

## **SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES ON SUGARBEET IN WESTERN NORTH DAKOTA AND EASTERN MONTANA IN 2014**

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The fifteenth weed control and production practices survey was mailed in November 2014 to sugarbeet growers in western North Dakota and eastern Montana. The last survey was conducted in 2011. Growers were requested to evaluate weed control and sugarbeet injury from specific herbicides, and to list the most important weed and production problems. In addition, growers were requested to list insecticide use, fungicide use, sugarbeet acreage, acres of hand-weeded sugarbeet, weed control and crop injury evaluations, and cost of hand thinning and hand weeding. Insecticide use and fungicide use portions of the survey can be found in the Entomology and Plant Pathology sections.

Growers planted 29,689 acres of sugarbeet in western North Dakota and eastern Montana in 2014. Twenty-three growers representing 25% of the total acres responded to the survey. All of the 7,556 acres reported were Roundup Ready® (RR) sugarbeet.

Table 1 is a summary of herbicide use and performance averaged over all counties. The number of responses for an herbicide treatment is listed and the acres treated are expressed as a percentage of the total reported acreage. Multiple herbicide treatments are tabulated for each herbicide treatment, thus the number of responses in Table 1 exceeds the total number of growers who responded to the survey. Also, multiple herbicide treatments on the same acreage are listed separately in the tables, thus acres treated exceeds 100%. The ratings of weed control and sugarbeet injury are presented as the percentage of growers evaluating weed control as excellent, good, fair, or poor and injury as none, slight, moderate, or severe.

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 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, Intensity, Intensity One, Prism, Section, Shadow, Trigger, Volunteer, and Targa.

Total sugarbeet acreage treated with herbicides in 2014 was 220% (Table 1), compared to 219% in 2011, 237% in 2009, 411% in 2007, 400% in 2005, 440% in 2003, and 408% in 2001. Postemergence herbicides were applied 2.1 times per acre in 2014 and 2011, compared to 2.4 times in 2009 and 2.8 times in 2007. Preemergence (PRE) herbicides were only used on 10% of reported acres and glyphosate was the only reported PRE herbicide used. The most common herbicide treatment in 2014 was glyphosate. Stinger and Betamix were the only herbicides other than glyphosate used by respondents in 2014.

Fifty percent of all survey respondents reported excellent weed control for postemergence herbicides in 2014 (Table 1), compared to 75% in 2011, 55% in 2009, 16% in 2007 and 11% in 2005. Seventy-eight percent of survey respondents reported no sugarbeet injury in 2014, compared to 74% in 2011, 65% in 2009, 10% in 2007 and 28% in 2005.

The average cumulative rate of glyphosate applied POST per acre in RR sugarbeets in 2014 was 2.05 pounds acid equivalent per acre (lb ae/A). This was calculated using actual product names and use rates provided by the respondents who grew RR sugarbeet (data available upon request). The average glyphosate rate per acre per application in 2014 was 0.93 lb ae/A. In 2014, Roundup PowerMax was applied by 76% of responses reporting the use of glyphosate formulations (Table 2).

A summary of the “most serious production” problem responses from 1989 to 2014 is shown in Table 3. In 2014, 35% of respondents named root diseases (including aphanomyces, fusarium, rhizoctonia, rhizomania, and nematodes) as their “most serious production” problem in sugarbeet. In 2014, 35% of respondents also named Cercospora Leaf Spot as

their most serious production problem in sugarbeet. Weeds were not mentioned as a production problem by any respondent in 2014.

Common lambsquarters was named most often in 2014 as the “worst weed” problem by 30% of respondents (Table 4). Thirty percent of respondents also named “none” as a “worst weed” problem in 2014, the greatest percentage in the history of the survey. Redroot pigweed, nightshades, kochia, wild oat, and velvetleaf were other weeds indicated.

Row crop cultivation was used by 17% of survey respondents in 2014 (Table 5). Eighty-three percent of respondents indicated zero cultivation per field. The average number of row crop cultivations reported was 0.1 per field in 2014, compared to 0.2 cultivations per field in 2011, 0.4 in 2009 and 1.7 in 2007. The number of row crop cultivations has declined sharply, likely due to the effectiveness of glyphosate in RR sugarbeet.

Hand weeding has virtually disappeared in western North Dakota and eastern Montana with no growers reporting hand weeding in 2014 (Table 6). The effectiveness of glyphosate applied to RR sugarbeet probably accounts for the near disappearance of hand weeding.

Sugarbeet acreage operated by survey respondents in 2014 varied from 24 acres to 1,062 acres (Table 8). The average and median number of sugarbeet acres per respondent was 329 and 280 acres, respectively, in 2014.

Wheat was used as a cover crop on 7% of respondent acres while barley was used on <1% of respondent acres. These were the only two cover crops reported in 2014.

Wheat was the main crop to directly precede the 2014 sugarbeet crop. Seventy percent of reported acres were preceded by wheat, 10% by corn, 7% by barley, 5% by beans (dry or soy), 3% by an ‘other’ crop, and 6% of reported acres did not specify the preceding crop.

Growers reported their N-P-K fertilizer rates on their heaviest fertilized sugarbeet field in 2014. Average nitrogen use was 158 lb/A, phosphorus use was 74 lbs/A, and potassium use was 41 lbs/A. Use rates ranged from 90 to 200 lb/A for nitrogen, 40 to 100 lb/A for phosphorus, and 0 to 60 lbs/A for potassium.

Survey respondents reported the age of person primarily responsible for production sugarbeet in 2014. Seventy-four percent of respondents were over the age of 50 with only 4 percent being 30 years old or younger.

Respondents were asked to report when they last used a band sprayer in their sugarbeet crop. Fifty-five percent indicated sometime between 2006 and 2010 while 23% reported still using a band sprayer in sugarbeet in 2014. The other time frames indicated were 2001 to 2005 and 2011 to 2013.

Growers were asked to indicate their preference in how they receive technical information about sugarbeet production. Four percent of respondents currently used an electronic application or ‘app’ to receive this information while 52% indicated they preferred using paper copies of the information. Twenty-six percent of respondents indicated they prefer apps but do not currently use any while 17% remained undecided between electronic and paper distribution methods of technical information.

**Table 1. Summary of all herbicides used in sugarbeet in western North Dakota and eastern Montana in 2014. Twenty-three growers reported on 7,556 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>B. Postemergence Herbicides</b>													
Glyphosate	48	15,248	201.8	17	50	33	0	0	13	81	6	0	0
Glyphosate+Betamix	1	350	4.6	0	100	0	0	0	0	0	100	0	0
Glyphosate+Stinger	1	280	3.7	100	0	0	0	0	100	0	0	0	0
Total-POST	50	15,878	210.1	18	50	32	0	0	14	78	8	0	0
<b>C. Preemergence &amp; Lay-by Herbicides</b>													
Glyphosate	3	764	10.1	67	33	0	0	0	67	33	0	0	0
Total-PRE&Lay-by	3	764	10.1	67	33	0	0	0	67	33	0	0	0
<b>D. Other Weed Control Methods</b>													
Cultivations	4	809	10.7	-	-	-	-	-	-	-	-	-	-
Total-Other Methods	4	809	10.7	-	-	-	-	-	-	-	-	-	-
<b>Total - All Treatments</b>	<b>57</b>	<b>17,451</b>	<b>231.0</b>	<b>21</b>	<b>49</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>75</b>	<b>8</b>	<b>0</b>	<b>0</b>

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

‘-’=weed control and crop injury was not requested for cultivations

**Table 2. Glyphosate product and use rates per acre in sugarbeet in 2014.**

	Number Of Responses	lb ae/A				Glyphosate Product Used				
		<0.7	0.7 to 0.84	0.85 to 1.0	>1.0	R.U. PowerMax	R.U. WeatherMax	R.U. Ultra	Cornerstone	Cornerstone 5 Plus
Total	46	11	30	26	33	76	4	7	7	7

**Table 3. A summary of the most serious production problem responses from 1989 to 2014.**

Year	Number of Respondents	Weeds	Weather	Root Diseases <sup>1</sup>	Labor Management	Emergence/ Stand	Cercospora Leaf Spot	No Problem
2014	20	0	0	35	10	5	35	15
2011	17	18	0	47	6	0	12	18
2009	14	0	7	29	0	29	7	21
2007	18	44	6	17	6	11	6	5
2005	21	48	10	10	0	14	0	5
2003	41	36	7	22	5	10	5	12
2001	64	23	3	6	2	25	39	0
1999	45	42	2	11	0	9	24	2
1997	46	24	15	10	0	22	20	2
1995	61	44	5	5	2	13	26	3
1993	56	21	18	7	4	23	12	9
1992	64	28	8	5	0	36	11	3
1991	84	23	0	25	5	6	24	2
1990	70	41	13	11	6	10	0	9
1989	81	20	5	22	6	21	0	14

<sup>1</sup>Root Diseases include aphanomyces, fusarium, rhizoctonia, and rhizomania and in 2014 ‘nemetodes’.

**Table 4. A summary of the worst weed responses from 1989 to 2014.**

Year	Number of Responses	RRPW <sup>1</sup>	COLQ	KOCZ	NISH	WIOA	Other	None
2014	23	13	30	9	9	4	4	30
2011	21	5	33	10	0	5	19	29
2009	18	0	22	17	6	6	-	22
2007	20	5	15	75	0	0	-	-
2005	24	8	13	75	0	0	-	-
2003	44	11	16	61	0	0	-	-
2001	64	14	16	62	2	0	-	-
1999	47	19	21	45	2	2	-	-
1997	43	58	16	12	5	0	-	-
1995	63	52	3	29	0	5	-	-
1993	58	17	17	28	3	12	-	-
1992	69	35	12	33	3	6	-	-
1991	84	43	7	26	10	2	-	-
1990	70	46	10	23	4	3	-	-
1989	81	43	11	22	3	1	-	-

<sup>1</sup>RRPW=redroot pigweed, COLQ=common lambsquarters, KOCZ=kochia, NISH=nightshade, WIOA=wild oat, OTHER=2014 velvetleaf (1); 2011 velvetleaf (3), common mallow (1).

**Table 5. A summary of the number of row crop cultivations per field for weeds from 1989 to 2014.**

Year*	Responses number	Number of cultivations					
		0	1	2	3	4	5
		-----% of respondents-----					
2014	23	83	17	0	0	0	0
2011	20	85	10	5	0	0	0
2009	15	67	27	6	0	0	0
2007	19	6	26	63	6	0	0
2001	64	2	16	69	13	0	0
1999	47	2	24	60	13	0	0
1997	43	2	0	43	55	0	0
1989	81	0	0	26	53	20	1

\*This question was not present on surveys from 2005, 2003, 1995, 1993, 1992, 1991, and 1990

**Table 6. A summary of hand weeded acres as a percent of acres planted in western North Dakota and eastern Montana from 1989 to 2014.**

Year	Respondent Acres Planted	Hand Weeded % of acres planted
2014	7,556	0
2011	6,134	6
2009	3,441	<1
2007	8,346	51
2005	7,733	41
2003	11,732	38
2001	22,125	23
1999	12,296	21
1997	11,059	26
1995	12,338	51
1993	9,242	62
1992	12,791	76
1991	15,784	85
1990	12,607	78
1989	15,857	89

**Table 7. A summary of the cost of hand weeding plus hand thinning from 1991 to 2014.**

Year	Responses number	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	>60
		-----% of respondents-----												
2014	23	100	0	0	0	0	0	0	0	0	0	0	0	0
2011	20	95	0	0	0	0	0	5	0	0	0	0	0	0
2009	15	93	0	0	0	0	0	0	0	0	7	0	0	0
2007	21	29	0	4	0	10	14	10	0	0	14	0	10	10
2005	24	50	0	4	4	8	4	4	4	3	8	4	8	0
2003	38	39	0	5	11	13	0	11	16	3	0	0	0	3
2001	65	69	2	0	3	6	8	3	5	0	2	0	2	2
1999	47	68	0	4	17	4	2	0	2	2	0	0	0	0
1997	43	49	0	9	14	2	12	0	2	0	0	0	5	7
1995	53	41	8	8	13	11	6	2	0	0	4	2	0	6
1993	46	15	4	13	2	11	4	0	0	0	2	24	15	9
1992	54	0	4	11	9	11	6	2	4	4	11	22	11	6
1991	73	0	0	8	3	7	0	1	3	0	8	29	18	23

**Table 8. A summary of sugarbeet acres produced by survey respondents from 1997 to 2014.**

Year	Responses number	Sugarbeet Acres									
		1-49	50-99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1500	>1500
		-----% of respondents-----									
2014	23	4	0	13	39	22	13	4	0	4	0
2011	20	0	20	15	15	35	0	10	0	5	0
2009	15	7	40	13	7	13	7	13	0	0	0
2007	21	5	19	5	19	10	24	0	14	5	0
2005	24	4	13	17	13	38	8	4	0	4	0
2003	44	11	16	21	11	24	5	5	3	5	0
2001	64	5	15	28	20	9	5	11	2	5	2
1999	47	2	17	28	23	11	8	4	4	2	0
1997	43	4	23	25	12	25	8	0	2	0	0