

SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2011

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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 2011, averaged over all counties, was 259% of respondent acres as compared to 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 2011 and 2010 compared to 9% in 2009, less than 1% in 2008, 1% in 2007, 2% in 2006, and 6% in 2005. Fungicide usage was greatest in Chippewa County in 2011 with 343% of respondent acres receiving fungicide for control of *Cercospora*. The greatest fungicide use in 2010 was in Kandiyohi County with 437%, 2009 was in Renville County with 284%, 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, Super/Agri Tin, Inspire XT, and Proline were the most commonly used fungicides in 2011 and were used on 88%, 46%, 45% and 43% of the acres, respectively.

Eminent had a Section 18 label from 1999 through 2004 and was fully labeled in 2005. Eminent was used on 9% of the acreage in 2011 (Table 1), 57% in 2010, 25% in 2009, 54% in 2008, 72% in 2007, 60% in 2006, and 78% in 2005. Headline was fully labeled for use in sugarbeet in 2002. In 2011, Headline was used on 88% of the sugarbeet acreage, 87% in 2010, 68% in 2009, 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, 1% in 2009, 3% in 2010, and 1% in 2011. 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. In 2011, 2010, and 2009, Headline was the only fungicide to be 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 six times per respondent in 2011 (Table 2). Eighty-four percent of respondents applied fungicides two or three times. The average number of applications per acre was 2.6 in 2011, 2.3 in 2010, 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, 78% of treated acres were sprayed with a ground sprayer while 22% were treated with an aerial sprayer in 2011 (Table 3). The usage of ground sprayers ranged from 62% in Marshall County to 100% in Kandiyohi County. The overall usage of ground sprayers was 78% in 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). Southern areas generally were sprayed earlier than northern areas. Twelve percent of respondents began spraying prior to July 11 in 2011, 2010, and 2009, while 5% of respondents in 2008, 22% 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 88% of the respondents and after August 31 by 35% 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 94% of the survey respondents averaged over all fungicides (Table 6).

The reported sugarbeet acreage believed to be damaged by Aphanomyces, Rhizoctonia, Fusarium, and Rhizomania in 2011 are 13% damaged by Aphanomyces, 17% damaged by Rhizoctonia, 2% damaged by Fusarium, and 3% damaged by Rhizomania (Table 7). Fifty-four percent of survey respondents reported Rhizoctonia/Aphanomyces as their number one production problem in 2011. Rhizoctonia was the number one worst production problem reported in 2011. Continuing efforts are needed to develop and refine control measures for these root diseases, particularly Rhizoctonia.

Fifty survey responses indicated making an in-furrow fungicide application to control Rhizoctonia root and crown rot in sugarbeet in 2011 (Table 8). The fungicides reported as applied in-furrow were Headline by 72% of respondents and Quadris by 28%. One hundred eleven responses reported making a foliar application of fungicide to control Rhizoctonia root and crown rot in sugarbeet in 2011. The fungicides reported as foliar applications were Quadris by 77% of respondents, Proline by 18%, and Headline by 5%. Forty-four percent of respondents who made an in-furrow fungicide application also made a foliar fungicide application. 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.

Table 1. Fungicide use for Cercospora control by survey respondents in 2011.

County	Respondent acres planted	Not treated	Super/ Agri Tin	Proline	Inspire XT	Eminent	Gem	Headline	Tin + Topsin	Other	Total acres treated
-----% of acres planted-----											
Cass	3,471	-	25	83	-	13	-	63	40	-	224
Chippewa	4,409	-	151	45	-	55	-	85	7	-	343
Clay ¹	9,940	12	36	20	64	2	-	87	23	-	232
Grand Forks	7,457	9	78	28	67	-	-	89	-	-	262
Kandiyohi	2,186	-	100	89	-	12	70	11	-	-	282
Kittson	8,581	-	2	75	18	3	-	96	-	-	194
Marshall	6,250	8	7	45	4	21	-	72	-	-	149
Norman ²	8,679	-	63	13	81	4	-	98	29	-	288
Pembina	12,235	-	4	52	40	10	-	98	-	-	204
Polk	32,329	1	36	57	36	7	-	96	44	-	276
Renville ³	4,387	10	109	64	41	18	25	57	-	-	314
Richland	6,613	-	76	33	65	-	-	92	19	-	285
Stevens ⁴	3,174	3	51	-	70	20	-	86	22	-	249
Trail	4,773	7	28	-	75	18	-	84	33	-	238
Walsh	4,100	-	56	54	32	8	-	98	-	-	248
Wilkin ⁵	8,777	-	49	31	63	-	5	94	88	-	330
No Response	9,598	5	63	31	57	9	15	70	28	-	273
Total	136,959	3	46	43	45	9	3	88	25	0	259

¹Includes Becker County

²Includes Mahnomen County

³Includes Faribault, Redwood, and Sibley Counties

⁴Includes Grant, Swift, and Traverse Counties

⁵Includes Ottertail County

Table 2. Number of fungicide applications by survey respondents in 2011.

County	Respondents	Number of Applications						
		0	1	2	3	4	5	6
		-----% of respondents-----						
Cass	8	-	13	50	25	13	-	-
Chippewa	9	-	-	11	44	33	11	-
Clay ¹	20	10	-	25	60	5	-	-
Grand Forks	13	8	-	15	62	15	-	-
Kandiyohi	4	-	-	25	25	50	-	-
Kittson	13	-	8	85	8	-	-	-
Marshall	14	7	7	71	14	-	-	-
Norman ²	12	-	-	8	83	8	-	-
Pembina	15	-	-	87	13	-	-	-
Polk	53	2	-	15	77	6	-	-
Renville ³	11	9	-	9	45	36	-	-
Richland	9	-	-	22	67	11	-	-
Stevens ⁴	6	17	-	17	50	17	-	-
Trail	12	8	8	25	58	-	-	-
Walsh	13	-	8	54	31	8	-	-
Wilkin ⁵	14	-	-	7	71	7	7	7
No Response	16	6	-	19	69	6	-	-
Total	242	4	2	31	53	9	1	<1

¹Includes Becker County²Includes Mahnomen County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County**Table 3. Ground and aerial application of fungicides in 2011.**

County	Treated Acres	Application Type	
		Ground	Aerial
		-----% of treated acres-----	
Cass	7,800	79	21
Chippewa	15,099	88	12
Clay ¹	23,086	84	15
Grand Forks	19,747	87	13
Kandiyohi	6,133	100	0
Kittson	16,600	91	9
Marshall	9,691	62	38
Norman ²	25,032	80	20
Pembina	25,268	94	6
Polk	85,554	69	31
Renville ³	13,562	74	26
Richland	17,209	82	18
Stevens ⁴	7,218	69	31
Trail	11,354	68	32
Walsh	10,151	85	15
Wilkin ⁵	30,815	80	20
No Response	26,382	60	40
Total	350,701	78	22

¹Includes Becker County²Includes Mahnomen County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County

Table 4. Date of first fungicide application in 2011.

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	8	-	-	25	63	-	12
Chippewa	9	-	-	78	22	-	-
Clay ¹	18	-	11	39	28	22	-
Grand Forks	11	-	-	-	82	18	-
Kandiyohi	4	25	25	25	25	-	-
Kittson	13	-	-	-	-	69	31
Marshall	13	8	-	23	8	46	15
Norman ²	12	8	8	25	33	25	-
Pembina	13	8	-	8	31	38	15
Polk	50	-	8	12	52	28	-
Renville ³	9	11	22	44	22	-	-
Richland	9	-	11	22	56	11	-
Stevens ⁴	5	-	40	-	60	-	-
Trail	10	-	-	-	70	30	-
Walsh	12	8	-	-	58	8	25
Wilkin ⁵	13	15	15	62	8	-	-
No Response	14	-	21	21	42	14	-
Total	223	4	8	21	40	22	5

¹Includes Becker County²Includes Mahanomen County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County**Table 5. Date of last fungicide application in 2011.**

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	8	13	25	-	50	13	-
Chippewa	9	-	-	22	56	22	-
Clay ¹	18	-	-	-	61	33	6
Grand Forks	11	-	-	-	45	55	-
Kandiyohi	3	-	-	67	-	33	-
Kittson	13	-	-	-	62	38	-
Marshall	13	-	15	8	38	31	8
Norman ²	12	-	-	-	67	33	-
Pembina	13	-	-	-	46	54	-
Polk	50	-	4	4	62	28	2
Renville ³	9	-	11	33	22	33	-
Richland	9	-	11	11	56	22	-
Stevens ⁴	5	-	20	-	40	40	-
Trail	9	-	11	-	67	22	-
Walsh	13	-	-	8	38	46	8
Wilkin ⁵	14	-	-	21	50	29	-
No Response	14	-	7	7	57	29	-
Total	223	<1	5	7	53	33	2

¹Includes Becker County²Includes Mahanomen County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County**Table 6. Fungicide control of Cercospora leafspot in 2011.**

Fungicide	Number of Respondents	Excellent	Good	Fair	Poor
		-----% of respondents-----			
Super Tin/Agri Tin	93	60	33	4	2
Proline	98	67	27	5	1
Inspire XT	85	74	25	1	-
Tin+Topsin	50	64	32	4	-
Eminent	33	64	30	6	-
Gem	6	67	33	-	-
Headline	194	69	28	1	2
Total	559	68	29	3	1

Table 7. Acres reported as damaged by Aphanomyces, Rhizoctonia, Fusarium, and Rhizomania in 2011.

County	Respondent acres planted	Acres reported as damaged by Aphanomyces	Acres reported as damaged by Rhizoctonia	Acres reported as damaged by Fusarium	Acres reported as damaged by Rhizomania	
		-----% of acres planted-----				
Cass	3,471	42	31	-	19	
Chippewa	4,409	4	3	-	-	
Clay ¹	9,940	32	20	11	4	
Grand Forks	7,457	3	14	-	<1	
Kandiyohi	2,186	19	25	-	18	
Kittson	8,581	23	29	1	-	
Marshall	6,250	21	23	-	<1	
Norman ²	8,679	14	15	<1	1	
Pembina	12,235	<1	11	2	-	
Polk	32,329	6	14	<1	3	
Renville ³	4,387	15	4	3	3	
Richland	6,613	24	34	5	8	
Stevens ⁴	3,174	14	12	3	19	
Traill	4,773	9	23	-	-	
Walsh	4,100	5	8	-	-	
Wilkin ⁵	8,777	6	5	-	1	
No Response	9,598	24	25	3	-	
Total	136,959	13	17	2	3	

¹Includes Becker County²Includes Mahnomon County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County**Table 8. Application method and name of fungicide applied to manage Rhizoctonia in 2011.**

	In-Furrow Application			Foliar Application				
	No. of Responses	Headline	Quadris	No. of Responses	Headline	Proline	Quadris	
		-----% of responses-----				-----% of responses-----		
Cass	1	100	-	1	-	100	-	
Chippewa	0	-	-	2	50	50	-	
Clay ¹	4	50	50	8	-	12	88	
Grand Forks	5	100	-	7	14	14	72	
Kandiyohi	0	-	-	0	-	-	-	
Kittson	5	60	40	8	-	-	100	
Marshall	4	50	50	11	9	18	73	
Norman ²	1	100	-	7	14	-	86	
Pembina	1	-	100	11	9	36	55	
Polk	10	80	20	30	-	13	87	
Renville ³	0	-	-	2	-	100	-	
Richland	2	100	-	3	33	-	67	
Stevens ⁴	3	100	-	2	-	-	100	
Traill	3	100	-	5	-	-	100	
Walsh	3	33	67	9	11	33	56	
Wilkin ⁵	7	71	29	2	-	50	50	
No Response	2	50	50	5	-	-	100	
Total	50	72	28	111	5	18	77	

¹Includes Becker County²Includes Mahnomon County³Includes Faribault, Redwood, and Sibley Counties⁴Includes Grant, Swift, and Traverse Counties⁵Includes Ottertail County