the same manner because in the Langdon trials incidence was "percent girdled stems," which can translate directly to yield loss, and in the other trials incidence was "percent plants showing any Sclerotinia infection." Nevertheless, the two measurements for incidence are likely to provide reasonably similar data sets. Other measurements taken included various estimations of disease by viewing the entire plot and giving it a 1-5 or 1-9 rating, or rating individual plants on a 1-5 scale for severity of infection.

A summary of all trials is presented in the next two tables.

Acknowledgements

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Yield (lb/A) of Core Treatments, Uniform Fungicide Trial (All Locations)

Fungicide	Rate/A	% Bloom	Red Lake Falls	Thief River Falls	Carrington	Langdon	Newburg Desch.	Newburg Henry
Untreated	—	—	1275	1468	1776	1303	1698	2049
Benlate	16 oz	30-40	1559*		2054	1906**		
Topsin M	16 oz	10-20			1775			
Topsin M	16 oz	30-40	1442	1685^	1796	2035**	2026*	2516*
Topsin M	16 oz	50-60			2048			
Rovral Flo	14.4 fl oz	10-20				1702*		
Rovral Flo	14.4 fl oz	30-40		1601^	2141	1871**	1799	
Rovral Flo	14.4 fl oz	50-60		1703^	1716	1999**		
Ronilan	12 oz	10-20			1738	1552		
Ronilan	12 oz	30-40	1521*	1643^	2074	1955**	1911*	2633*
Ronilan	12 oz	50-60			1814	1942**		
Ronilan	10.7 oz	30-40			1967	1933**	1865	2493*
BAS 510	4.07 oz	30-40			1896	2039**		
BAS 510	5.1 oz	10-20			1725	1884**		
BAS 510	5.1 oz	30-40			2074	1809**	1886*	2598*
BAS 510	5.1 oz	50-60			1872	2039**		
BAS 510	6.1 oz	30-40			1938	2212**		
Folicur	4 fl oz	10-20			1797	1724*		
Folicur	4 fl oz	30-40		1563^	1980	1485	1837	2443*
Folicur	4 fl oz	50-60			1895	1831**		
Folicur	6 fl oz	30-40			1803	1813**		
Quadris	9.6 fl oz	10-20			1479	1556		
LSD 10%, ^ = greater than untr.				80.9				
LSD 5%, * = greater than untr.			213		NS	318	172.5	251.7
LSD 1%, ** = greater than untr.							425	

Yield as % of Untreated for the Core Treatments, Uniform Fungicide Trial (All Locations)

Fungicide	Rate/A	% Bloom	Red Lake Falls	Thief River Falls	Carrington	Langdon	Newburg Desch.	Newburg Henry
Untreated	—	—	100	100	100	100	100	100
Benlate	16 oz	30-40	122*		116	146**		
Topsin M	16 oz	10-20			100			
Topsin M	16 oz	30-40	113	115^	101	156**	119*	123*
Topsin M	16 oz	50-60			115			
Rovral Flo	14.4 fl oz	10-20				131*		
Rovral Flo	14.4 fl oz	30-40		109^	121	144**	106	
Rovral Flo	14.4 fl oz	50-60		116^	97	153**		
Ronilan	12 oz	10-20			98	119		
Ronilan	12 oz	30-40	119*	112^	117	150**	113*	129*
Ronilan	12 oz	50-60			102	149**		
Ronilan	10.7 oz	30-40			111	148**	110	122*
BAS 510	4.07 oz	30-40			107	156**		
BAS 510	5.1 oz	10-20			97	142**		
BAS 510	5.1 oz	30-40			117	139**	111*	127*
BAS 510	5.1 oz	50-60			105	156**		
BAS 510	6.1 oz	30-40			109	170**		
Folicur	4 fl oz	10-20			101	132*		
Folicur	4 fl oz	30-40		106^	111	114	108	119*
Folicur	4 fl oz	50-60			107	141**		
Folicur	6 fl oz	30-40			102	139**		
Quadris	9.6 fl oz	10-20			83	119		

LSD 10%, ^ = significantly greater than untreated
LSD 5%, * = significantly greater than untreated
LSD 1%, ** = ignificantly greater than untreated

Crambe Fungicide Trial, Mohall

Kent McKay, Kristie Clark, Robert Gjellstad, North Central Research Extension Center, Minot

The trial on crambe was included with the canola data because they are related crops and the North Dakota state label for crambe was based on the label and data for canola. This appears to be the first data for crambe.

The trial was conducted on the Larry Johansen farm, 2 miles south of Mohall, North Dakota. 'BelAnn' crambe was seeded 9 May. First flower was recorded on 29 June. The first fungicide application, Timing 1, was applied 5 July at the 40% bloom stage. The second fungicide application, Timing 2, was applied on 9 July at the 60% bloom stage. Fungicides were applied with a back pack-type sprayer delivering 20 gpa at 30 psi through 8002 twin-jet nozzles. Fungicides were applied to a plot area of 10 by 30 feet. The trial design was a randomized complete block with three replications. End of flower was recorded on 23 July. Visual evaluations of Sclerotinia were taken on 30 July. Crambe was swathed on 8 August and combined on 15 August.

There was 7.21 inches of precipitation from planting to harvest. Conditions were dry when the crambe began to flower on 29 June and the risk of a Sclerotinia infection was low. There was only 0.30 of an inch of precipitation recorded from one week prior to flower (22 June) through the first 10 days of flower (9 July). It was also dry when both fungicide applications were made and the risk of a sclerotinia infection remained low. Everything changed from 10 July to 23 July when weather conditions changed to warm, wet, and humid. There were nine days out of 13 with recorded precipitation totaling 2.95 inches. Plants and flower petals were continuously wet during this period. The wet, humid conditions the last two weeks of flowering were very favorable for a late infection of Sclerotinia. The plants in the untreated plots became severely infected with Sclerotinia by the end of July. When the plots were evaluated on 30 July, the untreated plots had a Sclerotinia incidence of 84%. The untreated plots also had a Sclerotinia severity rating of 59% percent, which indicates a potential yield loss of 59%. Severity was calculated by scoring plants in one of the following categories, then averaging the scores of all plants evaluated:

> 0, 20% girdling, 40% girdling, 60% girdling, 80% girdling or 100% girdling

All fungicide treatments significantly decreased the sclerotinia incidence and severity, which resulted in a significant yield increase over the untreated. Ronilan applied on 5 July (Timing 1) had significantly higher levels of sclerotinia incidence and severity compared to when Ronilan was applied on 9 July (Timing 2). This resulted in significantly lower yields with Timing 1 compared to Timing 2 of Ronilan. It appears that the Timing 1 application did not have enough residual for the last two weeks of flower. The Timing 2 application was applied only four days later than Timing 1; however, it had a major impact on reducing the overall infection of sclerotinia resulting in a significant yield increase over Timing 1.

BAS 510 performed similar to or better than Ronilan. Although not statistically significant, the highest yielding treatment in the trial was BAS 510 applied on 5 July with a silicone adjuvant. All Timing 1 yields of BAS 510 were all significantly higher than Timing 1 yields of Ronilan. This indicates that the 5.1 ounces / acre of BAS 510 gave excellent control of Sclerotinia from the time of application to the end of flower on 23 July. Timing 1 yields and Timing 2 yields of BAS 510 were similar.

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Treatment	Rate/Acre	Fungicide Timing	Sclerotinia Incidence	Sclerotinia Severity	Yield	Test Weight
			%	%	lb/A	lb/bu
1. Untreated	—	—	84.2	59.0	745	26.8
2. Ronilan	12 oz	1: 5-Jul	49.2	29.0	1369	29.9
3. Ronilan Silicone Adjuvant	12 oz 0.25 %v/v	1: 5-Jul	45.0	30.1	1466	26.5
4. Ronilan	12 oz	2: 9-Jul	20.0	9.2	1872	31.3
5. Ronilan Silicone Adjuvant	12 oz 0.25 %v/v	2: 9-Jul	19.2	10.9	1880	29.3
6. BAS 510	5.1 oz	1: 5-Jul	27.5	15.1	1752	29.5
7. BAS 510 Silicone Adjuvant	5.1 oz 0.25 %v/v	1: 5-Jul	24.2	14.5	1945	30.6
8. BAS 510	5.1 oz	2: 9-Jul	28.3	17.7	1726	30.4
9. BAS 510 Silicone Adjuvant	5.1 oz 0.25 %v/v	2: 9-Jul	23.3	15.5	1873	29.1
LSD(P=.05)	—	—	7.7	7.4	163.2	2.1
CV%	—	—	12.5	19.0	4.2	5.8

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