

SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2009

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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*.

Fungicide use in 2009, averaged over all counties, was 156% as compared to 222% in 2008, 242% in 2007, 208% in 2006, and 206% in 2005 (Table 1). Acres not treated with fungicide grew to 9% in 2009 compared to less than 1% in 2008, 1% in 2007, 2% in 2006, and 6% in 2005. Fungicide usage was greatest in Renville County in 2009 with 284% of planted acres receiving fungicide for control of *Cercospora*. The greatest fungicide use in 2008 was in Renville County with 302%, 2007 in Renville County with 348%, 2006 in Renville County with 335%, 2005 in Renville County with 304%, and in 1998 in Chippewa County with 852%. Headline, Proline, Eminent, and Super/Agri Tin were the most commonly used fungicides in 2009 and were used on 68%, 27%, 25% and 23% of the acres, respectively.

Eminent had a Section 18 label from 1999 through 2004 and was fully labeled in 2005. Eminent was used on 25% of the acreage in 2009 (Table 1), 54% in 2008, 72% in 2007, 60% in 2006, and 78% in 2005. Headline was fully labeled for use in sugarbeet in 2002. In 2009, Headline was used on 68% of the sugarbeet acreage, 90% in 2008, 82% in 2007, 84% in 2006, 72% in 2005, 52% in 2004, and 85% in 2003. Eminent and Headline use has had a large impact on *Cercospora* control as the percentage of respondents who named *Cercospora* as their worst production problem in sugarbeet dropped from 36% in 1998 to 3% in 2000, <1% in 2002 and 2003, 0% in 2004 and 2005, <1% in 2006, 2007, and 2008, and 1% in 2009. Headline was the only fungicide to be applied by respondents from all counties in 2009. This is the first time since 1997 that only one fungicide was applied by respondents from all counties. In 1997 Super Tin was the only fungicide applied by respondents from all counties. An increased dependence on Headline without the alternation of other fungicide chemistries could result in increased levels of resistance by *Cercospora beticola* to strobilurin fungicides.

The number of fungicide applications varied from zero to four times per respondent in 2009 (Table 2). Sixty-eight percent of the respondents applied fungicides one or two times. The average number of applications per acre was 1.6 in 2009, 2.2 in 2008, 2.4 in 2007, 2.1 in 2006, 2005, and 2004, 2.8 in 2003, 2.6 in 2002, and 2.5 in 2001.

Averaged over fungicides and counties, 86% of fungicide applications were made with a ground sprayer and 23% with an aerial sprayer (Table 3). The usage of ground sprayers ranged from 62% in Grand Forks County to 100% in Cass and Kittson Counties. The overall usage of ground sprayers was 86% in 2009, 77% in 2008, 2007, and 2006, and 79% in 2005.

The date of the first *Cercospora* spraying ranged from June 20 to after August 15 (Table 4). Southern areas generally were sprayed earlier than northern areas. Twelve percent of respondents began spraying prior to July 11 in 2009 while 5% of respondents in 2008, 22% of respondents in 2007, 12% in 2006 and 2005, 33% in 2003, and 22% in 2001 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 65% of the respondents and after August 31 by 19% of the respondents. The last fungicide application was before August 11 by 19% of the respondents.

Cercospora leaf spot control was evaluated as excellent or good by 98% of the survey respondents averaged over all fungicides (Table 6). Comparisons among all fungicides are of questionable value since the number of responses varies greatly from one fungicide to another. However, a large number of responses were received for Eminent, Headline, Super Tin/Agri Tin, and Proline. Excellent or good evaluations were received from 100% of the respondents for Eminent, 98% for Headline, 100% for Super Tin/Agri Tin, and 98% for Proline.

The reported acreages of sugarbeet that were affected by Rhizoctonia, Aphanomyces, and Fusarium in 2009 are given in Table 7. Thirty percent of respondents' acres were seeded to Rhizoctonia-resistant varieties. The reported sugarbeet acreage affected by Rhizoctonia, Aphanomyces, and Fusarium in 2009 are 11% affected by Rhizoctonia, 6% affected by Aphanomyces, and 1% affected by Fusarium. Thirty percent of survey respondents reported Rhizoctonia/Aphanomyces as their number one production problem in 2009. This was the number one worst production problem reported in 2009. Continuing efforts are needed to develop and refine control measures for these root diseases, particularly Rhizoctonia.

Only nine percent of survey respondents indicated making a fungicide application to control Rhizoctonia root and crown rot in sugarbeet in 2009 (Table 8). The fungicides reported used were Quadris and Proline. Fifty-three percent of respondents who applied a fungicide did not report when the fungicide was applied. Current recommendations are to apply fungicide in a band prior to infection, or, prior to soil temperatures reaching 62-64°F at the 4 inch depth.

Table 1. Fungicide use for Cercospora control by survey respondents in 2009.

County	Repondent acres planted	Acres not treated	Super/ Agri tin	% of acres planted-----										Total acres treated	
				Eminent	Headline	Gem	Topsin	Tin+	Topsin+	Tin+	Proline	Inspire XT	Other		
Cass	1,239	-	-	-	100	-	-	-	-	-	-	-	-	-	100
Chippewa ¹	8,352	-	97	77	88	-	-	-	-	-	-	14	1	-	277
Clay ²	5,997	34	-	7	60	-	-	-	-	-	-	3	2	-	72
Grand Forks	2,194	-	-	6	99	-	-	-	-	-	-	79	-	-	244
Kittson	3,332	8	-	-	92	-	-	-	-	-	-	-	-	-	92
Marshall	4,009	8	-	-	91	-	-	-	-	-	-	22	-	-	113
Norman ³	3,099	-	5	17	100	-	-	-	-	-	-	1	24	-	147
Pembina	3,382	-	-	-	103	-	-	-	-	-	-	-	-	-	103
Polk	20,722	-	3	30	98	-	-	-	-	-	-	36	10	-	177
Renville ⁴	9,618	2	99	39	32	50	-	2	-	-	-	51	11	-	284
Richland	5,603	66	4	4	25	-	-	-	-	-	-	-	-	-	33
Trail	3,017	-	21	37	87	-	-	-	-	-	-	13	5	-	163
Traverse ⁵	9,003	-	17	12	18	4	-	-	-	-	-	80	-	-	131
Walsh	5,486	4	-	7	96	-	-	-	-	-	-	19	-	-	122
Wilkin ⁶	7,721	24	-	33	23	-	-	-	-	-	-	1	20	-	77
No Response	1,075	-	70	70	12	30	-	-	-	-	-	-	30	-	212
Total	93,849	9	23	25	68	6	0	<1	0	0	27	7	0	156	

¹Includes Kandiyohi and Swift Counties

²Includes Becker County

³Includes Mahnomon County

⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties

⁵Includes Big Stone, Grant, and Stevens Counties

⁶Includes Ottertail County

Table 2. Number of fungicide applications by survey respondents in 2009.

County	Respondents	Number of Applications						
		0	1	2	3	4	5	>5
		-----% of respondents-----						
Cass	3	-	100	-	-	-	-	-
Chippewa ¹	19	-	5	11	79	5	-	-
Clay ²	16	19	63	18	-	-	-	-
Grand Forks	5	-	20	80	-	-	-	-
Kittson	7	14	86	-	-	-	-	-
Marshall	12	8	75	17	-	-	-	-
Norman ³	8	-	38	38	25	-	-	-
Pembina	6	-	83	17	-	-	-	-
Polk	30	-	23	70	7	-	-	-
Renville ⁴	24	8	-	8	83	-	-	-
Richland	10	50	50	-	-	-	-	-
Trail	9	-	33	67	-	-	-	-
Traverse ⁵	10	-	40	50	10	-	-	-
Walsh	12	25	58	17	-	-	-	-
Wilkin ⁶	13	15	77	8	-	-	-	-
No Response	3	-	33	67	-	-	-	-
Total	187	9	40	28	22	1	0	0

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties⁵Includes Big Stone, Grant, and Stevens Counties⁶Includes Ottertail County**Table 3. Ground and aerial application of fungicides in 2009.**

County	Treated Acres	Application Type	
		Ground	Aerial
		-----% of treated acres-----	
Cass	1,239	100	0
Chippewa ¹	22,695	95	5
Clay ²	4,226	86	14
Grand Forks	3,706	62	38
Kittson	3,078	100	0
Marshall	4,537	76	24
Norman ³	4,520	77	23
Pembina	3,482	77	23
Polk	36,964	75	25
Renville ⁴	26,909	98	2
Richland	1,880	93	7
Trail	4,927	68	32
Traverse ⁵	11,884	90	10
Walsh	6,740	94	6
Wilkin ⁶	5,897	92	8
No Response	2,285	100	0
Total	144,969	86	14

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties⁵Includes Big Stone, Grant, and Stevens Counties⁶Includes Ottertail County

Table 4. Date of first fungicide application in 2009.

County	Number of Respondents	June 20-30	July 1-10	July 11-20	July 21-31	Aug. 1-15	Aug. 15+
		-----% of respondents-----					
Cass	3	-	-	-	-	-	100
Chippewa ¹	19	-	32	42	21	5	-
Clay ²	12	-	-	8	-	17	75
Grand Forks	4	-	-	-	-	50	50
Kittson	6	-	-	-	-	-	100
Marshall	11	-	-	9	-	27	64
Norman ³	7	-	-	-	14	14	71
Pembina	6	-	17	-	-	-	83
Polk	29	-	-	-	3	66	31
Renville ⁴	23	4	48	39	9	-	-
Richland	5	-	-	-	20	20	60
Traill	9	-	-	-	-	67	33
Traverse ⁵	10	-	-	10	60	20	10
Walsh	9	-	-	-	11	22	67
Wilkin ⁶	11	-	-	18	-	46	36
No Response	2	-	-	50	-	50	-
Total	166	1	11	14	10	27	38

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties⁵Includes Big Stone, Grant, and Stevens Counties⁶Includes Ottertail County**Table 5. Date of last fungicide application in 2009.**

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	3	-	-	-	100	-	-
Chippewa ¹	19	5	26	26	37	5	-
Clay ²	11	-	18	9	46	27	-
Grand Forks	4	-	-	-	75	25	-
Kittson	6	-	-	-	50	50	-
Marshall	11	9	9	9	46	27	-
Norman ³	8	-	13	-	50	25	13
Pembina	6	-	-	-	83	17	-
Polk	28	-	4	7	54	28	7
Renville ⁴	23	4	22	35	30	9	-
Richland	5	20	-	40	20	20	-
Traill	8	-	13	-	62	25	-
Traverse ⁵	9	11	33	23	33	-	-
Walsh	9	-	11	22	67	-	-
Wilkin ⁶	11	18	36	9	28	9	-
No Response	2	-	50	50	-	-	-
Total	163	4	15	15	46	17	2

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties⁵Includes Big Stone, Grant, and Stevens Counties⁶Includes Ottertail County

Table 6. Fungicide control of Cercospora leafspot in 2009.

Fungicide	Number of Respondents	Excellent	Good	Fair	Poor
		-----% of respondents-----			
Super Tin/Agri Tin	40	60	40	-	-
Proline	44	80	18	2	-
Inspire	11	81	18	-	-
Tin+Topsin	2	50	-	50	-
Eminent	53	79	21	-	-
Gem	7	72	14	14	-
Headline	123	76	23	1	-
Total	280	75	23	2	0

Table 7. Acres believed to be affected by Rhizoctonia, Aphanomyces, and Fusarium in 2009.

County	Respondent acres planted	Acres seeded to Rhizoctonia resistant variety	Acres reported as affected by Rhizoctonia	Acres reported as affected by Aphanomyces	Acres reported as affected by Fusarium
		-----% of acres planted-----			
Cass	1,239	80	44	39	-
Chippewa ¹	8,352	20	14	11	<1
Clay ²	5,997	22	20	9	8
Grand Forks	2,194	7	1	-	-
Kittson	3,332	8	<1	1	-
Marshall	4,009	16	3	11	-
Norman ³	3,099	16	<1	4	-
Pembina	3,382	25	3	-	-
Polk	20,722	33	17	5	1
Renville ⁴	9,618	21	11	6	<1
Richland	5,603	36	21	21	5
Trail	3,017	55	13	-	-
Traverse ⁵	9,003	46	11	3	<1
Walsh	5,486	58	4	<1	-
Wilkin ⁶	7,721	28	1	2	-
No Response	1,075	-	-	-	-
Total	93,849	30	11	6	1

¹Includes Kandiyohi and Swift Counties²Includes Becker County³Includes Mahnomon County⁴Includes Faribault, Lac Qui Parle, Redwood, Sibley, Stearns, and Yellow Medicine Counties⁵Includes Big Stone, Grant, and Stevens Counties⁶Includes Ottertail County**Table 8. Fungicide applied and date of application for Rhizoctonia control in 2009.**

Fungicide	No. of Respondents ¹	June 1-15	June 16-30	July 1+	No Response
		-----% of respondents-----			
Quadris	5	40	-	40	20
Proline	6	-	17	50	33
No Response	6	-	-	-	100
Total	17	12	6	29	53

¹One hundred seventy growers responded that no fungicide was applied.