

## **SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA - 2008**

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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 2008, averaged over all counties, was 222% as compared to 242% in 2007, 208% in 2006, 206% in 2005 and 2004, 275% in 2003, 262% in 2002, and 248% in 2001 (Table 1). Acres not treated with fungicide were less than 1% in 2008, 1% in 2007, 2% in 2006, 6% in 2005, and less than 1% in 2004, 2003, 2002, and 2001. Fungicide usage in Chippewa County was 280% in 2008. Fungicide use was 852% in 1998, 599% in 1999, 409% in 2000, 299% in 2001, 304% in 2002, 295% in 2003, 291% in 2004, 296% in 2005, 301% in 2006, and 295% in 2007 in Chippewa County. Fungicide use was 702% in 1998, 625% in 1999, 430% in 2000, 308% in 2001, 297% in 2002, 308% in 2003, 305% in 2004, 304% in 2005, 335% in 2006, 348% in 2007, and 302% in 2008 in Renville County. Headline, Eminent, Super/Agri Tin, and Inspire were the most commonly used fungicides and were used on 90%, 54%, 32%, and 26% of the acres, respectively.

Eminent had a Section 18 label from 1999 through 2004 and was used on 165% of the acreage in 1999, 170% in 2000, 144% in 2001, 153% in 2002, 124% in 2003 and 99% in 2004. Eminent was fully labeled in 2005 and was used on 78% of the acreage in 2005, 60% in 2006, 72% in 2007, and 54% in 2008. Headline was fully labeled in 2002 and was used on 85% of the acreage in 2003, 52% in 2004, 72% in 2005, 84% in 2006, 82% in 2007, and 90% in 2008. Eminent and Headline use apparently had a large impact on *Cercospora* control. The percentage of respondents who named *Cercospora* as their worst production problem dropped from 36% in 1998 to 3% in 2000, <1% in 2002 and 2003, 0% in 2004 and 2005, and <1% in 2006, 2007, and 2008. Eminent and Headline are excellent fungicides, but they should be rotated with other fungicides to reduce the risk of *Cercospora* developing resistance to these chemistries.

The number of fungicide applications varied from zero to four times per respondent (Table 2). Ninety-one percent of the respondents applied fungicides two or three times. The average number of applications per acre was 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 (Table 1).

Averaged over fungicides and counties, 77% of the fungicides were applied with a ground sprayer and 23% with aerial application (Table 3). The usage of ground sprayers ranged from 45% in Traill County to 98% in Chippewa County. The overall usage of ground sprayers was 63% in 2000, 60% in 2001, 67% in 2002, 79% in 2003, 73% in 2004, 79% in 2005, and 77% in 2006, 2007, and 2008.

The date of the first *Cercospora* spraying ranged from June 20 to after August 1 (Table 4). Southern areas generally were sprayed earlier than northern areas. Five percent of respondents began spraying prior to

July 11 in 2008 while 22% of respondents in 2007, 12% in 2006 and 2005, 20% in 2004, 33% in 2003, 29% in 2002, 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 81% of the respondents and after August 31 by 24% of the respondents. The last fungicide application was before August 11 by 5% of the respondents.

Cercospora leaf spot control was evaluated as excellent or good by 99% 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, Proline, and Inspire. Excellent or good evaluations were received from 99% of the respondents for Eminent, 98% for Headline, 99% for Super Tin/Agri Tin, 100% for Proline, and 99% for Inspire.

The reported acreages of sugarbeet that were affected by Rhizomania in 2008 are given in Table 7. Marshall, Wilken, and Renville counties had the greatest percent of acres affected with Rhizomania. All other counties had less than 10 % of respondents acres reported as affected. All but one county, Traverse, reported some affected acres. Fifty-nine percent of respondents' acres were seeded to Rhizomania-resistant varieties. The number of Rhizomania-resistant acres planted is expected to increase due to greater availability of resistant varieties with high yield and quality characteristics. The reported acreages of sugarbeet affected by Rhizoctonia, Aphanomyces, and Fusarium in 2008 are given in Table 7. These diseases continue to be a problem with 9% of reported acres affected by Rhizoctonia, 7% affected by Aphanomyces, and 2% affected by Fusarium. Twenty-four percent of survey respondents reported Rhizoctonia/Aphanomyces as their number one production problem in 2008, which was second only to weed control. A need exists for varieties with improved disease resistance and for new tools to manage root diseases.

**Table 1. Fungicide use for Cercospora control by survey respondents in 2008.**

County	Repondent acres planted	Acres not treated	Super/ Agri tin	Fungicide treated acres										Total acres treated	
				Eminent	Headline	Gem	Topsin/ Benlate	Tin+	Topsin+	Mancozeb	Tin+	Proline	Inspire		Other <sup>7</sup>
-----% of acres planted-----															
Cass	4,952	-	6	38	92	-	-	-	-	-	-	62	-	-	198
Chippewa <sup>1</sup>	8,304	-	102	90	73	-	-	-	-	-	-	-	10	5	280
Clay <sup>2</sup>	12,852	-	12	75	96	-	-	-	-	<1	-	5	14	-	202
Grand Forks	5,106	-	-	25	81	-	-	-	-	-	-	50	40	-	196
Kittson	5,910	-	3	19	97	-	-	-	-	-	-	13	32	-	164
Marshall	8,877	-	7	37	97	-	-	-	-	-	-	10	54	-	205
Norman <sup>3</sup>	6,294	-	47	63	78	-	-	5	-	-	-	<1	32	19	244
Pembina	5,012	-	8	15	95	-	-	-	-	-	-	26	32	-	176
Polk	22,308	-	12	58	100	-	-	-	-	-	-	24	19	-	213
Renville <sup>4</sup>	5,467	-	107	60	78	17	-	-	-	-	1	-	32	7	302
Richland	6,619	-	58	27	88	-	-	13	-	-	-	28	52	-	266
Trail	4,279	-	26	76	96	-	-	-	-	-	-	7	5	-	210
Traverse <sup>5</sup>	2,692	-	31	68	55	19	-	3	-	-	-	-	22	-	198
Walsh	5,958	4	12	73	101	-	-	-	-	-	-	6	12	-	204
Wilkin <sup>6</sup>	5,929	-	109	51	86	-	-	-	-	-	-	-	45	-	291
No Response	1,050	-	19	87	60	-	-	-	-	-	-	-	-	-	166
Total	111,609	<1	32	54	90	1	0	1	<1	<1	<1	15	26	2	222

<sup>1</sup>Includes Swift and Kandiyohi Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomon County

<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties

<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties

<sup>6</sup>Includes Ottertail County

<sup>7</sup>Includes Headline+Supertin (1), and Enable (2)

**Table 2. Number of fungicide applications by survey respondents in 2008.**

County	Respondents	Number of Applications						
		0	1	2	3	4	5	>5
		-----% of respondents-----						
Cass	11	-	-	91	9	-	-	-
Chippewa <sup>1</sup>	20	-	-	10	85	5	-	-
Clay <sup>2</sup>	23	-	4	65	31	-	-	-
Grand Forks	12	-	8	92	-	-	-	-
Kittson	11	-	36	64	-	-	-	-
Marshall	10	-	-	60	40	-	-	-
Norman <sup>3</sup>	13	-	-	38	62	-	-	-
Pembina	12	-	8	84	8	-	-	-
Polk	40	-	2	73	25	-	-	-
Renville <sup>4</sup>	27	-	4	-	85	11	-	-
Richland	10	-	-	20	80	-	-	-
Trail	10	-	-	80	20	-	-	-
Traverse <sup>5</sup>	6	-	-	83	17	-	-	-
Walsh	19	21	11	53	15	-	-	-
Wilkin <sup>6</sup>	13	-	15	31	46	8	-	-
No Response	2	-	-	100	-	-	-	-
Total	239	2	5	53	38	2	0	0

<sup>1</sup>Includes Swift and Kandiyohi Counties<sup>2</sup>Includes Becker County<sup>3</sup>Includes Mahnomon County<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties<sup>6</sup>Includes Ottertail County**Table 3. Ground and aerial application of fungicides in 2008.**

County	Treated Acres	Application Type	
		Ground	Aerial
		-----% of treated acres-----	
Cass	9,808	86	14
Chippewa <sup>1</sup>	22,678	98	2
Clay <sup>2</sup>	26,971	88	12
Grand Forks	10,025	70	30
Kittson	9,661	66	34
Marshall	18,183	74	26
Norman <sup>3</sup>	15,272	82	18
Pembina	8,823	69	31
Polk	47,601	58	42
Renville <sup>4</sup>	15,563	91	9
Richland	17,571	91	9
Trail	8,918	45	55
Traverse <sup>5</sup>	5,310	79	21
Walsh	11,019	76	24
Wilkin <sup>6</sup>	15,249	84	16
No Response	1,880	100	0
Total	244,532	77	23

<sup>1</sup>Includes Swift and Kandiyohi Counties<sup>2</sup>Includes Becker County<sup>3</sup>Includes Mahnomon County<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties<sup>6</sup>Includes Ottertail County

**Table 4. Date of first fungicide application in 2008.**

County	Number of Respondents	-----% of respondents-----				
		June 20-30	July 1-10	July 11-20	July 21-31	After Aug. 1
Cass	9	-	-	11	33	56
Chippewa <sup>1</sup>	20	10	5	55	25	5
Clay <sup>2</sup>	22	-	-	14	31	55
Grand Forks	12	8	-	8	34	50
Kittson	9	-	-	-	33	67
Marshall	9	-	11	-	33	56
Norman <sup>3</sup>	13	-	-	8	38	54
Pembina	12	-	8	-	42	50
Polk	38	-	3	5	24	68
Renville <sup>4</sup>	27	-	4	48	41	7
Richland	10	-	-	30	70	-
Trails	10	-	-	-	10	90
Traverse <sup>5</sup>	3	-	-	-	67	33
Walsh	14	-	-	7	21	72
Wilkin <sup>6</sup>	13	8	15	23	46	8
No Response	1	-	-	-	-	100
Total	222	2	3	18	33	44

<sup>1</sup>Includes Swift and Kandiyohi Counties<sup>2</sup>Includes Becker County<sup>3</sup>Includes Mahnomon County<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties<sup>6</sup>Includes Ottertail County**Table 5. Date of last fungicide application in 2008.**

County	Number of Respondents	-----% of respondents-----					
		Before Aug. 1	Aug. 1-10	Aug. 11-20	Aug. 21-31	Sept. 1-10	After Sept. 10
Cass	10	-	-	-	60	40	-
Chippewa <sup>1</sup>	20	-	15	40	35	10	-
Clay <sup>2</sup>	22	-	-	5	73	23	-
Grand Forks	11	-	-	27	55	18	-
Kittson	7	-	-	14	43	43	-
Marshall	9	-	-	11	33	33	22
Norman <sup>3</sup>	13	-	-	-	54	38	8
Pembina	12	-	17	-	67	17	-
Polk	38	-	3	8	50	34	5
Renville <sup>4</sup>	27	4	-	26	63	7	-
Richland	10	-	10	20	60	10	-
Trails	10	-	-	-	90	-	10
Traverse <sup>5</sup>	5	-	-	60	40	-	-
Walsh	13	-	7	7	77	8	-
Wilkin <sup>6</sup>	12	8	-	17	67	8	-
No Response	1	-	-	-	-	100	-
Total	220	1	4	15	58	21	3

<sup>1</sup>Includes Swift and Kandiyohi Counties<sup>2</sup>Includes Becker County<sup>3</sup>Includes Mahnomon County<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties<sup>6</sup>Includes Ottertail County

**Table 6. Fungicide control of Cercospora leafspot in 2008.**

Fungicide	Number of Respondents	Excellent	Good	Fair	Poor
		-----% of respondents-----			
Super Tin/Agri Tin	79	80	19	1	-
Proline	34	85	15	-	-
Inspire	58	78	21	1	-
Tin+Topsin	3	100	-	-	-
Tin+Mancozeb	1	100	-	-	-
Topsin+Mancozeb	1	100	-	-	-
Eminent	129	78	21	1	-
Gem	10	100	-	-	-
Headline	195	78	20	2	-
Other <sup>1</sup>	3	67	33	-	-
Total	513	79	20	1	0

<sup>1</sup>Other=SuperTin+Headline(1), and Enable (2)

**Table 7. Acres believed to be affected by Rhizomania, Aphanomyces, Rhizoctonia, and Fusarium in 2008.**

County	Respondent acres planted	Acres seeded to Rhizomania resistant variety	Acres reported as affected by Rhizomania	Acres reported as affected by Aphanomyces	Acres reported as affected by Rhizoctonia	Acres reported as affected by Fusarium
		-----% of acres planted-----				
Cass	4,952	8	3	3	<1	2
Chippewa <sup>1</sup>	8,304	45	6	6	5	-
Clay <sup>2</sup>	12,852	52	2	12	4	7
Grand Forks	5,106	64	<1	<1	3	-
Kittson	5,910	27	2	1	<1	<1
Marshall	8,877	84	20	18	11	2
Norman <sup>3</sup>	6,294	84	1	3	19	2
Pembina	5,012	37	1	1	2	1
Polk	22,308	72	9	5	12	5
Renville <sup>4</sup>	5,467	66	11	14	12	1
Richland	6,619	65	1	1	2	-
Trails	4,279	60	1	3	19	-
Traverse <sup>5</sup>	2,692	22	-	1	7	-
Walsh	5,958	63	7	23	11	<1
Wilkin <sup>6</sup>	5,929	61	35	19	19	-
No Response	1,050	64	-	33	33	-
Total	111,609	59	7	7	9	2

<sup>1</sup>Includes Swift and Kandiyohi Counties

<sup>2</sup>Includes Becker County

<sup>3</sup>Includes Mahnomon County

<sup>4</sup>Includes Redwood, Faribault, Yellow Medicine, Lac Qui Parle, Sibley, and Stearns Counties

<sup>5</sup>Includes Grant, Stevens, and Big Stone Counties

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