SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES ON SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2015

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The forty-seventh annual weed control and production practices questionnaire was conducted electronically in 2015. The survey was linked to the websites of American Crystal Sugar Company, Minn-Dak Farmers Cooperative, and Southern Minnesota Beet Sugar Cooperative (SMBSC) from November to early December, 2015. Growers were asked to evaluate weed control and sugarbeet injury from specific herbicides, and to list the most important weed and production problems related to sugarbeet grown in 2015. In addition, growers were asked to indicate insecticide use, fungicide use, sugarbeet acreage, acres of hand-weeded sugarbeet, pesticide application methods, cost of hand weeding sugarbeet and other questions relating to their 2015 sugarbeet crop. Insecticide use and fungicide use portions of the survey can be found in the Entomology and Plant Pathology sections of this book.

Sugarbeet growers planted 638,964 acres of sugarbeet in the Minnesota and eastern North Dakota in 2015. Ninety growers responded to the survey, representing 58,776 acres or 9% of the total acres planted. All of the acres reported were Roundup Ready® (RR) sugarbeet. This compared to 99% of reported acres being RR in 2014, 99% in 2013, 97% in 2012, 82% in 2011, 93% in 2010, 88% in 2009, and 49% in 2008. 2015 marked the fourth year the survey was conducted exclusively online.

A summary of herbicide use, weed control, and crop injury averaged across all counties is presented in Table 1. The number of responses for an herbicide treatment is listed and the acres treated are expressed as a percentage of the total acreage reported. Multiple herbicide treatments are tabulated for each grower; therefore, the number of responses for herbicide treatments exceeds the total number of survey respondents. Also, multiple herbicide treatments on the same acreage are listed separately in the tables, thus, acres treated exceeds 100%. Weed control and sugarbeet injury are presented as the percentage of growers evaluating weed control or sugarbeet injury according to the categories listed.

The herbicide trade names listed in the tables are original trade names. The original trade names also represent the generic formulations of the same active ingredient. Thus Nortron also represents Ethofumesate SC, Ethofumesate 4SC, and Ethotron; Betamix also represents Phen-Des 8+8 and Sugarbeet Mix; Stinger also represents Clopyr Ag, Garrison, and Spur; Dual Magnum as a lay-by herbicide also represents Brawl, Cinch, and Charger Basic; Outlook also represents Commit, Establish, Propel, or Slider; and Grass Herbicide represents Assure II, Select, Select Max, Arrow, Clethodim 2EC, Section Three, Intensity, Intensity One, Prism, Section, Shadow, Trigger, Volunteer, and Targa.

Total sugarbeet acreage treated with herbicides in 2015 was 260% (Table 1) compared to 236% in 2014, 232% in 2013, 208% in 2012, 287% in 2011, 256% in 2010, 230% in 2009, 308% in 2008, 383% in 2007, 386% in 2006, and 378% in 2005. The acres treated do not include "other weed control methods" which were non-herbicidal methods.

Nortron, Dual Magnum, and tank-mixes of Nortron+Dual were the soil-applied herbicides reported by respondents in 2015. Soil-applied herbicide use for all sugarbeet acreage was 18% in 2015 (Table 1) 4% in 2014, 3% in 2013, 2% in 2012, 6% in 2011, 2% in 2010, 5% in 2009, 20% in 2008, 25% in 2007, 23% in 2006, 24% in 2005, and 47% in 1989.

Lay-by herbicides Outlook, Warrant, and Dual Magnum were applied to 42% of reported acres in 2015 (Table 1) compared to only 15% in 2014. The increase in lay-by application from 2014 to 2015 is likely due to the increasing presence of glyphosate resistant waterhemp. All lay-by applications were made as tank-mixes with glyphosate and/or other herbicides. Outlook was the most commonly applied lay-by product being applied to nearly 30% of reported acres

compared to only 13% in 2014. Warrant and Dual Magnum were applied to 9% and 7% of reported acres, respectively, in 2015.

Postemergence (POST) herbicide use averaged across all sugarbeet was 201% in 2015 (Table 1) compared to 232% in 2014, 221% in 2013, 201% in 2012, 276% in 2011, 253% in 2010, 224% in 2009, 279% in 2008, 340% in 2007, 335% in 2006, and 336% in 2005.

The most common herbicide treatment reported by all respondents since 2009 has been glyphosate applied POST. Glyphosate, alone and when combined across all tank-mix combinations, was applied to 242% of all sugarbeet acreage reported in 2015 (Table 1), compared to 227% in 2014, 215% in 2013, 192 % in 2012, 198% in 2011, 224% in 2010, 190% in 2009 and 105% in 2008. Glyphosate plus Stinger at 37% and glyphosate plus Outlook at 16% of acres treated were the most frequently reported herbicide tank-mix combinations by respondents planting sugarbeet in 2015 (Table 1). Stinger may be added to glyphosate to help control weeds such as common ragweed or volunteer RR soybean, while Outlook may be added as a lay-by to control small seeded broadleaf weeds like waterhemp.

The average cumulative rate of glyphosate applied POST per acre in RR sugarbeet in 2015 was 2.59 pounds acid equivalent per acre (lb ae/A), compared to 2.19 in 2014, 2.11 in 2013, 2.32 in 2012, 2.21 in 2011, 2.09 in 2010, 1.85 in 2009 and 1.95 lb ae/A in 2008. Since 2012 the average total rate of glyphosate applied per acre has been calculated using actual product names and use rates provided by the respondents who grew RR sugarbeet (data available upon request). In 2008 through 2011 the average total rate of glyphosate applied per acre was calculated by multiplying a glyphosate rate listed in Table 1 by the total percentage (in decimal form) of acres treated for that particular glyphosate rate listed in Table 1 and by the total acres reported in Table 1. The procedure was repeated for each glyphosate rate listed, the results were added, and then divided by the total RR sugarbeet acreage reported by all growers. The average glyphosate rate per acre per application in 2015 was 0.99 lb ae/A compared to 0.97 in 2014, 0.91 lb ae/A in 2013 (Table 2).

The use of postemergence grass herbicides alone or in combination was 11% of all sugarbeet acres in 2015 (Table 1) as compared to 24% in 2014, 23% in 2013, 30% in 2012, 56% in 2011, 32% in 2010, 29% in 2009, 104% in 2008, 189% in 2007, 215% in 2006, and 203% in 2005. The rapid decline in postemergence grass herbicide usage after 2007 is due to the rapid adoption of RR sugarbeet and the use of glyphosate to control grass weeds. In RR sugarbeet, grass herbicides are most commonly used to control volunteer RR corn.

The RR sugarbeet system continues to provide the most effective POST weed control reported by growers in the history of this survey. Forty-one percent of respondents (Table 1) reported excellent POST weed control. Of those growers who reported weed control from glyphosate applied alone (excludes those who did not respond), 60% reported excellent weed control in 2015 compared to 63% in 2014, 75% in 2013, 77% in 2012, 80% in 2011, 81% in 2010, 87% in 2009, and 92% in 2008. This declining trend of excellent weed control by respondents with RR sugarbeet should be noted as it is likely an indicator of increasing levels of glyphosate-resistant weeds.

The rotary hoe was used on only 0.9% of all acres in 2015 (Table 1) compared to 0.5% in 2014, 0.1% in 2013, 0.7% in 2012, 0.9% in 2011, 2.8% in 2010, 2.4% in 2009, 15% in 2008, 25% in 2007, 41% in 2006, and 56% in 2005. The rotary hoe and harrow have nearly vanished as tools to control weeds in sugarbeet compared to historical use due to the introduction of RR sugarbeet. Three respondents indicated flailing/swathing/mowing 0.9% of all reported acres in 2015.

Sugarbeet acreage operated by survey respondents in 2015 varied from 50 to 99 acres to greater than 2,000 acres (Table 3) with the average being 653 acres. The most common range in acres of sugarbeet was 400 to 599 acres with 30% of the respondents. Sixteen percent of respondents reported producing 1,000 or more acres of sugarbeet in 2015.

Waterhemp was reported most frequently as the "worst weed" problem by 46% of respondents planting RR sugarbeet in 2015 (Tables 4 & 5). Each year from 2008 to 2013, 'none' had been chosen most often as "worst weed" by RR sugarbeet growers. With waterhemp now being chosen more often than 'none' as "worst weed", along with a declining trend in satisfaction from glyphosate applied alone, growers should closely monitor their farms for waterhemp escapes and create management strategies that do not rely upon glyphosate alone. Ragweed (14%), 'None' (10%), and common lambsquarters (10%) were the next most reported "worst weed" problems by survey respondents planting sugarbeet in

2015 (Table 5). Wild oat, foxtail, volunteer RR crops, smartweed, and biennial wormweed were write-in responses on the survey.

Rhizoctonia/Aphanomyces was selected most often as the "most serious production problem" by survey respondents for the sixth year in a row with 45% of respondents (Table 6). From 1999 to 2008, weeds were the primary problem for respondents, but in 2015 only 14% of respondents selected weeds as their most serious production problem. This reduction in emphasis on weeds, although 7% greater than in 2014, is primarily due to the adoption of RR sugarbeet. 2015 was a very dry spring which allowed for early season planting. Eighteen percent of respondents wrote-in "emergence/stand" related issues as their worst production problem (Table 7).

Averaged across all counties, respondents reported hand-weeding on 13% of sugarbeet acres (Table 8) in 2015. Survey respondents from Cass, Chippewa, Norman, Renville, and Richland counties each reported greater than 10% hand-weeded acreage in 2015. Sixty-seven percent, 79%, 73%, and 80% of Cass, Chippewa, Renville, and Richland county respondents, respectively, also reported waterhemp as their "worst weed." Waterhemp may likely be the cause for above average reports of hand-weeding in these counties.

The cost of hand weeding ranged from zero to $50/A in 2015 (Table 8). The most common cost in 2015 was zero dollars as reported by 87% of survey respondents. Zero cost responses were 57% in 2005, 45% in 2006, 48% in 2007, 62% in 2008, 89% in 2009, 98% in 2010, 92% in 2011, 85% in 2012, 91% in 2013 and 87% in 2014. When averaged over all survey respondents, the average cost of hand weeding as calculated from Table 8 was $1.95/A in 2015 as compared to $2.47/A in 2014, $1.91 in 2013, $3.25/A in 2012, $2.23/A in 2011, $0.63/A in 2010, $4.78/A in 2009, $11.32/A in 2008, $15.50/A in 2007, $14.37/A in 2006, $10.78/A in 2005, and $34/A in 1995. The effectiveness of glyphosate and the percentage of acreage planted to RR sugarbeet have likely caused the reduction in the average cost of hand weeding averaged over all respondents. When averaged across growers who actually reported hand-weeded acres, the average cost of hand weeding in 2015 was $15.04/A compared to $17.11/A in 2014, $10.03 in 2013, $21.76 in 2012, $20.90/A in 2011, $29.06/A in 2010, $27.58/A in 2009, $27.41/A in 2008, and $29.40/A in 2007.

Nineteen percent of RR sugarbeet acreage was reportedly row crop cultivated in 2015 (Table 9) compared to 19% in 2014, 12% in 2013, 14% in 2012, 10% in 2011, 11% in 2010, 28% in 2009, and 32% in 2008. RR sugarbeet has reduced row crop cultivation for weed control.

The percentage of respondents compared to the percentage of acres reported were very similar among factory districts (Table 10). Minn-Dak growers represented 23% of all respondents and 26% of reported acres, while Drayton growers represented 12% of respondents and 11% of reported acres. Within a county, growers represented 1 to 3 factory districts.

Respondents indicated seeding cover crops in 49% of sugarbeet acres in 2015 (Table 11). Barley was the most commonly reported cover crop specie on 25% of reported acres. Respondents from Chippewa and Richland counties reported 80% and 84%, respectively, of sugarbeet acres seeded with cover crop in 2015.

Wheat was the most common crop to precede sugarbeet in 2015 on 50% of reported acres (Table 12). Corn preceded sugarbeet on 22% of acres reported and soybean on 10% of reported acres. Every county surveyed reported at least some sugarbeet acres to have been preceded by wheat.

Twenty-eight percent of respondents to this year's survey gave no response to which resources they used most for aiding in making field decisions (Table 13). Twenty-eight percent of respondents considered the NDAWN website and the Cercospora and Rhizoctonia models as their most used resource. Twenty-three percent of respondents considered a NDSU/U of MN extension publication their most used resource. Nine percent of respondents considered NDSU website crop and pest reports and root fly maggot counts as their most used resource. Thirteen percent of respondents indicated relying mainly on trials, agronomists, consultants, or all of the above as their most used resources. Many respondents indicated they used more than one of the resources provided as options on the survey.

Twenty-two percent of respondents indicated they plan to use a soil-applied (PPI or PRE) herbicide in the spring of 2016 (Table 14). Forty-one percent do not plant to use a PPI or PRE and 37% are undecided. When asked if they planned to use a lay-by herbicide in 2016, 36% said yes, 34% said no, 30% said maybe.

Table 1. Summary of weed control methods used in sugarbeet reported in 2015. 90 growers reported on 58,776 acres.

Treatment	No. of Responses	Acres Treated	Acres Treated % of Total	% of Responses Reporting Weed Control					% of Responses Reporting Crop Injury				
				NR*	Exc	Gd	Fr	Pr	NR	None	Slt	Mod	Sev
A. SOIL APPLIED HERBICIDES													
Other PRE	9	4,463	7.6	56	22	11	11	-	44	44	12	-	-
Dual PRE	6	2,861	4.9	-	-	33	67	-	-	33	17	50	-
Nortron PRE	4	1,043	1.8	-	-	100	-	-	-	75	25	-	-
Dual+Nortron PRE	3	2,225	3.8	-	33	67	-	-	-	100	-	-	-
Total-PPI & PRE	**22**	**10,592**	**18.0**	**23**	**14**	**40**	**23**	**0**	**18**	**54**	**14**	**14**	**0**
B. POSTEMERGENCE HERBICIDES													
Glyphosate	109	79,208	134.8	31	41	24	4	-	17	80	3	-	-
Glyp+Stinger	25	21,956	37.4	8	64	28	-	-	8	60	32	-	-
Glyp+Nortron	5	4,090	7.0	40	20	40	-	-	80	-	20	-	-
Glyp+Stinger+Nort	4	2,800	4.8	25	25	50	-	-	25	25	50	-	-
Glyp+Grass**	2	1,350	2.3	-	-	100	-	-	-	100	-	-	-
Glyp+Stinger+Grass**	2	3,283	5.6	50	-	50	-	-	-	50	50	-	-
Glyp+Betamix	2	1,128	1.9	-	100	-	-	-	-	100	-	-	-
Glyp+UpBeet	2	1,374	2.3	-	-	100	-	-	-	100	-	-	-
Glyp+Nort+UpB	1	511	0.9	-	-	100	-	-	-	-	100	-	-
Glyp+Stinger+Bmix+Nort+UpB	1	200	0.3	100	-	-	-	-	-	-	100	-	-
Glyp+Bmix+Stinger	1	1,350	2.3	-	-	100	-	-	-	-	100	-	-
Glyp+Stinger+Nortron+UpB	1	500	0.9	-	100	-	-	-	-	100	-	-	-
Grass**	1	158	0.3	-	-	100	-	-	100	-	-	-	-
Total-POST	**156**	**117,908**	**200.6**	**25**	**41**	**32**	**2**	**0**	**17**	**71**	**12**	**0**	**0**
C. LAY-BY HERBICIDES													
Outlook+Glyp	16	8,989	15.3	-	38	44	18	-	6	94	-	-	-
Dual+Glyp	11	3,834	6.5	-	55	45	-	-	-	64	18	18	-
Outlook+Glyp+Stinger	5	3,502	6.0	-	-	20	80	-	-	20	40	40	-
Warrant+Glyp	4	1,172	2.0	-	50	50	-	-	-	100	-	-	-
Outlook+Glyp+Nort	2	700	1.2	-	50	50	-	-	-	100	-	-	-
Outlook+Glyp+Grass**	2	232	0.4	-	100	-	-	-	-	100	-	-	-
Warrant+Glyp+Bmix	1	1,375	2.3	-	-	100	-	-	-	-	100	-	-
Warrant+Glyp+Grass**	1	1,300	2.2	-	-	100	-	-	-	-	100	-	-
Warrant+Glyp+Stinger	1	1,300	2.2	-	-	100	-	-	-	100	-	-	-
Outlook+Glyp+Nort+Stinger	1	1,042	1.8	-	-	-	100	-	-	-	100	-	-
Outlook+Glyp+Nort+Stinger+UpB	1	500	0.9	-	100	-	-	-	-	100	-	-	-
Outlook+Glyp+Warrant	1	200	0.3	-	-	100	-	-	-	100	-	-	-
Total-Lay-by	**46**	**24,146**	**41.1**	**0**	**39**	**43**	**18**	**0**	**2**	**74**	**15**	**9**	**0**
D. OTHER WEED CONTROL METHODS													
Cultivations	25	11,120	18.9	5	5	46	32	12	5	32	54	9	-
Rotary Hoe	1	500	0.9	100	-	-	-	-	100	-	-	-	-
Harrow	1	240	0.4	100	-	-	-	-	100	-	-	-	-
Flail/Swath/Mow	3	536	0.9	100	-	-	-	-	100	-	-	-	-
Total-Other Methods	**30**	**12,396**	**21.1**	**19**	**3**	**41**	**27**	**10**	**19**	**27**	**47**	**7**	**0**
TOTAL ALL TREATMENTS	**254**	**165,042**	**280.8**	**20**	**33**	**35**	**10**	**2**	**15**	**65**	**17**	**3**	**0**

*NR=No Response;Exc=Excellent;Gd=Good;Fr=Fair;Pr=Poor;Slt=Slight;Mod=Moderate;Sev=Severe

**Grass=Grass Herbicide

Table 2. Reported glyphosate use rate per application in sugarbeet by county in 2015.

County	Applications Reported	lb ae/A			
		<0.7	0.7 to 0.84	0.85 to1.0	>1.0
		% of applications			
Cass	8	-	-	75	25
Chippewa[1]	27	-	26	15	59
Clay[2]	11	-	18	45	36
Grand Forks	11	-	18	55	27
Kittson	6	-	17	33	50
Marshall	6	-	-	-	100
Norman	7	-	29	-	71
Pembina	7	-	43	57	-
Polk[3]	19	-	26	21	53
Renville[4]	33	-	36	12	52
Richland	15	-	27	33	40
Traverse[5]	15	-	7	40	53
Walsh	8	-	13	63	25
Wilkin	25	-	32	40	28
Total	198	0	24	31	45

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 3. Total sugarbeet acreage operated by survey respondents in 2015.

County	Respondents	Acres of sugarbeet										
		<50	50-99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1499	1500-1999	2000+
		% of respondents										
Cass	3	-	-	-	-	-	100	-	-	-	-	-
Chippewa[1]	14	-	14	14	-	7	14	30	7	7	7	-
Clay[2]	6	-	-	-	17	-	50	33	-	-	-	-
Grand Forks	4	-	-	-	-	-	25	25	-	25	-	25
Kittson	3	-	-	-	33	-	-	33	33	-	-	-
Marshall	2	-	-	-	-	-	50	-	50	-	-	-
Norman	3	-	-	-	-	-	67	-	-	-	-	33
Pembina	3	-	-	-	-	-	-	67	33	-	-	-
Polk[3]	14	-	-	7	14	22	50	-	-	7	-	-
Renville[4]	15	-	7	13	7	7	26	7	7	19	7	-
Richland	5	-	-	-	-	20	-	20	-	40	-	20
Traverse[5]	5	-	-	-	-	-	20	40	-	40	-	-
Walsh	4	-	-	-	-	25	50	25	-	-	-	-
Wilkin	9	-	-	22	11	34	11	11	11	-	-	-
Total	90	0	3	8	7	11	30	18	7	11	2	3

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 4. A summary of the worst weed problem responses in RR sugarbeet for the past 8 years.

Year	Response	None	COCB[1]	KOCZ	COLQ	FXTL	PIWE	RAWE	SMWE	VELF	WIBW	WIOA	WAHE	RR Crops	Other
		% of responses													
2008	57	54	0	7	7	0	16	-	0	0	5	4	2	5	-
2009	178	39	2	3	30	0	12	2	1	1	2	2	3	2	-
2010	246	30	2	4	23	1	17	2	2	1	5	2	5	2	-
2011	205	29	1	4	16	2	20	7	1	0	3	2	11	3	-
2012	109	28	0	4	19	1	20	6	0	1	0	0	13	3	-
2013	180	36	<1	2	18	1	16	4	<1	0	2	2	13	3	-
2014	187	26	1	1	10	0	7	9	1	0	2	1	37	4	3
2015	90	10	0	6	10	1	2	16	1	0	1	1	46	4	2

[1]COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; FXTL=foxtail species; PIWE=pigweed species; RAWE=ragweed, common or giant; SMWE=smartweed; VELF=velvetleaf; WIBW=wild buckwheat; WIOA=wild oat; WAHE=waterhemp; RR Crops=Roundup Ready crops.

Table 5. A summary of the worst weed problem responses in RR sugarbeet by county in 2015.

County	Responses	None	KOCZ[6]	COLQ	PIWE	GIRA	CORA	WIBW	RR Can	WAHE	Other[7]
		% of responses									
Cass	3	-	-	-	-	-	33	-	-	67	-
Chippewa[1]	14	14	7	-	-	-	-	-	-	79	-
Clay[2]	6	-	-	-	-	-	17	-	17	66	-
Grand Forks	4	-	-	50	-	-	25	-	-	25	-
Kittson	3	-	-	-	-	-	-	-	67	-	33
Marshall	2	-	-	-	-	-	-	50	-	-	50
Norman	3	-	-	67	-	-	33	-	-	-	-
Pembina	3	33	33	33	-	-	-	-	-	-	-
Polk[3]	14	14	14	7	7	-	44	-	-	-	14
Renville[4]	15	7	-	-	-	13	-	-	-	73	7
Richland	5	-	-	-	-	-	-	-	-	80	20
Traverse[5]	5	-	-	-	-	-	20	-	-	80	-
Walsh	4	50	-	25	-	-	-	-	-	-	25
Wilkin	9	-	11	22	11	-	11	-	-	45	-
Total	90	10	6	10	2	2	14	1	3	46	6

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County
[6]KOCZ=kochia; RR Soy=Roundup Ready soybean; COLQ=common lambsquarters; PIWE=pigweed species; GIRA=giant ragweed; CORA= common ragweed; VEMA=venice mallow; WIBW=wild buckwheat; RR can=Roundup Ready canola; WAHE=waterhemp.
[7]Other= smartweed; wild oat; foxtail; biennial wormweed; volunteer RR crops excluding canola.

Table 6. A summary of the most serious production problem responses for the past 25 years.

	Production problem indicated as worst in sugarbeet									
Year	No Problem	Weeds	Weather	Emergence/ Stand	Labor mgmt.	Root maggot	Cercospora leaf spot	Rhizoctonia/ Aphanomyces	Rhizomania	Herbicide Injury
	% of responses									
1991	3	26	4	18	1	26	7	8	-	-
1992	11	45	9	15	5	9	1	3	-	-
1993	3	40	21	16	4	1	2	12	-	-
1994	3	56	12	13	4	1	3	8	-	-
1995	2	51	6	2	3	<1	24	11	-	-
1996	6	53	12	11	6	2	3	6	-	-
1997	15	34	13	12	3	1	5	14	2	-
1998	3	25	9	4	1	1	36	17	3	-
1999	14	39	14	12	2	1	6	9	2	-
2000	8	48	9	10	1	<1	3	18	2	-
2001	6	52	13	5	2	1	1	16	3	-
2002	4	53	11	19	1	<1	<1	9	3	-
2003	7	61	9	4	1	<1	1	11	2	4
2004	6	47	10	21	2	1	0	8	1	1
2005	3	36	22	3	3	0	0	22	11	0
2006	9	57	5	9	1	0	<1	13	3	1
2007	4	46	7	18	<1	<1	<1	18	2	1
2008	12	30	4	21	3	0	<1	24	2	1
2009	14	7	12	21	2	1	1	30	5	1
2010	14	6	8	5	2	1	3	53	5	1
2011	7	5	15	7	<1	1	1	54	3	<1
2012	11	11	7	8	3	0	7	43	1	0
2013	18	5	16	9	8	1	<1	30	1	<1
2014	7	7	31	13	4	2	0	33	1	1
2015	3	14	4	18	0	3	12	45	0	1

Table 7. A summary of the most serious production problem responses by county in 2015.

County	Responses	No Prob.	Emerg/ Stand	Aphan-omyces	Rhizoc-tonia	CLS[6]	Root Maggot	Weeds	Herbicide Injury	Weather	Other[7]
						% of responses					
Cass	3	-	-	-	67	-	-	33	-	-	-
Chippewa[1]	14	-	14	-	36	29	-	7	7	-	7
Clay[2]	6	-	17	-	-	17	-	66	-	-	-
Grand Forks	4	25	-	-	50	-	25	-	-	-	-
Kittson	3	-	-	33	33	-	-	-	-	33	-
Marshall	2	-	50	-	50	-	-	-	-	-	-
Norman	3	-	33	-	67	-	-	-	-	-	-
Pembina	3	-	-	33	33	-	33	-	-	-	-
Polk[3]	14	-	30	14	21	-	7	7	-	21	-
Renville[4]	15	7	7	-	53	26	-	7	-	-	-
Richland	5	-	40	-	20	20	-	20	-	-	-
Traverse[5]	5	-	20	-	40	20	-	20	-	-	-
Walsh	4	-	25	50	25	-	-	-	-	-	-
Wilkin	9	11	11	-	45	-	-	33	-	-	-
Total	90	3	18	7	36	12	3	14	1	5	1

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County [6]CLS=Cercospora leaf spot
[7]Other= compaction and not enough nitrogen.

Table 8. Hand-weeded acres and cost of hand-weeding in sugarbeet by county in 2015.

County	RR acres planted	Hand-weeded	Responses	Dollars per acre: 0	1-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
		% of acres planted		% of respondents									
Cass	1,434	10	3	97	7	-	-	-	-	-	-	-	-
Chippewa[1]	7,976	40	14	60	28	8	-	-	-	-	-	-	4
Clay[2]	3,148	2	6	98	-	-	-	2	-	-	-	-	-
Grand Forks	5,143	<1	4	99	-	-	<1	-	-	-	-	-	-
Kittson	1,820	7	3	93	7	-	-	-	-	-	-	-	-
Marshall	1,425	0	2	100	-	-	-	-	-	-	-	-	-
Norman	3,404	26	3	74	26	-	-	-	-	-	-	-	-
Pembina	2,159	0	3	100	-	-	-	-	-	-	-	-	-
Polk[3]	6,486	5	14	95	4	-	<1	-	-	-	-	-	-
Renville[4]	9,246	14	15	86	2	6	-	-	6	-	-	-	-
Richland	6,095	25	5	75	-	3	5	-	-	-	17	-	-
Traverse[5]	4,605	1	5	99	-	1	-	-	-	-	-	-	-
Walsh	1,985	0	4	100	-	-	-	-	-	-	-	-	-
Wilkin	3,850	5	9	95	-	-	5	-	-	-	-	-	-
Total	58,776	13	90	87	6	2	<1	<1	<1	0	2	0	<1

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 9. Percent of sugarbeet acres planted that were cultivated to control weeds by county in 2015.

County	Respondents	Acres Planted	Acres Cultivated[6]	Acres Cultivated	Weed Control					Crop Injury				
					NR*	Exc.	Good	Fair	Poor	NR	None	Slt	Mod	Sev
					% of planted acres									
Cass	3	1,434	0	-	-	-	-	-	-	-	-	-	-	-
Chippewa[1]	14	7,976	5,192	65	-	-	13	52	<1	-	17	37	11	-
Clay[2]	6	3,148	100	3	-	-	3	-	-	-	-	3	-	-
Grand Forks	4	5,143	0	-	-	-	-	-	-	-	-	-	-	-
Kittson	3	1,820	0	-	-	-	-	-	-	-	-	-	-	-
Marshall	2	1,425	0	-	-	-	-	-	-	-	-	-	-	-
Norman	3	3,404	0	-	-	-	-	-	-	-	-	-	-	-
Pembina	3	2,159	680	32	-	-	-	32	-	-	32	-	-	-
Polk[3]	14	6,486	470	7	-	-	7	-	-	-	2	5	-	-
Renville[4]	15	9,246	3,278	36	3	-	19	3	11	3	15	18	-	-
Richland	5	6,095	250	4	-	-	4	-	-	-	-	-	4	-
Traverse[5]	5	4,605	30	1	-	-	1	-	-	-	-	1	-	-
Walsh	4	1,985	1,120	56	-	17	13	-	26	-	17	39	-	-
Wilkin	9	3,850	260	7	-	-	7	-	-	-	-	7	-	-
Total	90	58,776	11,120	19	<1	<1	7	9	2	<1	7	10	2	0

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 10. Breakdown of survey respondents and acres by factory district and county in 2015.

County	No. of Resp.	Acres	Factory District													
			Drayton		E. Grand Forks		Crookston		Hillsboro		Moorhead		Minn-Dak		SMBSC	
			% of respondents / % of acres													
Cass	3	1,434	-	-	-	-	-	-	67	67	33	33	-	-	-	-
Chippewa[1]	14	7,976	-	-	-	-	7	6	-	-	-	-	-	-	93	94
Clay[2]	6	3,148	-	-	-	-	-	-	-	-	83	87	17	13	-	-
Grand Forks	4	5,143	-	-	50	69	25	9	25	22	-	-	-	-	-	-
Kittson	3	1,820	100	100	-	-	-	-	-	-	-	-	-	-	-	-
Marshall	2	1,425	50	40	50	60	-	-	-	-	-	-	-	-	-	-
Norman	3	3,404	-	-	-	-	-	-	33	76	67	24	-	-	-	-
Pembina	3	2,159	100	100	-	-	-	-	-	-	-	-	-	-	-	-
Polk[3]	14	6,486	-	-	14	11	86	89	-	-	-	-	-	-	-	-
Renville[4]	15	9,246	-	-	-	-	-	-	-	-	-	-	7	5	93	95
Richland	5	6,095	-	-	-	-	-	-	-	-	-	-	100	100	-	-
Traverse[5]	5	4,605	-	-	-	-	-	-	-	-	-	-	100	100	-	-
Walsh	4	1,985	100	100	-	-	-	-	-	-	-	-	-	-	-	-
Wilkin	9	3,850	-	-	-	-	-	-	-	-	-	-	100	100	-	-
Total	90	58,776	12	11	6	9	16	11	4	8	9	7	23	26	22	28

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 11. Percent of sugarbeet acres seeded with various cover crops by county in 2015.

County	No. of responses	Acres planted	Barley	Oat	Wheat	Rye	Other	None
			% of acres planted					
Cass	3	1,434	28	-	-	-	-	72
Chippewa[1]	14	7,976	6	59	15	-	-	20
Clay[2]	6	3,148	32	-	-	-	-	68
Grand Forks	4	5,143	40	-	-	-	-	60
Kittson	3	1,820	7	-	-	-	-	93
Marshall	2	1,425	-	-	-	-	-	100
Norman	3	3,404	75	-	-	-	-	25
Pembina	3	2,159	-	-	54	-	-	56
Polk[3]	14	6,486	24	-	-	-	-	76
Renville[4]	15	9,246	-	17	40	-	-	43
Richland	5	6,095	43	-	37	4	-	16
Traverse[5]	5	4,605	33	-	18	-	-	49
Walsh	4	1,985	-	-	20	-	-	80
Wilkin	9	3,850	53	-	3	-	-	44
Total	90	58,776	25	10	15	<1	-	51

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County

Table 12. Percent of sugarbeet acres seeded in 2015 into various crop residues by county.

		Sugarbeet	Crop Preceding Sugarbeet					
County	No. of responses	Acres planted	Corn	Dry Bean	Soybean	Wheat	Fallow	Other[6]
			% of acres planted					
Cass	2	964	5	-	5	90	-	-
Chippewa[1]	11	7,145	75	-	6	7	-	12
Clay[2]	6	3,148	6	-	40	22	11	21
Grand Forks	4	5,143	1	-	2	51	25	21
Kittson	3	1,820	-	-	-	100	-	-
Marshall	2	1,425	-	-	6	74	-	20
Norman	2	2,991	-	24	3	68	5	-
Pembina	3	2,159	-	-	-	69	-	31
Polk[3]	12	5,769	-	-	4	94	-	2
Renville[4]	12	6,861	59	-	11	7	-	23
Richland	5	6,095	10	-	19	71	-	-
Traverse[5]	5	4,605	25	-	10	60	5	-
Walsh	4	1,985	-	-	15	85	-	-
Wilkin	9	3,850	12	-	18	70	-	-
Total	80	53,960	22	1	10	50	7	10

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant County
[6]Other=Sweet Corn; Potatoes; Barley; Field Pea.

Table 13. Most used resources for making field decisions in by district in 2015.

Factory District	Number of Responses	Sugarbeet Production Guide[1]	Sugarbeet R. & E. Reports[1]	Cercospora Model[2]	Rhizoctonia Model[2]	Root Maggot Fly Counts[3]	NDSU Crop and Pest Report[3]	Other[4]	No Response
		% of responses							
Drayton	11	-	-	-	18	9	-	36	37
East Grand Forks	5	-	-	20	20	-	20	-	40
Crookston	14	21	21	14	-	-	-	8	36
Hillsboro	4	25	25	-	-	25	-	25	-
Moorhead	8	13	13	-	13	25	-	13	23
Minn-Dak	21	19	10	14	14	-	-	5	38
SMBSC	27	7	11	44	-	11	-	15	12
Total	90	12	11	20	8	8	1	13	28

[1]NDSU/U of MN Extension Publication
[2]NDAWN Website
[3]NDSU Website
[4]Other=coop. trials; coop. agronomist; crop consultant; All of the above.

Table 14. Percent of respondents in 2015 intending to use PPI/PRE or Lay-By herbicides in 2016 by county.

County	No. of responses	Acres planted	2016 PPI/PRE Intentions			2016 Lay-By Intentions		
			Yes	Maybe	No	Yes	Maybe	No
			----------% of respondents----------					
Cass	3	1,434	67	-	33	33	33	33
Chippewa[1]	14	7,976	36	36	28	50	36	14
Clay[2]	6	3,148	33	33	33	33	50	17
Grand Forks	4	5,143	-	50	50	-	25	75
Kittson	3	1,820	-	-	100	-	-	100
Marshall	2	1,425	-	50	50	-	50	50
Norman	3	3,404	-	67	33	-	100	-
Pembina	3	2,159	-	-	100	-	-	100
Polk[3]	14	6,486	-	36	64	-	29	71
Renville[4]	15	9,246	20	53	27	60	40	-
Richland	5	6,095	40	40	20	80	-	20
Traverse[5]	5	4,605	80	-	20	100	-	-
Walsh	4	1,985	-	-	100	-	-	100
Wilkin	9	3,850	22	67	11	45	33	22
Total	90	58,776	22	37	41	36	30	34

[1]Includes Kandiyohi, Swift and Pope Counties
[2]Includes Becker County
[3]Includes Pennington County
[4]Includes Redwood and Yellow Medicine Counties
[5]Includes Grant Count