

SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2014

Peter C. Hakk¹, Aaron L. Carlson¹, Mohamed F.R. Khan², Thomas J. Peters², and Mark A. Boetel³

¹Sugarbeet Research Specialists and ²Extension Sugarbeet Specialists
North Dakota State University & University of Minnesota, Fargo, ND
and

³Professor, Dept. of Entomology, North Dakota State University

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Sugarbeet growers were asked to report the fungicide used and the number of applications to sugarbeet acreage as part of the annual survey of sugarbeet growers. Multiple applications of fungicides to the same acreage were counted as multiple acres treated; thus, acres treated may exceed 100% of acres planted. All fungicides in Table 1 would be used primarily for control of *Cercospora* leaf spot (CLS).

Fungicide use for CLS in 2014, averaged over all counties, was 179% of respondent acres as compared to 218% in 2013, 277% in 2012, 259% in 2011, 225% in 2010, 156% in 2009, 222% in 2008, 242% in 2007, 208% in 2006, and 206% in 2005 (Table 1). Acres not treated with fungicide were 3% in 2014 as compared to 4% in 2013, 11% in 2012, 3% in 2011 and 2010, 9% in 2009, less than 1% in 2008, 1% in 2007, 2% in 2006, and 6% in 2005. Fungicide usage was greatest in Renville County in 2014 with 283% of respondent acres receiving fungicides for control of CLS. The greatest fungicide use in 2013, 2012, and 2011 was in Chippewa County with 352%, 476% and 343% of acres, respectively, 2010 was in Kandiyohi County with 437%, and in 1998 in Chippewa County with 852%. Headline, Inspire XT, Super/Agri Tin and Proline were the most commonly used fungicides in 2014 and were used on 65%, 31%, 28% and 24% of the acres respectively.

The percentage of respondents who named *Cercospora* as their worst production problem in sugarbeet dropped from 36% in 1998 to 0% in 2005, 3% in 2010, 1% in 2011, 7% in 2012, <1% in 2013 and 0% in 2014. Triazoles, either by themselves or in tank-mixtures, were applied to 69% of respondent acres in 2014, compared to 58% of respondent acres in 2013, 82% in 2012, 97% in 2011, and 88% in 2010. Headline was used on 65% of the sugarbeet acreage in 2014, 70% in 2013, 71% in 2012, 88% in 2011, and 87% in 2010. In 2014, 2013, 2012, 2011, 2010, and 2009, Headline was the only fungicide to be applied by respondents from all counties. Prior to 2009, the most recent occurrence of only one fungicide being applied by respondents from all counties was in 1997 and the fungicide was Super Tin. Strobilurin fungicides (Headline, Gem, and Priaxor) were applied either alone or in tank mixtures to 71% of acres in 2014, 78% in 2013, 77% in 2012, 91% in 2011, and 89% in 2010.

The number of fungicide applications varied from zero to four times per respondent in 2014 (Table 2). The average number of applications per acre was 1.8 in 2014, 2.2 in 2013, 2.8 in 2012, 2.6 in 2011, and 2.3 in 2010.

Averaged over fungicides and counties, 86% of treated acres were sprayed with a ground sprayer while 14% were treated with an aerial sprayer in 2014 (Table 3). The usage of ground sprayers ranged from 0% in Traill County to 100% in Marshall County. The overall usage of ground sprayers was 85% in 2013, 82% in 2012, 78% in 2011 and 2010, 86% in 2009, 77% in 2008, 2007, and 2006, and 79% in 2005.

The date of the first fungicide application for *Cercospora* ranged from June 20 to after August 10 (Table 4). Four percent of respondents began spraying prior to July 11 in 2014, while 10% of respondents in 2013, 12% in 2011 and 2010 began spraying for *Cercospora* prior to July 11.

The date of the last fungicide application ranged from before August 1 to after September 10 (Table 5). The last fungicide application was after August 20 by 70% of the respondents and after August 31 by 31% of the respondents. The last fungicide application was before August 11 by 12% of the respondents.

Cercospora leaf spot control was evaluated as excellent or good by 94% of the survey respondents averaged over all fungicides (Table 6). Five percent of responses indicated an unsure level of CLS control.

Fungicides were evaluated for Rhizoctonia control and crop injury in 2014 (Table 7). Sixteen responses were reported for in-furrow fungicide applications. Headline was applied in-furrow in 75% of responses, while Quadris was applied in-furrow in 19%. Fifty-three post emergence responses were reported. Quadris was applied in 89% of responses while Proline and Headline were each applied on 4% of acres.

Fifty-five percent of responses indicated a post emergence fungicide applied from June 1 to 15 (Table 8). Current recommendations for controlling Rhizoctonia are to apply labeled fungicides to sugarbeet either in-furrow at planting or in a 7 inch band prior to infection (prior to soil temperatures reaching 62°F at the 4 inch depth because infection takes place ≥ 65 °F) or at both timings. Eleven percent of responses were for post emergence applications made after July 1 which is most likely too late to help control Rhizoctonia. Quadris was band applied to 82% of reported acres, while Headline and Proline were each broadcast to 100% of reported acres (Table 9).

An evaluation of satisfaction of seed treatments was conducted (Table 10). In 2014, 75% of respondents were satisfied with Metlock + Rizolex + Kabina, 73% were satisfied with Tachigaren, 73% were satisfied with Kabina, and 67% were satisfied with Metlock + Rizolex. One percent of respondents in 2014 reported being unsatisfied with Kabina while 6% were unsatisfied with Metlock + Rizolex + Kabina. Ninety-seven percent of reported acres were treated with a seed treatment to protect against root pathogens.

Table 1. Fungicide use for Cercospora control by survey respondents in 2014.

County	Respondent acres planted ⁹	Super/		Triazoles			Strobilurins		Tank-mixes					Total acres treated	
		Not treated	Agri Tin	Top-sin	Pro-line	Emi-ment	Inspire XT	Head-line	Gem	Tin+	Tin+	EBDC+	EBDC		Other ¹⁰
		-----% of acres planted-----													
Cass	4,393	26	3	-	-	-	39	71	-	9	-	-	-	-	121
Chippewa ¹	7,611	8	65	-	40	27	-	17	6	-	-	21	-	28	202
Clay ²	5,244	-	13	-	-	-	34	61	-	-	-	-	-	-	108
Grand Forks	6,009	-	52	-	-	-	66	100	-	-	-	-	-	-	217
Kittson	920	9	-	-	-	-	-	87	-	-	-	-	-	-	87
Marshall	6,359	-	-	-	40	11	-	91	-	-	8	-	8	-	159
Norman ³	5,237	-	2	-	8	-	82	98	-	18	8	-	-	-	216
Pembina	5,132	8	16	-	-	-	-	70	-	-	-	-	-	-	86
Polk ⁴	14,111	2	14	8	37	8	18	84	-	12	3	2	-	2	188
Renville ⁵	8,939	-	96	-	80	19	-	25	60	-	-	2	-	1	283
Richland ⁶	8,301	-	22	-	33	19	58	71	-	-	-	-	-	-	203
Trail	492	-	-	-	-	-	-	100	-	100	-	-	-	-	200
Traverse ⁷	7,370	2	29	-	11	21	37	69	4	-	-	-	-	-	170
Walsh	3,427	-	37	11	4	-	30	81	-	-	-	-	-	-	163
Wilkin ⁸	10,021	4	9	-	6	12	57	34	-	-	-	-	-	19	137
Total	93,566	3	28	2	24	11	31	65	6	4	1	2	1	5	179

¹Includes Kandiyohi and Swift Counties

²Includes Becker County

³Includes Mahnommen County

⁴Includes Pennington and Red Lake Counties

⁵Includes Lac Qui Parle, McLeod, Redwood, Stearns, and Yellow Medicine Counties

⁶Includes Roberts (SD) County

⁷Includes Grant and Stevens Counties

⁸Includes Otter Tail County

⁹Respondent acres planted does not include acres by respondents who skipped the cercospora questions on the survey.

¹⁰Other includes: Topguard, Priaxor

Table 2. Number of fungicide applications by survey respondents in 2014.

County	Respondents	Number of Applications per Respondent						NR ⁹
		0	1	2	3	4	5	
		-----% of respondents-----						
Cass	7	14	14	71	0	0	0	0
Chippewa ¹	14	7	14	21	43	14	0	0
Clay ²	11	0	73	27	0	0	0	0
Grand Forks	9	0	0	78	22	0	0	0
Kittson	3	33	67	0	0	0	0	0
Marshall	9	0	33	67	0	0	0	0
Norman ³	6	0	0	33	67	0	0	0
Pembina	8	13	75	13	0	0	0	0
Polk ⁴	29	7	3	72	17	0	0	0
Renville ⁵	20	0	10	10	70	10	0	0
Richland ⁶	10	0	10	60	30	0	0	0
Traill	2	0	0	100	0	0	0	0
Traverse ⁷	11	9	18	55	18	0	0	0
Walsh	8	0	38	38	25	0	0	0
Wilkin ⁸	20	10	45	45	0	0	0	0
Total	167	5	24	46	23	2	0	0

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Pennington and Red Lake Counties⁵Includes Lac Qui Parle, McLeod, Redwood, Stearns, and Yellow Medicine Counties⁶Includes Roberts (SD) County⁷Includes Grant and Stevens Counties⁸Includes Otter Tail County⁹NR=no response**Table 3. Ground and aerial application of fungicides in 2014.**

County	Treated Acres	Application Type	
		Ground	Aerial
		-----% of treated acres-----	
Cass	5,330	73	27
Chippewa ¹	15,362	98	2
Clay ²	5,654	76	24
Grand Forks	13,061	90	10
Kittson	800	68	33
Marshall	10,094	100	0
Norman ³	11,312	92	8
Pembina	4,433	79	21
Polk ⁴	26,564	71	29
Renville ⁵	25,278	95	5
Richland ⁶	16,821	80	20
Traill	984	0	100
Traverse ⁷	12,557	92	8
Walsh	5,596	85	15
Wilkin ⁸	13,685	83	17
Total	167,531	86	14

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Pennington and Red Lake Counties⁵Includes Lac Qui Parle, McLeod, Redwood, Stearns, and Yellow Medicine Counties⁶Includes Roberts (SD) County⁷Includes Grant and Stevens Counties⁸Includes Otter Tail County

Table 4. Date of first fungicide application for CLS in 2014.

County	Number of Respondents	June 20-30	July 1-10	July 11-20	July 21-31	Aug. 1-10	After Aug. 10
		-----% of respondents-----					
Cass	5	0	0	0	0	60	40
Chippewa ¹	13	15	0	38	38	8	0
Clay ²	10	0	0	0	10	10	80
Grand Forks	9	0	0	22	22	33	22
Kittson	2	0	0	0	0	0	100
Marshall	9	0	0	0	22	22	56
Norman ³	6	0	0	0	33	50	17
Pembina	7	0	0	0	0	29	71
Polk ⁴	25	0	0	4	24	36	36
Renville ⁵	20	0	15	55	20	10	0
Richland ⁶	10	0	0	0	50	30	20
Traill	2	0	0	0	0	0	100
Traverse ⁷	10	0	20	10	20	30	20
Walsh	8	0	0	13	25	38	25
Wilkin ⁸	18	0	0	22	17	44	17
Total	154	1	3	16	22	28	29

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahanomen County⁴Includes Pennington and Red Lake Counties⁵Includes Lac Qui Parle, McLeod, Redwood, Stearns, and Yellow Medicine Counties⁶Includes Roberts (SD) County⁷Includes Grant and Stevens Counties⁸Includes Otter Tail County**Table 5. Date of last fungicide application for CLS in 2014.**

County	Number of Respondents	Before Aug. 1	Aug. 1-10	Aug. 11-20	Aug. 21-31	Sept. 1-10	After Sept. 10
		-----% of respondents-----					
Cass	6	0	0	0	67	17	17
Chippewa ¹	13	8	15	46	8	15	8
Clay ²	9	0	11	11	44	22	11
Grand Forks	9	0	0	11	56	33	0
Kittson	2	0	0	0	100	0	0
Marshall	8	0	0	0	50	50	0
Norman ³	6	0	0	0	50	17	33
Pembina	4	0	0	0	75	25	0
Polk ⁴	26	0	4	0	38	50	8
Renville ⁵	20	0	20	35	35	10	0
Richland ⁶	9	0	0	11	56	33	0
Traill	2	0	0	0	0	100	0
Traverse ⁷	10	0	10	40	50	0	0
Walsh	6	0	33	0	0	50	17
Wilkin ⁸	17	12	24	29	29	6	0
Total	147	2	10	17	39	26	5

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahanomen County⁴Includes Pennington and Red Lake Counties⁵Includes Lac Qui Parle, McLeod, Redwood, Stearns, and Yellow Medicine Counties⁶Includes Roberts (SD) County⁷Includes Grant and Stevens Counties⁸Includes Otter Tail County

Table 6. Fungicide control of Cercospora leaf spot in 2014.

Fungicide	Number of Responses	Excellent	Good	Fair	Poor	Unsure
		-----% of responses-----				
Super Tin/Agri Tin	57	61	32	0	0	7
Topsin	4	75	25	0	0	0
Proline	39	64	28	0	0	8
Eminent	24	54	42	0	0	4
Inspire XT	47	77	21	0	0	2
Headline	115	64	29	2	0	5
Gem	11	36	64	0	0	0
Tin+Topsin	3	67	33	0	0	0
Tin+Triazole	9	78	11	0	0	11
EBDC+Triazole	1	100	0	0	0	0
Tin+Headline	3	100	0	0	0	0
Other ¹	7	57	29	0	0	14
Total	320	65	29	1	0	5

¹Other includes Topguard, Priaxor**Table 7. Evaluation of fungicides for Rhizoctonia control and crop injury in 2014.**

Application Method	Acres Treated	Responses	Crop Injury					Rhizoctonia Control				
			None	Slight	Mod	Sev	Unsure	Exc	Good	Fair	Poor	Unsure
			-----% of responses-----					-----% of responses-----				
In-Furrow												
Quadris	1,125	3	67	33	0	0	0	33	33	33	0	0
Headline	3,113	12	92	0	0	0	8	25	58	8	0	8
Unspecified	440	1	100	0	0	0	0	100	0	0	0	0
Foliar												
Quadris ¹	18,435	48	94	4	0	0	2	17	58	10	0	15
Proline	1,010	2	100	0	0	0	0	0	0	100	0	0
Headline	430	2	100	0	0	0	0	0	100	0	0	0
Priaxor	350	1	100	0	0	0	0	0	100	0	0	0
Total	24,903	69	93	4	0	0	3	19	57	13	0	12

¹Quadris includes generic azoxystrobin Satori**Table 8. Date of POST fungicide application for Rhizoctonia control in sugarbeet in 2014.**

Fungicide	No. of Responses	Before May 1	May 1-15	May 16-31	June 1-15	June 16-30	After July 1
		-----% of responses-----					
Quadris ¹	48	0	13	4	60	21	2
Proline	2	0	0	0	0	0	100
Headline	2	0	0	0	0	0	100
Priaxor	1	0	0	0	0	0	100
Total	53	0	11	4	55	19	11

¹Quadris includes generic azoxystrobin Satori**Table 9. Method of application of POST fungicides applied for Rhizoctonia control in sugarbeet in 2014.**

Fungicide	No. responses	Acres Treated	Band	Broadcast
			-----% of acres treated-----	
Quadris ¹	48	18,435	82	18
Headline	2	1,010	0	100
Proline	2	430	0	100
Priaxor	1	350	0	100
Total	53	20,225	75	25

¹Quadris includes generic azoxystrobin Satori**Table 10. Rating of seed treatment performance in sugarbeet in 2014.**

Seed Treatment	Acres Treated	Responses	Satisfied	Mixed Performance	Unsatisfied	No Response
			-----% of responses-----			
Kabina	38,600	86	73	26	1	0
Metlock+Rizolex	7,139	21	67	33	0	0
Metlock+Rizolex+Kabina	6,278	16	75	19	6	0
Tachigaren	38,417	82	73	27	0	0
Total	90,434	205	73	26	1	0