

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

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The sixteenth weed control and production practices survey was mailed in November 2015 to sugarbeet growers in western North Dakota and eastern Montana. The last survey was conducted in 2014. 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 30,940 acres of sugarbeet in western North Dakota and eastern Montana in 2015. Twenty-two growers representing 20% of the total acres responded to the survey. All of the 6,132 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 2015 was 223% (Table 1), compared to 220% in 2014, 219% in 2011, 237% in 2009, 411% in 2007, 400% in 2005, 440% in 2003, and 408% in 2001. Postemergence herbicides were applied 2.2 times per acre in 2015, compared to 2.1 times per acre in 2014 and 2011, 2.4 times in 2009 and 2.8 times in 2007. Preemergence (PRE) herbicides were only used on 0.9% of reported acres and glyphosate was the only reported PRE herbicide used. The most common herbicide treatment in 2015 was glyphosate. Grass herbicides and Betamix were the only herbicides other than glyphosate used by respondents in 2015.

Forty-six percent of all survey respondents reported excellent weed control for postemergence herbicides in 2015 (Table 1), compared to 50% in 2014, 75% in 2011, 55% in 2009, 16% in 2007 and 11% in 2005. Ninety-two percent of survey respondents reported no sugarbeet injury in 2015, compared to 78% in 2014, 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 2015 was 2.08 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 2015 was 0.94 lb ae/A (Calculated from Table 2 values).

Sugarbeet acreage operated by survey respondents in 2015 varied from 54 acres to 650 acres (Table 3). The average number of sugarbeet acres per respondent was 279 acres, respectively, in 2015 (Table 4).

A summary of the “most serious production” problem responses from 1989 to 2015 is shown in Table 5. In 2015, 27% of respondents named root diseases (including aphanomyces, fusarium, rhizoctonia, and rhizomania) as their “most serious production” problem in sugarbeet. In 2015, 14% 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 2015.

Common lambsquarters was named most often in 2015 as the “worst weed” problem by 21% of respondents (Table 6). Seventeen percent of respondents named “none” as a “worst weed” problem in 2015. Redroot pigweed, nightshades, kochia, wild oat, foxtail, common mallow, and velvetleaf were other weeds indicated.

Row crop cultivation was used by 27% of survey respondents in 2015 (Table 7). Seventy-six percent of respondents indicated zero cultivation per field. The average number of row crop cultivations reported was 0.8 per field in 2015, compared to 0.1 per field in 2014, 0.2 cultivations per field in 2011, 0.4 in 2009 and 1.7 in 2007.

Hand weeding has virtually disappeared in western North Dakota and eastern Montana with no growers reporting hand weeding in 2015 (Table 8). The effectiveness of glyphosate applied to RR sugarbeet probably accounts for the near disappearance of hand weeding.

Soybean was the main crop to directly precede the 2015 sugarbeet crop (Table 10). Thirty-three of reported acres were preceded by soybean, 26% by wheat, 19% by barley, 10% by dry beans, 6% by corn, and 6% by an ‘other’ crop.

The majority of respondents (33%) to this year’s survey gave no response to which resource used most for making field decisions (Table 11). Thirty-six percent of respondents considered a NDSU/U of MN extension publication their most used resource. Twenty-four percent of respondents considered the NDAWN Cercospora and Rhizotonia degree-day models as their most used resource. Seven percent of respondents indicated they used trials, agronomists, consultants. Many respondents indicated they used more than one of the resources provided as options on the survey.

Table 1. Summary of all herbicides used in sugarbeet in western North Dakota and eastern Montana in 2015. Twenty-two growers reported on 6,132 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. PRE-EMERGENCE HERBICIDES													
Glyphosate PRE	1	54	0.9	100	-	-	-	-	100	-	-	-	-
Total-PRE	1	54	0.9	100	0	0	0	0	100	0	0	0	0
B. POSTEMERGENCE HERBICIDES													
Glyphosate	47	13,190	215.1	6	45	36	-	13	6	94	-	-	-
Glyp+Grass**	2	124	2.2	-	50	50	-	-	50	50	-	-	-
Betamix	1	300	5.2	-	100	-	-	-	-	100	-	-	-
Total-POST	50	13,614	222.0	6	46	36	0	12	8	92	0	0	0
C. OTHER WEED CONTROL METHODS													
Cultivations	6	4,661	76.0	100	-	-	-	-	100	-	-	-	-
Total-Other Methods	6	4,661	76.0	100	-	-	-	-	100	-	-	-	-
TOTAL ALL TREATMENTS	57	18,329	298.9	18	40	32	0	10	19	81	0	0	0

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

**Grass=Grass Herbicide

Table 2. Glyphosate use rates per acre across all POST application timings in sugarbeet by county in 2015.

County	Total ¹	lb ae/A				fl. oz./A ²									
		<0.7	0.7 to 0.84	0.85 to 1.0	>1.0	22	24	26	28	29	30	32	34	40	48
-----% of responses-----															
Custer	2	-	-	100	-	-	-	-	100	-	-	-	-	-	-
Dawson	8	-	-	100	-	-	-	50	-	-	50	-	-	-	
McKenzie	8	37	-	63	-	37	-	13	-	-	50	-	-	-	
Prairie	7	-	-	100	-	-	-	-	-	-	100	-	-	-	
Richland	15	-	-	100	-	-	-	47	-	-	53	-	-	-	
Williams	7	-	-	100	-	-	-	57	-	-	43	-	-	-	
Total	47	6	0	94	0	6	0	0	38	0	0	56	0	0	

¹Total number of glyphosate applications made during the year.

²Based on a 4.5 lb/gal. acid equivalent formulation of glyphosate

Table 3. A summary of sugarbeet acres produced by survey respondents from 1997 to 2015.

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-----											
2015	22	0	19	10	28	24	14	5	0	0	0
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

Table 4. 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+
-----% of respondents-----										
Custer	1	-	100	-	-	-	-	-	-	-
Dawson	4	-	-	25	-	75	-	-	-	-
McKenzie	4	-	25	-	25	25	25	-	-	-
Prairie	4	-	25	-	50	-	-	25	-	-
Richland	6	-	17	17	49	17	-	-	-	-
Williams	3	-	-	-	-	-	100	-	-	-
Total	22	0	19	10	28	24	14	5	0	0

Table 5. A summary of the most serious production problem responses from 1989 to 2015.

Year	Number of Respondents	Weeds	Weather	Root Diseases ¹	Labor Management	Emergence/Stand	Cercospora Leaf Spot	No Problem	Insect Damages ²
2015	22	0	18 ^a	27	0	18	14	9	14 ^b
2014	20	0	0	35	10	5	35	15	5
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	-

¹Root Diseases include aphanomyces, fusarium, rhizoctonia, and rhizomania.

²Insect Damages include Root maggot, root aphid, springtails, and nematode.

^aHail Damage in 2015.

^bSpringtails in 2015.

Table 6. A summary of the worst weed responses from 1989 to 2015.

Year	Number of Responses	RRPW ¹	COLQ	KOCZ	NISH	WIOA	Other ²	None
2015	24 ^a	12	21	17	4	8	21	17
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	-	-

¹RRPW=redroot pigweed, COLQ=common lambsquarters, KOCZ=kochia, NISH=nightshade, WIOA=wild oat, ²OTHER=velvetleaf, common mallow, foxtail; (3), (1), (1) respectively in 2015.

^aMultiple responses from two surveys

Table 7. A summary of the number of row crop cultivations per field for weeds from 1989 to 2015.

Year ¹	Responses number	Number of cultivations					
		0	1	2	3	4	5
-----% of respondents-----							
2015	22	76	5	0	5	5	9
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

¹This question was not present on surveys from 2005, 2003, 1995, 1993, 1992, 1991, and 1990.

Table 8. A summary of hand weeded acres as a percent of acres planted from 1989 to 2015.

Year	Respondent Acres Planted	Hand Weeded
		% of acres planted
2015	6,132	0
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 9. A summary of the cost of hand weeding plus hand thinning from 1991 to 2015.

Year	Responses	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-----												
2015	22	100	0	0	0	0	0	0	0	0	0	0	0	0
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 10. Percent of sugarbeet acres seeded in 2015 into various crop residues by county.

County	No. of responses	Sugarbeet Acres planted	Crop Preceding Sugarbeet					
			Corn	Dry Bean	Soybean	Wheat	Barley	Other
			-----% of acres planted-----					
Custer	1	54	-	-	100	-	-	-
Dawson	4	1,115	-	35	32	18	-	15
McKenzie	4	1,134	-	5	61	34	-	-
Prairie	4	1,187	16	-	55	7	22	-
Richland	6	1,306	15	-	3	50	22	-
Williams	3	1,300	-	11	18	22	49	-
Total	22	6,132	6	10	33	26	19	6

Table 11. Most used resources for making field decisions in eastern Montana and western North Dakota by county in 2015.

County	No. of Responses ¹	Sugarbeet Production Guide ²	Sugarbeet R. & E. Reports ²	Cercospora Model ³	Rhizoctonia Model ³	Root Maggot Fly Counts ⁴	NDSU Crop and Pest Report ⁴	Other ⁵	No Response
		-----% of responses-----							
Custer	3	-	33	33	33	-	-	-	-
Dawson	5	20	20	-	-	-	-	-	40
McKenzie	9	11	11	22	22	-	-	22	11
Prairie	4	25	-	-	-	-	-	-	75
Richland	6	-	33	-	-	-	-	-	67
Williams	4	50	25	25	-	-	-	-	-
Total	31	16	20	14	10	0	0	7	33

¹Response was multiple choice, each survey taker could select multiple.

²NDSU/U of MN Extension Publication.

³NDAWN Website.

⁴NDSU Website.

⁵Other=coop. trials; coop. agronomist; crop consultant.