SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2010

Aaron L. Carlson[1], John L. Luecke[1], Mark A. Boetel[2], Mohamed F.R. Khan[1], and Jeff M. Stachler[1]

[1]Sugarbeet Research Technician, Sugarbeet Research Specialist, Extension Sugarbeet Specialist, and Extension Sugarbeet Specialist
North Dakota State University - University of Minnesota, Fargo, ND
and
[2]Associate Professor, 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.

Fungicide use in 2010, averaged over all counties, was 225% of respondent acres as compared to 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 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 Kandiyohi County in 2010 with 437% of respondent acres receiving fungicide for control of Cercospora. The greatest fungicide use in 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, Eminent, Super/Agri Tin, and Proline were the most commonly used fungicides in 2010 and were used on 87%, 57%, 46% and 18% of the acres, respectively.

Eminent had a Section 18 label from 1999 through 2004 and was fully labeled in 2005. Eminent was used on 57% of the acreage in 2010 (Table 1), 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 2010, Headline was used on 87% of the sugarbeet acreage, 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, and 3% in 2010. Headline was the only fungicide to be applied by respondents from all counties in 2009 and again in 2010. 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 2010 (Table 2). Eighty percent of respondents applied fungicides two or three times. The average number of applications per acre was 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 (Table 3). The usage of ground sprayers ranged from 44% in Becker County to 98% in Pembina 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 2010 and in 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 82% of the respondents and after August 31 by 45% of the respondents. The last fungicide application was before August 11 by 6% 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 acreages of sugarbeet that were believed to be damaged by Aphanomyces, Rhizoctonia, Furarium, and Rhizomania in 2010 are given in Table 7. The reported sugarbeet acreage believed to be damaged by Aphanomyces, Rhizoctonia, Furarium, and Rhizomania in 2010 are 11% damaged by Aphanomyces, 21% damaged by Rhizoctionia, 3% damaged by Fusarium, and 7% damaged by Rhizomania. Fifty-three percent of survey respondents reported Rhizoctonia/Aphanomyces as their number one production problem in 2010. Rhizoctonia was the number one worst production problem reported in 2010**.** Continuing efforts are needed to develop and refine control measures for these root diseases, particularly Rhizoctonia.

Twenty-five percent of survey respondents indicated making a fungicide application to control Rhizoctonia root and crown rot in sugarbeet in 2010 (Table 8). The fungicides reported used were Quadris and Proline. Sixty-nine percent of respondents who applied a fungicide made the application from May 16 to June 15. Current recommendations are to apply fungicide in a band prior to infection, or, prior to soil temperatures reaching 62°F at the 4 inch depth.

Table 1. Fungicide use for Cercospora control by survey respondents in 2010.

County	Respondent acres planted	Not treated	Super/ Agri Tin	Proline	Inspire XT	Eminent	Gem	Headline	Tin + Topsin	Other[6]	Total acres treated
		% of acres planted									
Becker	2,172	-	72	-	26	74	-	98	-	-	270
Cass	2,958	-	53	78	6	-	-	100	5	-	242
Chippewa[1]	3,150	-	150	25	-	70	-	95	-	-	340
Clay	11,446	-	65	44	22	36	4	95	-	-	266
Grand Forks	7,337	-	41	22	3	70	-	96	-	-	232
Kandiyohi	2,549	-	131	192	9	12	56	37	-	-	437
Kittson	5,009	20	-	-	-	20	-	76	-	-	116
Marshall	12,423	<1	5	27	4	58	-	92	-	-	186
Norman[2]	7,028	-	81	4	54	41	-	96	-	-	276
Pembina	17,390	4	17	6	3	48	-	82	1	-	161
Polk	22,817	4	20	6	12	69	-	92	9	<1	212
Renville[3]	6,170	-	139	19	20	68	10	89	-	-	345
Richland	5,857	19	76	10	18	63	-	65	-	-	251
Traill	7,118	-	10	-	23	77	-	98	-	-	208
Traverse[4]	4,046	-	88	-	12	81	6	60	-	-	247
Walsh	6,790	10	8	20	21	31	-	76	-	-	166
Wilkin[5]	8,418	-	68	1	6	93	-	84	1	-	253
No Response	5,610	-	80	17	15	66	10	85	-	-	273
Total	138,288	3	46	18	13	57	2	87	2	<1	225

[1]Includes Swift Counties
[2]Includes Mahnomen County
[3]Includes Faribault, Lac Qui Parle, McLeod, Meeker, Redwood, Sibley, and Yellow Medicine Counties
[4]Includes Big Stone, Grant, and Stevens Counties
[5]Includes Ottertail County
[6]Other: was not specified

Table 2. Number of fungicide applications by survey respondents in 2010.

County	Respondents	Number of Applications						
		0	1	2	3	4	5	>5
		% of respondents						
Becker	4	-	-	25	75	-	-	-
Cass	7	-	14	14	58	14	-	-
Chippewa[1]	9	-	-	-	56	44	-	-
Clay	23	-	4	26	70	-	-	-
Grand Forks	15	-	7	53	40	-	-	-
Kandiyohi	8	-	-	-	50	50	-	-
Kittson	12	-	67	33	-	-	-	-
Marshall	20	-	20	50	30	-	-	-
Norman[2]	14	-	-	14	86	-	-	-
Pembina	19	-	16	68	16	-	-	-
Polk	44	2	7	66	25	-	-	-
Renville[3]	16	-	-	-	37	63	-	-
Richland	12	17	-	8	75	-	-	-
Traill	16	-	-	81	19	-	-	-
Traverse[4]	5	-	-	60	40	-	-	-
Walsh	15	13	20	54	13	-	-	-
Wilkin[5]	16	-	-	38	56	6	-	-
No Response	13	-	8	23	38	31	-	-
Total	268	2	9	40	40	9	0	0

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[5]Includes Ottertail County

Table 3. Ground and aerial application of fungicides in 2010.

County	Treated Acres	Ground	Aerial
		% of treated acres	
Becker	5,866	44	56
Cass	7,148	90	10
Chippewa[1]	10,676	84	16
Clay	30,509	76	24
Grand Forks	15,941	89	11
Kandiyohi	8,322	94	6
Kittson	4,826	79	21
Marshall	23,127	79	21
Norman[2]	19,453	71	29
Pembina	27,142	98	2
Polk	47,342	67	33
Renville[3]	24,112	97	3
Richland	13,591	85	15
Traill	14,819	63	37
Traverse[4]	10,098	45	55
Walsh	10,585	70	30
Wilkin[5]	21,233	79	21
No Response	15,378	71	29
Total	310,168	78	22

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[5]Includes Ottertail County

Table 4. Date of first fungicide application in 2010.

County	Number of Respondents	June 20-30	July 1-10	July 11-20	July 21-31	Aug. 1-10	After Aug. 10
		----------% of respondents----------					
Becker	4	-	-	50	-	25	25
Cass	7	-	-	14	43	29	14
Chippewa[1]	9	-	44	56	-	-	-
Clay	22	-	-	36	46	18	-
Grand Forks	14	-	-	14	36	36	14
Kandiyohi	8	25	25	25	25	-	-
Kittson	12	-	-	-	-	8	92
Marshall	20	-	-	15	20	40	25
Norman[2]	14	-	7	7	65	14	7
Pembina	19	-	5	16	10	32	37
Polk	43	-	-	2	12	65	21
Renville[3]	16	13	63	19	-	-	6
Richland	10	-	-	50	50	-	-
Traill	16	-	-	-	13	69	18
Traverse[4]	4	-	25	75	-	-	-
Walsh	13	-	-	15	47	15	23
Wilkin[5]	16	6	19	19	50	-	6
No Response	12	8	25	8	34	25	-
Total	259	2	10	17	25	28	17

[1]Includes Swift Counties
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[4]Includes Big Stone, Grant, and Stevens Counties
[5]Includes Ottertail County

Table 5. Date of last fungicide application in 2010.

County	Number of Respondents	Before Aug. 1	Aug. 1-10	Aug. 11-20	Aug. 21-31	Sept. 1-10	After Sept. 10
		----------% of respondents----------					
Becker	4	-	-	-	100	-	-
Cass	7	-	-	14	86	-	-
Chippewa[1]	9	-	-	78	11	11	-
Clay	23	-	9	9	39	43	-
Grand Forks	14	-	-	-	50	43	7
Kandiyohi	8	13	13	-	50	12	12
Kittson	11	-	-	-	45	55	-
Marshall	18	-	5	-	17	67	11
Norman[2]	14	-	-	7	57	29	7
Pembina	18	-	17	-	33	50	-
Polk	41	-	-	7	46	42	5
Renville[3]	16	-	6	31	25	13	25
Richland	10	-	10	40	20	20	10
Traill	16	-	-	-	69	31	-
Traverse[4]	4	-	-	25	25	50	-
Walsh	13	-	7	8	46	31	8
Wilkin[5]	16	6	13	25	31	25	-
No Response	12	-	8	8	59	25	-
Total	254	1	5	12	42	35	5

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[5]Includes Ottertail County

Table 6. Fungicide control of Cercospora leafspot in 2010.

Fungicide	Number of Respondents	Excellent	Good	Fair	Poor
		----------% of respondents----------			
Super Tin/Agri Tin	108	41	49	7	3
Proline	47	62	32	6	-
Inspire XT	47	66	32	-	2
Tin+Topsin	5	40	40	20	-
Eminent	138	65	29	5	1
Gem	7	43	43	14	-
Headline	218	60	36	3	1
Total	570	58	36	5	1

Table 7. Acres believed to have been damaged by Aphanomyces, Rhizoctonia, Fusarium, and Rhizomania in 2010.

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----------			
Becker	2,172	23	23	-	-
Cass	2,958	13	18	-	-
Chippewa[1]	3,150	8	-	1	3
Clay	11,446	19	28	16	18
Grand Forks	7,337	2	24	-	8
Kandiyohi	2,549	31	34	-	32
Kittson	5,009	21	2	-	<1
Marshall	12,423	23	24	-	2
Norman[2]	7,028	3	40	-	6
Pembina	17,390	5	9	2	<1
Polk	22,817	10	28	2	5
Renville[3]	6,170	10	18	-	<1
Richland	5,857	6	16	-	3
Traill	7,118	2	21	-	9
Traverse[4]	4,046	23	22	21	63
Walsh	6,790	5	15	2	<1
Wilkin[5]	8,418	11	32	<1	6
No Response	5,610	8	7	3	-
Total	138,288	11	21	3	7

[1]Includes Swift Counties
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[5]Includes Ottertail County

Table 8. Fungicide applied and date of application for Rhizoctonia control in 2010.

Fungicide	No. of Responses[1]	May 1-15	May 16-31	June 1-15	June 16-30	July 1 +	No Response
		---------- % of responses ----------					
Quadris	52	12	38	38	8	2	2
Proline	7	-	-	-	14	86	-
Quadris & Proline	3	-	33	67	-	-	-
No Response	4	-	50	25	-	-	25
Total	66	9	35	34	8	11	3

[1] One hundred ninety-three growers responded that no fungicide was applied.