

## **SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES ON SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2013**

Aaron L. Carlson<sup>1</sup>, Mohamed F.R. Khan<sup>1</sup>, and Mark A. Boetel<sup>2</sup>

<sup>1</sup>Sugarbeet Research Specialist and Extension Sugarbeet Specialist  
North Dakota State University - University of Minnesota, Fargo, ND  
and

<sup>2</sup>Professor, Dept. of Entomology, North Dakota State University

The forty-fifth annual weed control and production practices questionnaire was conducted electronically in 2013. The survey was linked to the websites of American Crystal Sugar Company, Minn-Dak Farmers Cooperative, and Southern Minnesota Beet Sugar Cooperative in September 2013. 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 2013. 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 2013 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 676,244 acres of sugarbeet in the Minnesota and Eastern North Dakota in 2013. One-hundred eighty-three growers responded to the survey, representing 121,063 acres or 18% of the total acres planted. Of the acres reported, 1% was conventional and 99% were Roundup Ready® (RR) sugarbeet. This compared to 97 % of reported acres being RR in 2012, 82% in 2011, 93% in 2010, 88% in 2009, and 49% in 2008. Polk and Wilkin Counties had 6 and 1 respondents, respectively, who grew conventional sugarbeet while respondents from all other counties grew only RR sugarbeet. 2013 was the second year of conducting the survey exclusively online. Response was much improved over 2012 with the majority of responses being submitted in October and November.

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. Table 2 and 3 provides a summary of herbicide use and performance in conventional sugarbeet and RR sugarbeet, respectively.

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; Progress also represents BnB Plus; Stinger also represents Clopyr Ag, Garrison, and Spur; Dual Magnum also represents Brawl, Cinch, and Charger Basic; Outlook also represents Commit, Establish, Propel, or Slider; Select also represents Select Max, Arrow, Clethodim 2EC, Intensity, Intensity One, Prism, Section, Shadow, Trigger, and Volunteer; and Assure II also represents Targa.

Total sugarbeet acreage treated with herbicides in 2013 was 232% (Tables 1 and 4) compared to 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. Respondents planting conventional sugarbeet in 2013 applied herbicides to 480% of their acreage (Tables 2 and 4), compared to 378% in 2012, 403% in 2011, 385% in 2010, 299% in 2009, and 407% in 2008. Respondents who planted RR sugarbeet in 2013 applied herbicides to 229% of their acreage (Tables 3 and 4) compared to 202% in 2012, 262% in 2011, 245% in 2010, 225% in 2009, and 225% in 2008.

Nortron, Dual Magnum, and Eptam were the soil-applied herbicides reported by respondents in 2013. Soil-applied herbicide use for all sugarbeet acreage was 3% in 2013 (Table 1), 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. Soil-applied herbicide use by respondents growing conventional sugarbeet was 28% in 2013 (Table 2), 42% in 2012, 27% in 2011, 4% in 2010, 18% in 2009, and 35% in 2008. Two percent of RR sugarbeet acres received a soil-applied herbicide in 2013 (Table 3).

Postemergence (POST) herbicide use averaged across all sugarbeet was 221% in 2013 (Table 1) compared to 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.

Postemergence herbicide use in conventional sugarbeet was 375% in 2013 (Table 2) compared to 303 % in 2012, 362% in 2011, 378% in 2010, 259% in 2009 and 346% in 2008. Postemergence herbicide use by respondents planting RR sugarbeet was 219% in 2013 (Table 3) compared to 198% in 2012, 260% in 2011, 247% in 2010, 225% in 2009 and 223% in 2008.

The most common herbicide treatment reported by all respondents since 2009 has been glyphosate applied POST. Glyphosate, when combined across all rates and combinations, was applied POST to 215% of all (conventional + RR) sugarbeet acreage reported in 2013 (Table 1), compared to 192 % in 2012, 198% in 2011, 224% in 2010, 190% in 2009 and 105% in 2008. Glyphosate, when combined across all rates and combinations, was applied to 218% of RR sugarbeet acreage reported in 2013 (Table 3), compared to 198% in 2012, 244% in 2011, 242% in 2010, 224% in 2009 and 223% in 2008. Glyphosate plus Stinger at 26% and glyphosate plus Select at 13% of acres treated were the most frequently reported herbicide combinations by respondents planting RR sugarbeet in 2013 (Table 3). Stinger may be added to glyphosate to help control weeds such as common ragweed or volunteer RR soybean, while Select may be added to help control volunteer RR corn.

The average cumulative rate of glyphosate applied POST per acre in RR sugarbeets in 2013 was 2.11pounds acid equivalent per acre (lb ae/A), compared to 2.32 in 2012, 2.21 in 2011, 2.09 in 2010, 1.85 in 2009 and 1.95 lb ae/A in 2008. In 2012 and 2013 the average total rate of glyphosate applied per acre was calculated using actual product names and use rates provided by 160 of the 180 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 listed in Table 4. The average glyphosate rate per acre per application in 2013 was 0.91 lb ae/A. In 2013, Roundup PowerMax was applied by 76% of responses reporting the use of glyphosate formulations (Table 5).

The use of postemergence grass herbicides alone or in combination was 23% of all sugarbeet acres in 2013 (Table 1) as compared to 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. The usage of postemergence grass herbicides was 273% of conventional sugarbeet acreage only in 2013 (Table 2) compared to 260% in 2012 and 2011, 233% in 2010, 194% in 2009, and 220% in 2008.

The RR sugarbeet system continues to provide the most effective POST weed control reported by growers in the history of this survey. Sixty-eight percent of RR sugarbeet respondents (Table 3) reported excellent POST weed control compared to 44% of respondents who grew conventional sugarbeet (Table 2). From 1974 to 2010, an average of 25% of conventional sugarbeet growers reported excellent weed control. Of growers who reported weed control from glyphosate applied alone (excludes those who did not respond), 75% reported excellent weed control in 2013 compared to 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 may be an indicator of increasing levels of glyphosate-resistant weeds.

Glyphosate was applied preemergence to 0.6% of reported sugarbeet acres in 2013 while Outlook was applied lay-by to 6.9% of reported acres and Dual Magnum to 0.5% (Table 1).

The rotary hoe was used on only 0.1% of all acres in 2013 (Table 1) compared to 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 a tool to control weeds in sugarbeet compared to historical use due to the introduction of RR sugarbeet. The electrical discharge system, weed pullers, mowing or swathing were not reported in 2013 or 2012 compared to use on 0.1% of the total sugarbeet acreage in 2011, 0% in 2010, <1% in 2009, 0.4% in 2008, 2.6% in 2007, 1.7% in 2006, 1.9% in 2005, and 7.6% of the acreage in 1995.

Sugarbeet acreage operated by survey respondents in 2013 varied from less than 50 acres to greater than 2,000 acres (Table 6) with the median sugarbeet acreage being 500 acres and the average being 662 acres. The most common range in acres of sugarbeet was 400 to 599 acres with 20% of the respondents. Sixteen percent of respondents reported producing 1,000 or more acres of sugarbeet in 2013.

'None' was reported most frequently as the "worst weed" problem by 36% of respondents planting RR sugarbeet in 2013 (Table 9). 'None' has been chosen most often as "worst weed" by RR sugarbeet growers each year since RR sugarbeet was commercially produced in 2008. Common lambsquarters (18%), pigweed (16%), and waterhemp (13%)

were the next most reported “worst weed” problems by survey respondents planting RR sugarbeet in 2013 (Table 10). Bolters, volunteer RR crops, biennial wormwood, smartweed, and smooth scouringrush were write-in responses on the survey.

Rhizoctonia/Aphanomyces was selected most often as the “most serious production problem” by survey respondents for the fifth year in a row with 30% of respondents (Table 11). From 1999 to 2008, weeds were the primary problem for respondents, but in 2013 only 5% of respondents selected weeds as their most serious production problem. This reduction in emphasis on weeds is primarily due to the adoption of RR sugarbeet.

Thirty-six respondents with RR sugarbeet from 10 counties suspected the presence of glyphosate-resistant weeds in sugarbeet in 2013 (Table 14). Waterhemp, common ragweed, common lambsquarters, and kochia were the most frequently listed weeds suspected of being glyphosate-resistant with 50%, 39%, 17%, and 17% of respondents in 2013, respectively. Waterhemp, common ragweed, and giant ragweed have been confirmed resistant through greenhouse and/or field testing in Minnesota and/or North Dakota over the past 4 years. Respondents growing RR sugarbeet suspected glyphosate-resistant weeds on 10% of RR sugarbeet acres (Table 15). Survey respondents estimated the density of glyphosate-resistant weeds in their sugarbeet fields to be about 1 weed per acre in 2013. At this density, hand weeding can be a very important tool to reduce the spread of suspected glyphosate-resistant weeds.

Averaged across all counties, respondents reported hand-weeding on 5% of RR sugarbeet acres (Table 15) while respondents reported hand-weeding on 18% of conventional acres (data not shown) in 2013. The percentage of acreage hand-weeded was 62% in 1996, 23% in 2005, 28% in 2006 and 2007, 20% in 2008, 4% in 2009, 1% in 2010, 3% in 2011, and 6% in 2012. Survey respondents from Chippewa and Richland counties reported the greatest amount of hand-weeded acreage in 2013 at 16% and 13%, respectively. Respondents from these two counties reported the first and third greatest acreage with suspected glyphosate-resistant weeds which may explain these levels of hand-labor.

The cost of hand weeding ranged from zero to \$80/A in 2013 (Table 16). The most common cost in 2013 was zero dollars as reported by 91% 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, and 85% in 2012. When averaged over all survey respondents, the average cost of hand weeding as calculated from Table 16 was \$1.91/A in 2013 as compared to \$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 2013 was \$10.03/A compared to \$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.

Averaged over all herbicides, herbicides were band-applied to 3%, broadcast-applied with a ground sprayer to 90%, and broadcast-applied by air to 7% of the sugarbeet acreage in 2013 (Table 17). In 1998, 40% of the acreage was band-applied, 37% was band-applied in 2000, and 38% in 2002.

Survey respondents planting conventional sugarbeets reported 155% of acreage as row crop cultivated in 2013 (Table 18), compared to 119% in 2012, 97% in 2011, 74% in 2010, 100% in 2009, 95% in 2008 and 99% in 2007. Only 12% of RR sugarbeet acreage was reportedly row crop cultivated in 2013 compared to 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 compared to conventional sugarbeet.

Questions were asked about harvest equipment on this year’s survey. Eighty percent of respondents reported using one defoliator and 82% of respondents reported using one sugarbeet lifter in 2013 (Table 19). Seventy-three percent of respondents reported using a 12-row defoliator, while lifter row width was evenly distributed among 6, 8, or 12-rows. The average respondent used 4.7 trucks to harvest the 2013 sugarbeet crop with a median response of 4 trucks (Table 20). Responses ranged from 2 to greater than 15 trucks used.

Respondents were asked to rank topics of interest for extension personnel to address at growers seminars or summer plot tours on a scale from 1 to 6 in order of importance, with 1 being most important and 6 being the least important. Disease management received the first place rating of 1.7, followed by identifying diseases at 3.0 (Table 21). Growers from Minn-Dak Farmers Cooperative and Southern Minnesota Beet Sugar Cooperative valued information on resistant weed management second to disease management. Extension personnel greatly appreciate input from growers and are thankful for their responses to this survey.

**TABLE 1. SUMMARY OF ALL HERBICIDES USED IN SUGARBEET REPORTED IN 2013. 183 GROWERS REPORTED ON 121,063 ACRES.**

Treatment	No. of Responses	Acres Treated	Acres % of Treated	% of Responses Reporting WEED CONTROL					% of Responses Reporting CROP INJURY				
				NR*	Exc	Gd	Fr	Pr	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES</b>													
Dual PRE	1	1,200	1.0	0	0	100	0	0	0	0	0	100	0
Nortron PRE	3	788	0.7	0	33	67	0	0	0	100	0	0	0
Eptam PPI	2	641	0.5	0	0	50	50	0	0	100	0	0	0
Nortron PPI	2	254	0.2	50	0	50	0	0	50	0	50	0	0
Dual PPI	2	202	0.2	0	0	100	0	0	0	50	50	0	0
<b>Total-PPI &amp; PRE</b>	<b>10</b>	<b>3,085</b>	<b>2.5</b>	<b>10</b>	<b>10</b>	<b>70</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>60</b>	<b>20</b>	<b>10</b>	<b>0</b>
<b>B. POSTEMERGENCE HERBICIDES</b>													
Glyphosate	334	203,400	168.0	6	70	22	2	1	6	91	3	1	0
Glyp+Stinger	54	31,143	25.7	0	74	24	0	2	0	85	15	0	0
Glyp+Select	29	14,983	12.4	0	55	38	7	0	0	90	10	0	0
Glyp+Stinger+Select	8	4,434	3.7	0	67	33	0	0	0	50	50	0	0
Glyp+Assure II	3	2,890	2.4	0	0	100	0	0	0	100	0	0	0
Glyp+Betamix	6	2,054	1.7	0	50	50	0	0	0	33	50	17	0
Bmix+Sting+UpB+Nort+Sel+Oil	4	1,700	1.4	0	100	0	0	0	0	0	100	0	0
Bmix+Sting+UpB+Sel+Oil	4	940	0.8	0	100	0	0	0	0	0	100	0	0
Glyp+Sting+Bmix	2	744	0.6	0	50	50	0	0	0	100	0	0	0
Glyp+Sel+Sequence	1	600	0.5	0	0	100	0	0	0	100	0	0	0
Prog+Sting+UpB+Sel+Oil	2	588	0.5	0	0	100	0	0	0	0	100	0	0
Select	3	520	0.4	0	67	33	0	0	0	67	33	0	0
Betamix	2	443	0.4	0	50	50	0	0	0	50	50	0	0
Bnex+UpB+Nort+Sel+Oil	1	425	0.4	0	100	0	0	0	0	0	100	0	0
Bmix+Sting+Select	2	402	0.3	0	0	0	0	100	0	100	0	0	0
Bmix+Sting+UpB+Oil	1	350	0.3	0	0	100	0	0	0	0	100	0	0
Prog+Sting+UpB+Oil	1	288	0.2	0	0	100	0	0	0	0	100	0	0
Bmix+Sting+UpBeet	2	286	0.2	0	0	100	0	0	0	0	100	0	0
Nortron	1	250	0.2	0	0	0	100	0	0	0	100	0	0
Assure II	1	235	0.2	0	100	0	0	0	0	100	0	0	0
Betamix+Stinger	1	201	0.2	0	0	0	0	100	0	100	0	0	0
Stinger	1	200	0.2	0	0	100	0	0	0	0	100	0	0
Glyp+Sting+Sel+Bmix	1	153	0.1	0	100	0	0	0	0	0	100	0	0
Progress	1	143	0.1	0	0	100	0	0	0	0	100	0	0
Glyp+Sel+Nort+Bmix	1	109	0.1	0	0	0	0	100	0	100	0	0	0
Bmix+Sting+UpB+Nort+Oil	1	95	0.1	0	100	0	0	0	0	100	0	0	0
Prog+Sting+UpB+Nort+Sel+Oil	2	78	0.1	0	0	100	0	0	0	100	0	0	0
Bnex+Sting+UpB+Oil	1	74	0.1	0	0	100	0	0	0	0	100	0	0
Prog+UpB+Sel+Oil	1	39	0.0	0	100	0	0	0	0	100	0	0	0
Stinger+Oil	1	3	0.0	0	0	0	100	0	0	0	100	0	0
<b>Total-POST</b>	<b>472</b>	<b>267,770</b>	<b>221.2</b>	<b>4</b>	<b>67</b>	<b>26</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>85</b>	<b>11</b>	<b>1</b>	<b>0</b>
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES</b>													
Outlook	16	8,304	6.9	6	44	31	19	0	13	75	6	6	0
Glyp PRE	4	763	0.6	0	75	25	0	0	0	75	25	0	0
Dual	1	600	0.5	0	0	0	100	0	0	100	0	0	0
<b>Total-PRE&amp;Lay-by</b>	<b>21</b>	<b>9,667</b>	<b>8.0</b>	<b>5</b>	<b>48</b>	<b>29</b>	<b>19</b>	<b>0</b>	<b>10</b>	<b>76</b>	<b>10</b>	<b>5</b>	<b>0</b>
<b>D. OTHER WEED CONTROL METHODS</b>													
Cultivations	56	16,333	13.5	20	13	43	23	2	4	59	38	0	0
Rotary Hoe	3	1,330	1.1	0	33	0	67	0	0	33	67	0	0
<b>Total-Other Methods</b>	<b>59</b>	<b>17,663</b>	<b>14.6</b>	<b>19</b>	<b>14</b>	<b>41</b>	<b>25</b>	<b>2</b>	<b>3</b>	<b>58</b>	<b>40</b>	<b>0</b>	<b>0</b>
<b>TOTAL ALL TREATMENTS</b>	<b>562</b>	<b>298,185</b>	<b>246.3</b>	<b>6</b>	<b>59</b>	<b>28</b>	<b>5</b>	<b>1</b>	<b>4</b>	<b>81</b>	<b>14</b>	<b>1</b>	<b>0</b>

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

**TABLE 2. SUMMARY OF HERBICIDES USED IN CONVENTIONAL SUGARBEET IN 2013. 7 GROWERS REPORTED ON 1,561 ACRES.**

Treatment	No. of Responses	Acres Treated	Acres % of Treated	% of Responses Reporting WEED CONTROL					% of Responses Reporting CROP INJURY				
				NR*	Exc	Gd	Fr	Pr	NR	None	Slt	Mod	Sev
<b>A. SOIL APPLIED HERBICIDES</b>													
Nortron PRE	2	238	15.2	0	50	50	0	0	0	100	0	0	0
Eptam PPI	1	201	12.9	0	0	100	0	0	0	100	0	0	0
<b>Total-PPI &amp; PRE</b>	<b>3</b>	<b>439</b>	<b>28.1</b>	<b>0</b>	<b>33</b>	<b>67</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>B. POSTEMERGENCE HERBICIDES</b>													
Bmix+Sting+UpB+Nort+Sel+Oil	4	1,700	108.9	0	100	0	0	0	0	0	100	0	0
Bmix+Sting+UpB+Sel+Oil	4	940	60.2	0	100	0	0	0	0	0	100	0	0
Prog+Sting+UpB+Sel+Oil	2	588	37.7	0	0	100	0	0	0	0	100	0	0
Bnex+UpB+Nort+Sel+Oil	1	425	28.2	0	100	0	0	0	0	0	100	0	0
Bmix+Sting+Select	2	402	25.8	0	0	0	0	100	0	100	0	0	0
Bmix+Sting+UpB+Oil	1	350	22.4	0	0	100	0	0	0	0	100	0	0
Prog+Sting+UpB+Oil	1	288	18.4	0	0	100	0	0	0	0	100	0	0
Bmix+Sting+UpBeet	2	286	18.3	0	0	100	0	0	0	0	100	0	0
Betamix+Stinger	1	201	12.9	0	0	0	0	100	0	100	0	0	0
Betamix	1	143	9.2	0	0	100	0	0	0	0	100	0	0
Progress	1	143	9.2	0	0	100	0	0	0	0	100	0	0
Bmix+Sting+UpB+Nort+Oil	1	95	6.1	0	100	0	0	0	0	100	0	0	0
Select	1	95	6.1	0	100	0	0	0	0	100	0	0	0
Prog+Sting+UpB+Nort+Sel+Oil	2	78	5.0	0	0	100	0	0	0	100	0	0	0
Bnex+Sting+UpB+Oil	1	74	4.7	0	0	100	0	0	0	0	100	0	0
Prog+UpB+Sel+Oil	1	39	2.5	0	100	0	0	0	0	100	0	0	0
Stinger+Oil	1	3	0.2	0	0	0	100	0	0	0	100	0	0
<b>Total-POST</b>	<b>27</b>	<b>5,850</b>	<b>374.8</b>	<b>0</b>	<b>44</b>	<b>41</b>	<b>4</b>	<b>11</b>	<b>0</b>	<b>30</b>	<b>70</b>	<b>0</b>	<b>0</b>
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES</b>													
Glyp PRE	3	661	42.3	0	100	0	0	0	0	67	33	0	0
Outlook	2	545	34.9	0	50	0	50	0	0	50	0	50	0
<b>Total-PRE&amp;Lay-by</b>	<b>5</b>	<b>1,206</b>	<b>77.3</b>	<b>0</b>	<b>80</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>0</b>
<b>D. OTHER WEED CONTROL METHODS</b>													
Cultivations	7	2,425	155.3	14	29	57	0	0	0	57	43	0	0
Rotary Hoe	2	1,230	78.8	0	50	0	50	0	0	50	50	0	0
<b>Total-Other Methods</b>	<b>9</b>	<b>3,655</b>	<b>234.1</b>	<b>11</b>	<b>33</b>	<b>44</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>44</b>	<b>0</b>	<b>0</b>
<b>TOTAL ALL TREATMENTS</b>	<b>44</b>	<b>11,150</b>	<b>714.3</b>	<b>2</b>	<b>45</b>	<b>39</b>	<b>7</b>	<b>7</b>	<b>0</b>	<b>43</b>	<b>55</b>	<b>2</b>	<b>0</b>

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

**TABLE 3. SUMMARY OF HERBICIDES USED IN ROUNDUP READY SUGARBEET IN 2013. 180 GROWERS REPORTED ON 119,502 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
<b>A. SOIL APPLIED HERBICIDES</b>													
Dual PRE	1	1,200	1.0	0	0	100	0	0	0	0	0	100	0
Nortron PRE	1	550	0.5	0	0	100	0	0	0	100	0	0	0
Eptam PPI	1	440	0.4	0	0	0	100	0	0	100	0	0	0
Nortron PPI	2	254	0.2	50	0	50	0	0	50	0	50	0	0
Dual PPI	2	202	0.2	0	0	100	0	0	0	50	50	0	0
<b>Total-PPI &amp; PRE</b>	<b>7</b>	<b>2,646</b>	<b>2.2</b>	<b>14</b>	<b>0</b>	<b>72</b>	<b>14</b>	<b>0</b>	<b>14</b>	<b>43</b>	<b>29</b>	<b>14</b>	<b>0</b>
<b>B. POSTEMERGENCE HERBICIDES</b>													
Glyp	334	203,400	170.2	6	70	22	2	1	6	91	3	1	0
Glyp+Stinger	54	31,143	26.1	0	74	24	0	2	0	85	15	0	0
Glyp+Select	29	14,983	12.5	0	55	38	7	0	0	90	10	0	0
Glyp+Stinger+Select	8	4,434	3.7	0	67	33	0	0	0	50	50	0	0
Glyp+Assure II	3	2,890	2.4	0	0	100	0	0	0	100	0	0	0
Glyp+Betamix	6	2,054	1.7	0	50	50	0	0	0	33	50	17	0
Glyp+Sting+Bmix	2	744	0.6	0	50	50	0	0	0	100	0	0	0
Glyp+Sel+Sequence	1	600	0.5	0	0	100	0	0	0	100	0	0	0
Select	2	425	0.4	0	50	50	0	0	0	50	50	0	0
Betamix	1	300	0.3	0	100	0	0	0	0	100	0	0	0
Nortron	1	250	0.2	0	0	0	100	0	0	0	100	0	0
Assure II	1	235	0.2	0	100	0	0	0	0	100	0	0	0
Stinger	1	200	0.2	0	0	100	0	0	0	0	100	0	0
Glyp+Sting+Sel+Bmix	1	153	0.1	0	100	0	0	0	0	0	100	0	0
Glyp+Sel+Nort+Bmix	1	109	0.1	0	0	0	0	100	0	100	0	0	0
<b>Total-POST</b>	<b>445</b>	<b>261,920</b>	<b>219.2</b>	<b>4</b>	<b>68</b>	<b>25</b>	<b>2</b>	<b>1</b>	<b>4</b>	<b>88</b>	<b>7</b>	<b>1</b>	<b>0</b>
<b>C. PREEMERGE &amp; LAY-BY HERBICIDES</b>													
Outlook	14	7,759	6.5	7	43	36	14	0	14	79	7	0	0
Dual	1	600	0.5	0	0	0	100	0	0	100	0	0	0
Glyp PRE	1	102	0.1	0	0	100	0	0	0	100	0	0	0
<b>Total-PRE&amp;Lay-by</b>	<b>16</b>	<b>8,461</b>	<b>7.1</b>	<b>6</b>	<b>37</b>	<b>37</b>	<b>18</b>	<b>0</b>	<b>13</b>	<b>81</b>	<b>6</b>	<b>0</b>	<b>0</b>
<b>D. OTHER WEED CONTROL METHODS</b>													
Cultivations	49	13,908	11.6	20	10	41	27	2	4	59	37	0	0
Rotary Hoe	1	100	0.1	0	0	0	100	0	0	0	100	0	0
<b>Total-Other Methods</b>	<b>50</b>	<b>14,008</b>	<b>11.7</b>	<b>20</b>	<b>10</b>	<b>40</b>	<b>28</b>	<b>1</b>	<b>4</b>	<b>58</b>	<b>38</b>	<b>0</b>	<b>0</b>
<b>TOTAL ALL TREATMENTS</b>	<b>518</b>	<b>287,035</b>	<b>240.2</b>	<b>6</b>	<b>61</b>	<b>27</b>	<b>5</b>	<b>1</b>	<b>5</b>	<b>84</b>	<b>10</b>	<b>1</b>	<b>0</b>

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

**Table 4. Acres of sugarbeet and percent of sugarbeet acres treated with herbicide by grower groups in 2013.**

	Respondents <sup>1</sup>	Acres	% of Acres treated with herbicide
RR Sugarbeet	180	119,502	229
Conventional Sugarbeet	7	1,561	480
All Sugarbeet	183	121,063	232

<sup>1</sup>Respondents = Of the 7 respondents who grew conventional sugarbeet, 3 grew only conventional beets while 4 grew both conventional and RR beets. Therefore 180 who grew RR + 3 who grew only conventional beets = 183 Total respondents

**Table 5. Glyphosate product and use rates per acre in sugarbeet by county in 2013.**

County	Responses	lb ae/A				Glyphosate Product Used											
		<0.7	0.7 to 0.84	0.85 to 1.0	>1.0	P.Max <sup>5</sup>	W.Max	O.Max	Durango	Buc-aneer	Mad Dog	Corner-stone	Gly Star Plus	Makaze	Dura-max	T-down Total	Other
		-----% of responses-----															
Cass	7	-	29	71	-	100	-	-	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	17	6	29	18	47	65	6	12	12	-	-	-	-	-	6	-	-
Clay	27	-	44	37	19	85	-	-	7	-	-	-	-	-	7	-	-
Grand Forks	19	-	32	53	16	100	-	-	-	-	-	-	-	-	-	-	-
Kittson	11	9	27	55	9	82	-	9	-	-	-	9	-	-	-	-	-
Marshall	14	7	43	21	29	71	-	-	-	-	-	-	-	14	-	-	14
Norman	20	15	55	20	10	60	15	-	-	-	-	-	-	-	-	15	-
Pembina	26	-	35	38	27	88	-	-	-	12	-	-	-	-	-	-	-
Polk	85	4	42	27	27	75	4	2	-	-	7	2	9	-	-	-	-
Renville <sup>2</sup>	25	4	28	28	40	56	12	4	16	12	-	-	-	-	-	-	-
Richland <sup>3</sup>	19	16	32	32	21	74	-	5	5	-	-	11	-	-	5	-	-
Trails	16	-	19	75	6	94	-	-	-	6	-	-	-	-	-	-	-
Traverse <sup>4</sup>	26	4	31	35	31	54	8	-	12	8	-	-	-	-	19	-	-
Walsh	36	8	31	22	39	89	-	8	-	-	-	-	3	-	-	-	-
Wilkin	48	-	44	33	23	73	4	2	15	-	-	4	2	-	-	-	-
<b>Total</b>	<b>396</b>	<b>4</b>	<b>37</b>	<b>33</b>	<b>26</b>	<b>76</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>2</b>	<b>&lt;1</b>	<b>3</b>	<b>&lt;1</b>	<b>3</b>	<b>2</b>	<b>&lt;1</b>	<b>1</b>

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>5</sup>P.Max=Roundup PowerMax; W.Max=Roundup WeatherMax; Bucaneer=Bucaneer 5, Bucaneer Plus; Mad Dog=Mad Dog, Mad Dog Plus; Cornerstone=Cornerstone, Cornerstone 5 Plus, Cornerstone Plus; Makaze=Makaze, Makaze Yield Pro; T-down Total=Touchdown Total

**Table 6. Total sugarbeet acreage operated by survey respondents in 2013.**

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	4	-	-	-	25	50	-	25	-	-	-	-
Chippewa <sup>1</sup>	6	-	17	17	17	17	-	-	-	33	-	-
Clay	12	-	8	-	-	-	33	33	-	8	-	17
Grand Forks	9	-	-	-	11	-	22	33	-	11	11	11
Kittson	5	-	40	20	-	20	-	-	20	-	-	-
Marshall	7	-	-	14	-	-	29	29	29	-	-	-
Norman	9	-	-	11	11	-	33	11	11	-	-	22
Pembina	11	-	-	18	18	9	9	-	9	9	9	18
Polk	41	-	2	5	12	5	32	27	5	7	2	2
Renville <sup>2</sup>	11	-	18	18	-	18	-	-	18	9	18	-
Richland <sup>3</sup>	9	-	-	11	-	33	11	22	-	22	-	-
Trails	8	-	-	-	63	-	13	-	-	25	-	-
Traverse <sup>4</sup>	12	-	-	17	25	8	8	8	8	17	8	-
Walsh	18	6	6	11	11	17	22	11	11	-	6	-
Wilkin	21	-	-	14	24	10	24	10	14	-	5	-
<b>Total</b>	<b>183</b>	<b>1</b>	<b>4</b>	<b>10</b>	<b>14</b>	<b>10</b>	<b>20</b>	<b>16</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>4</b>

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

**Table 7. A summary of the worst weed problem responses in conventional sugarbeet for the past 25 years.**

Year	PIWE <sup>1</sup>	FXTL	COLQ	WIOA	WIBW	WIMU	KOCZ	COCB	SMWE	EBNS	COMA	LASA	VELE	WAHE	RAWE
-----% of responses-----															
1989	54	5	4	1	5	<1	21	1	-	-	-	-	-	-	-
1990	51	2	8	1	5	0	23	1	3	-	-	-	-	-	-
1991	59	3	4	0	2	0	18	2	3	-	-	-	-	-	-
1992	47	4	8	3	4	<1	16	3	8	-	-	-	-	-	-
1993	38	3	6	6	8	1	13	3	9	3	2	-	-	-	-
1994	61	2	6	2	8	1	8	2	6	2	1	-	-	-	-
1995	71	2	4	1	2	1	4	1	8	4	1	-	-	-	-
1996	72	4	4	2	1	1	3	2	6	2	1	-	-	-	-
1997	53	7	4	2	6	1	3	2	5	4	1	-	-	-	-
1998	51	9	7	2	4	1	13	1	4	1	<1	-	-	-	-
1999	40	2	10	2	1	<1	33	1	3	1	<1	2	-	-	-
2000	18	2	19	<1	2	<1	43	2	3	<1	<1	2	-	1	-
2001	43	1	10	<1	1	0	32	1	4	4	<1	1	-	2	-
2002	44	<1	14	<1	<1	0	26	1	4	<1	<1	<1	2	5	-
2003	25	<1	18	<1	<1	0	46	<1	4	<1	<1	1	1	2	-
2004	21	<1	25	1	0	0	41	1	4	1	1	1	2	1	-
2005	42	<1	15	0	<1	0	29	2	4	<1	0	<1	1	1	-
2006	35	0	18	0	0	0	41	<1	3	0	0	0	1	<1	-
2007	34	<1	16	0	0	0	41	0	1	<1	<1	0	1	4	-
2008	24	0	19	0	0	0	33	5	10	2	0	0	0	0	-
2009	25	0	41	0	0	0	23	2	2	0	0	-	0	2	2
2010	31	0	21	0	0	0	38	0	0	-	3	-	0	0	0
2011	33	0	20	4	0	0	27	0	2	-	2	-	0	0	0
2012	33	11	22	0	0	0	22	0	0	-	0	-	0	0	0
2013	14	0	14	0	0	0	29	0	0	-	0	-	0	0	0

<sup>1</sup>PIWE=pigweed species, FXTL=green & yellow foxtail, COLQ=common lambsquarters, WIOA=wild oat, WIBW=wild buckwheat, WIMU=wild mustard, KOCZ=kochia, COCB=common cocklebur, SMWE=smartweed, EBNS=eastern black nightshade, COMA=common mallow, LASA=lanceleaf sage, VELE=velevetleaf, WAHE=waterhemp, and RAWE=ragweed.

**Table 8. Worst weed problem in conventional sugarbeet by county in 2013.**

County	Responses	None	KOCZ <sup>5</sup>	PIWE	COLQ	RR Corn	SMWE	WIOA	YENU	FXTL
-----% of responses-----										
Cass	0	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	0	-	-	-	-	-	-	-	-	-
Clay	0	-	-	-	-	-	-	-	-	-
Grand Forks	0	-	-	-	-	-	-	-	-	-
Kittson	0	-	-	-	-	-	-	-	-	-
Marshall	0	-	-	-	-	-	-	-	-	-
Norman	0	-	-	-	-	-	-	-	-	-
Pembina	0	-	-	-	-	-	-	-	-	-
Polk	6	33	33	17	17	-	-	-	-	-
Renville <sup>2</sup>	0	-	-	-	-	-	-	-	-	-
Richland <sup>3</sup>	0	-	-	-	-	-	-	-	-	-
Trails	0	-	-	-	-	-	-	-	-	-
Traverse <sup>4</sup>	0	-	-	-	-	-	-	-	-	-
Walsh	0	-	-	-	-	-	-	-	-	-
Wilkin	1	-	-	-	-	100	-	-	-	-
Total	7	29	29	14	14	14	0	0	0	0

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

<sup>5</sup>KOCZ=kochia; PIWE=pigweed species; COLQ=common lambsquarters; RR Corn=Roundup Ready corn; SMWE=smartweed; WIOA=wild oat; YENU=yellow nutsedge FXTL=green and yellow foxtail.

**Table 9. A summary of the worst weed problem responses in RR sugarbeet for the past 6 years.**

Year	Response	None	COCB <sup>1</sup>	KOCZ	COLQ	FXTL	PIWE	RAWE	SMWE	VELF	WIBW	WIOA	WAHE	RR Crops
-----% 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

<sup>1</sup>COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; FXTL=foxtail species; PIWE=pigweed species; RAWE=ragweed; SMWE=smartweed; VELF=velvetleaf; WIBW=wild buckwheat; WIOA=wild oat; WAHE=waterhemp; RR Crops=Roundup Ready crops.



**Table 10. Worst weed problem in RR sugarbeet by county in 2013.**

County	Responses	None	COCB <sup>5</sup>	KOCZ	COLQ	FXTL	PIWE	RAWE	VEMA	WIOA	WIBW	RR Can	WAHE	Other <sup>6</sup>
-----% of responses-----														
Cass	4	50	-	-	-	-	-	-	25	-	-	-	25	-
Chippewa <sup>1</sup>	6	17	-	-	33	-	-	-	-	-	-	-	50	-
Clay	12	33	-	-	17	-	8	8	-	-	-	17	8	8
Grand Forks	9	44	-	11	11	-	22	-	-	-	-	11	-	-
Kittson	5	60	-	-	-	20	20	-	-	-	-	-	-	-
Marshall	7	71	-	-	14	-	-	-	-	-	-	14	-	-
Norman	9	22	-	11	33	-	33	-	-	-	-	-	-	-
Pembina	11	55	-	-	9	-	9	-	-	-	18	-	-	9
Polk	39	46	-	-	21	-	15	5	-	5	3	-	-	5
Renville <sup>2</sup>	11	18	-	-	18	-	-	-	9	-	-	-	45	9
Richland <sup>3</sup>	9	-	-	-	11	-	22	11	-	-	-	-	56	-
Traill	8	50	-	-	13	-	25	-	-	-	-	-	-	13
Traverse <sup>4</sup>	12	17	8	-	8	-	8	8	-	-	-	-	50	-
Walsh	18	50	-	-	33	6	6	-	-	-	6	-	-	-
Wilkin	20	10	-	10	15	-	40	15	-	-	-	-	10	-
Total	180	36	<1	2	18	1	16	4	1	1	2	2	13	3

<sup>1</sup>Includes Kandiyohi and Swift Counties<sup>2</sup>Includes Redwood County<sup>3</sup>Includes Ransom County<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties<sup>5</sup>COCB=common cocklebur; KOCZ=kochia; COLQ=common lambsquarters; FXTL=foxtail species; PIWE=pigweed species; RAWE=ragweed; VEMA=venice mallow; WIOA=wild oat; WIBW=wild buckwheat; RR can=Roundup Ready canola; WAHE=waterhemp.<sup>6</sup>Other= smartweed; biennial wormwood; bolters; smooth scouringrush; RR soybean; bolters**Table 11. A summary of the most serious production problem responses for the past 25 years.**

Year	Production problem indicated as worst in sugarbeet									
	No Problem	Weeds	Weather	Emergence/ Stand	Labor mgmt.	Root maggot	Cercospora leaf spot	Rhizoctonia/ Aphanomyces	Rhizomania	Herbicide Injury
-----% of responses-----										
1989	5	38	19	16	3	8	2	-	-	-
1990	5	42	20	10	2	8	4	-	-	-
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

**Table 12. Most serious production problem in conventional sugarbeet by county in 2013.**

County	Responses	No Problem	Rhizoctonia	Weeds	Springtails	Weather
-----% of responses-----						
Polk	6	33	-	16	16	33
Wilkin	1	-	-	-	-	100
Total	7	14	-	14	14	57

**Table 13. Most serious production problem in RR sugarbeet by county in 2013.**

County	Responses	No	Emerg/	Rhizo-	Aphan-	Rhizoc-	CLS <sup>5</sup>	Root	Herbicide	Labor	Weather	Other <sup>6</sup>	
		Prob.	Stand	mania	omyces	tonia		Maggot	Weeds	Injury			Mangmt
-----% of responses-----													
Cass	4	25	25	-	-	25	-	-	-	25	-	-	
Chippewa <sup>1</sup>	6	17	-	-	-	33	-	-	50	-	-	-	
Clay	12	-	8	8	25	8	8	-	-	-	25	17	
Grand Forks	9	33	11	-	11	44	-	-	-	-	-	-	
Kittson	5	20	20	-	-	-	-	20	-	-	20	20	
Marshall	7	29	-	-	-	29	-	-	-	14	14	14	
Norman	9	22	11	11	-	22	-	-	-	-	-	33	
Pembina	11	18	-	-	-	27	-	-	-	27	18	9	
Polk	39	18	3	-	5	21	-	-	3	13	13	26	
Renville <sup>2</sup>	11	-	-	-	9	55	-	-	9	9	18	-	
Richland <sup>3</sup>	9	22	44	-	-	11	-	11	-	-	11	-	
Trails	8	25	13	-	13	13	-	-	-	13	25	-	
Traverse <sup>4</sup>	12	8	17	-	8	33	-	-	25	8	-	-	
Walsh	18	28	11	-	6	11	-	-	-	11	28	6	
Wilkin	20	20	10	-	5	35	-	-	5	5	20	-	
Total	180	18	9	1	6	24	<1	1	5	<1	8	14	11

<sup>1</sup>Includes Kandiyohi and Swift Counties<sup>2</sup>Includes Redwood County<sup>3</sup>Includes Ransom County<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties<sup>5</sup>CLS=Cercospora leaf spot<sup>6</sup>Other= fusarium (2); Coop harvest issues (2); root aphid (7); sprangled roots (1); red & swiss chard contamination (1); low sugar% (1); bolters (2); soil fertility (2); springtail (1);**Table 14. Weeds in sugarbeet suspected of being resistant to glyphosate in 2013.**

County	No. of	No. of sgbt	RR										
	Respondents	fields	KOCZ <sup>5</sup>	COLQ	PAAM	CORA	GIRA	RRPW	Crops <sup>6</sup>	SMWE	VELF	WIBW	WAHE
-----% of respondents-----													
Chippewa <sup>1</sup>	4	14	25	25	25	50	-	-	25	-	-	-	75
Clay	3	8	-	33	-	-	-	-	133	-	-	-	33
Norman	3	5	33	-	-	100	-	-	-	-	-	-	-
Pembina	1	2	-	100	-	-	-	-	-	-	100	-	-
Polk	5	10	-	-	-	80	-	20	40	-	-	20	-
Renville <sup>2</sup>	4	13	-	-	25	-	25	-	100	50	-	-	75
Richland <sup>3</sup>	4	10	25	25	-	-	-	-	75	-	-	-	100
Traverse <sup>4</sup>	6	15	-	-	-	67	-	17	-	-	-	-	67
Walsh	1	1	-	100	-	-	-	-	-	-	-	-	-
Wilkin	5	16	60	20	20	20	40	20	140	-	20	20	60
Total	36	94	17	17	8	39	8	8	58	6	3	8	50

<sup>1</sup>Includes Kandiyohi and Swift Counties<sup>2</sup>Includes Redwood County<sup>3</sup>Includes Ransom County<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties<sup>5</sup>KOCZ=kochia; COLQ=common lambsquarter; PAAM=palmer amaranth; CORA=common ragweed; GIRA=giant ragweed; RRPW=redroot pigweed; SMWE=smartweed; VELF=velvetleaf; WIBW=wild buckwheat; WAHE=waterhemp<sup>6</sup>RR Crops=Roundup Ready Canola (7); Roundup Ready Soybean (8); Roundup Ready Corn (6)

**Table 15. Roundup Ready sugarbeet acreage that was hand-weeded, sugarbeet acreage having suspected glyphosate resistant weeds, and estimated densities of suspected glyphosate resistant weeds in 2013.**

County	Respondent RR acres planted	Hand-weeded	Having suspected glyph. resistant weeds	Density of suspected resistant weeds									
				1 per 160 acre	1 per 40 acre	1 per 10 acre	1 per acre	1 per 1/4 acre	1 per area of a pickup	1 per square yard	1 per square foot	more weeds than beets	
				-----% of RR acres planted-----									
Cass	1,557	0	0	-	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	3,344	16	42	-	-	2	36	4	-	-	-	-	-
Clay	11,977	2	7	-	-	-	-	6	-	1	-	-	-
Grand Forks	11,998	7	0	-	-	-	-	-	-	-	-	-	-
Kittson	1,580	0	0	-	-	-	-	-	-	-	-	-	-
Marshall	4,468	3	0	-	-	-	-	-	-	-	-	-	-
Norman	8,840	0	9	2	-	5	-	-	-	-	2	-	-
Pembina	10,106	3	3	-	-	-	-	-	3	-	-	-	-
Polk	24,131	2	7	-	3	2	2	-	-	-	-	-	-
Renville <sup>2</sup>	6,986	0	24	-	-	20	2	-	-	2	-	-	-
Richland <sup>3</sup>	5,296	13	25	-	-	14	4	3	3	-	-	-	-
Trail	3,802	0	0	-	-	-	-	-	-	-	-	-	-
Traverse <sup>4</sup>	7,071	1	26	-	9	5	9	2	2	-	-	-	-
Walsh	8,682	0	1	-	-	-	1	-	-	-	-	-	-
Wilkin	9,664	2	26	-	6	6	-	-	-	-	-	-	13
<b>Total</b>	<b>119,502</b>	<b>3</b>	<b>10</b>	<b>&lt;1</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>&lt;1</b>	<b>1</b>

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

**Table 16. Cost of hand weeding in sugarbeet 2013.**

County	Respondents	Dollars per acre														
		0	1-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-70	71-80	80+
		-----% of respondents-----														
Cass	4	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chippewa <sup>1</sup>	6	50	17	-	17	17	-	-	-	-	-	-	-	-	-	-
Clay	12	83	-	8	-	-	-	-	-	-	-	-	-	-	8	-
Grand Forks	9	89	-	-	11	-	-	-	-	-	-	-	-	-	-	-
Kittson	5	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marshall	7	86	-	14	-	-	-	-	-	-	-	-	-	-	-	-
Norman	9	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pembina	11	91	-	-	-	-	9	-	-	-	-	-	-	-	-	-
Polk	41	93	2	2	-	2	-	-	-	-	-	-	-	-	-	-
Renville <sup>2</sup>	11	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Richland <sup>3</sup>	9	78	22	-	-	-	-	-	-	-	-	-	-	-	-	-
Trail	8	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Traverse <sup>4</sup>	12	92	-	-	8	-	-	-	-	-	-	-	-	-	-	-
Walsh	18	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wilkin	21	90	-	-	-	-	-	-	5	-	5	-	-	-	-	-
<b>Total</b>	<b>183</b>	<b>91</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>&lt;1</b>	<b>0</b>	<b>&lt;1</b>	<b>0</b>	<b>&lt;1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>&lt;1</b>	<b>0</b>

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

**Table 17. Method of herbicide application in 2013.**

Herbicide	Acres treated	Method of application		
		Band	Broadcast Ground	Broadcast Air
-----% of acres treated-----				
<b>A. PRE &amp; PPI Herbicides</b>				
Dual/Nortron PRE	1,988	72	28	0
Dual/Eptam/Nortron PPI	1,097	0	100	0
Glyphosate PRE	763	0	100	0
<b>B. POST Herbicides</b>				
<i>Glyphosate</i>	<b>203,400</b>	<b>1</b>	<b>92</b>	<b>7</b>
Glyphosate+Stinger	31,143	0	95	5
Glyphosate+Grass	18,473	0	92	8
Glyphosate+Stinger+Grass	4,434	0	100	0
Glyphosate+Betamix	2,054	0	100	0
<i>Bmix/Prog+Sting+UpB+Nort+Grass+Oil</i>	<b>1,778</b>	<b>100</b>	<b>0</b>	<b>0</b>
Bmix/Prog+Sting+UpB+Grass+Oil	1,528	0	100	0
Bmix/Prog/Nortron	836	64	36	0
Grass	755	0	100	0
Glyp+Bmix+Stinger	744	0	100	0
Bnex/Bmix/Prog+Sting+UpB+Oil	712	0	100	0
Bnex+UpB+Nort+Grass+Oil	425	100	0	0
Bmix+Stinger+Grass	402	0	50	50
Stinger	203	1	99	0
Bmix+Stinger+UpBeet	286	50	50	0
Betamix+Stinger	201	0	100	0
Glyp+Bmix+Stinger+Grass	153	0	100	0
Glyp+Bmix+Nortron+Grass	109	0	100	0
Bmix+Sting+UpB+Nort+Oil	95	0	100	0
Prog+UpB+Grass+Oil	39	100	0	0
<b>C. Lay-by Herbicides</b>				
Outlook	8,304	11	53	36
Dual	600	0	100	0
<b>Total</b>	<b>280,522</b>	<b>3</b>	<b>90</b>	<b>7</b>

**Table 18. Percent of acres planted that were cultivated to control weeds in 2013.**

County	Roundup Ready Sugarbeet				Conventional Sugarbeet			
	Number of Respondents	Acres Planted	Acres Cultivated	Acres Cultivated	Number of Respondents	Acres Planted	Acres Cultivated	Acres Cultivated
% of acres planted				% of acres planted				
Cass	4	1,557	0	0	0	0	0	0
Chippewa <sup>1</sup>	6	3,344	3,094	93	0	0	0	0
Clay	12	11,977	290	2	0	0	0	0
Grand Forks	9	11,998	50	0	0	0	0	0
Kittson	5	1,580	0	0	0	0	0	0
Marshall	7	4,468	100	2	0	0	0	0
Norman	9	8,840	715	8	0	0	0	0
Pembina	11	10,106	1,500	15	0	0	0	0
Polk	39	24,131	945	4	6	1,360	2,023	149
Renville <sup>2</sup>	11	6,986	2,903	42	0	0	0	0
Richland <sup>3</sup>	9	5,296	1,765	33	0	0	0	0
Traill	8	3,802	0	0	0	0	0	0
Traverse <sup>4</sup>	12	7,071	700	10	0	0	0	0
Walsh	18	8,682	1,206	14	0	0	0	0
Wilkin	20	9,664	590	6	1	201	402	200
<b>Total</b>	<b>180</b>	<b>119,502</b>	<b>13,858</b>	<b>12</b>	<b>7</b>	<b>1,561</b>	<b>2,425</b>	<b>155</b>

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties

**Table 19. Number of sugarbeet defoliators and lifters and associated row widths used by respondents to harvest sugarbeet in 2013.**

Acres	No. of Respondents	Number of Defoliators			Defoliater Row Width			Number of Lifters			Lifter Row Width			
		1	2	3+	6	8	12	1	2	3+	4	6	8	12
		-----% of respondents-----												
1-100	9	89	11	-	11	-	89	100	-	-	-	33	44	22
101-200	15	93	7	-	47	-	53	93	7	-	-	73	20	7
201-300	23	100	-	-	31	17	52	100	-	-	-	48	44	9
301-400	17	82	18	-	41	6	53	82	18	-	-	59	29	12
401-500	13	100	-	-	23	8	69	92	8	-	-	46	46	8
501-600	15	80	20	-	7	20	73	87	13	-	-	33	47	20
601-700	16	81	19	-	-	13	87	88	13	-	-	6	38	56
701-800	11	82	18	-	-	27	73	55	36	9	9	9	55	27
801-900 <sup>1</sup>	6	50	50	-	-	33	67	67	33	-	-	14	29	57
901-1000	6	67	33	-	-	-	100	67	33	-	-	17	17	67
1001-1250 <sup>2</sup>	8	62	38	-	-	-	100	75	25	-	-	-	11	88
1251-1500	4	50	-	50	-	-	100	50	25	25	-	-	-	100
1501-2000	4	-	-	100	-	-	100	50	50	-	-	-	-	100
2001+	3	-	33	67	-	-	100	-	33	67	-	-	-	100
Total	150	80	17	3	17	9	73	82	15	3	<1	32	33	33

<sup>1</sup>One respondent indicated using both a 12-row and 6-row lifter so 7 responses are reflected in Lifter Number of Rows

<sup>2</sup>One respondent indicated using both a 12-row and 8-row lifter so 9 responses are reflected in Lifter Number of Rows

**Table 20. Number of trucks used to harvest sugarbeet by respondents in 2013.**

Acres	No. of Respondents	Number of Trucks												
		2	3	4	5	6	7	8	9	10	11-12	13-14	15+	
		-----% of respondents-----												
1-100	9	22	22	44	11	-	-	-	-	-	-	-	-	-
101-200	15	40	20	20	-	20	-	-	-	-	-	-	-	-
201-300	23	22	52	17	-	-	4	4	-	-	-	-	-	-
301-400	17	12	29	35	18	6	-	-	-	-	-	-	-	-
401-500	13	-	46	15	31	8	-	-	-	-	-	-	-	-
501-600	15	-	13	40	27	13	-	7	-	-	-	-	-	-
601-700	16	-	6	31	31	25	6	-	-	-	-	-	-	-
701-800	11	-	-	18	36	18	18	-	-	-	9	-	-	-
801-900	6	-	-	17	33	50	-	-	-	-	-	-	-	-
901-1000	6	-	-	16	16	33	33	-	-	-	-	-	-	-
1001-1250	8	-	-	13	25	25	25	13	-	-	-	-	-	-
1251-1500	4	-	-	-	-	-	25	25	25	-	-	25	-	-
1501-2000	4	-	-	-	50	-	-	-	25	-	25	-	-	-
2001+	3	-	-	-	-	-	-	-	-	-	33	33	33	-
Total	150	10	21	23	19	13	6	4	2	0	3	2	1	

**Table 21. Topics of interest for sugarbeet seminars and plot tours as ranked by respondents in 2013.**

Coop	Weed ID	Resistant Weed	Disease	Identifying	Soil	Insect
		Management	Management	Diseases	Fertility	Management
		-----Ranking of importance (1=most emphasis; 6=least emphasis)-----				
Drayton	5.3	3.9	1.9	2.7	2.9	4.3
Crookston	5.0	3.3	1.6	2.8	3.9	4.4
E. Grand Forks	5.0	3.6	1.3	3.2	3.3	4.6
Hillsboro	4.9	3.8	1.6	2.7	3.2	4.8
Moorhead	4.4	3.3	1.4	3.0	3.4	5.3
Minn-Dak	4.4	2.9	1.7	3.3	3.2	5.5
SMBSC	4.5	2.8	2.2	3.2	3.0	5.2
Average Rank	4.8	3.4	1.7	3.0	3.3	4.8
No. of Responses	148	148	148	148	148	148

**Table 22. Breakdown of survey respondents and acres by factory district and county in 2013.**

County	No. of		Factory District											
	Resp.	Acres	Drayton	E. Grand Forks	Crookston	Hillsboro		Moorhead	Minn-Dak		SMBSC			
-----% of respondents / % of acres-----														
Cass	4	1,557	-	-	-	-	50	61	50	39	-	-	-	-
Chippewa <sup>1</sup>	6	3,344	-	-	-	-	-	-	-	-	-	-	100	100
Clay	12	11,977	-	-	-	-	-	-	-	75	86	25	14	-
Grand Forks	9	11,998	-	-	11	2	-	-	89	98	-	-	-	-
Kittson	5	1,580	100	100	-	-	-	-	-	-	-	-	-	-
Marshall	7	4,468	43	35	43	52	14	13	-	-	-	-	-	-
Norman	9	8,840	-	-	-	-	-	-	89	95	11	5	-	-
Pembina	11	10,106	100	100	-	-	-	-	-	-	-	-	-	-
Polk	41	25,491	-	-	29	26	71	74	-	-	-	-	-	-
Renville <sup>2</sup>	11	6,986	-	-	-	-	-	-	-	-	-	-	-	100
Richland <sup>3</sup>	9	5,296	-	-	-	-	-	-	-	-	11	4	89	96
Trail	8	3,802	-	-	-	-	-	-	100	100	-	-	-	-
Traverse <sup>4</sup>	12	7,071	-	-	-	-	-	-	-	-	-	-	83	95
Walsh	18	8,682	72	63	28	37	-	-	-	-	-	-	-	-
Wilkin	21	9,865	-	-	-	-	-	-	-	-	-	-	100	100
Total	183	121,063	17	15	11	10	16	16	14	21	7	9	23	19

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

<sup>2</sup>Includes Redwood County

<sup>3</sup>Includes Ransom County

<sup>4</sup>Includes Big Stone, Grant, and Stevens Counties