

SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES ON SUGARBEET IN WESTERN NORTH DAKOTA AND EASTERN MONTANA IN 2009

Jeff M. Stachler¹, Aaron L. Carlson¹, John L. Luecke¹, Mark A. Boetel², and Mohamed F.R. Khan¹

¹Extension Sugarbeet Specialist, Sugarbeet Research Technician, Sugarbeet Research Specialist, and
Extension Sugarbeet Specialist

North Dakota State University - University of Minnesota, Fargo, ND
and

²Associate Professor, Dept. of Entomology, North Dakota State University

Other portions of this survey are published in the Entomology and Plant Pathology sections.

The thirteenth weed control and production practices questionnaire was mailed in September 2009 to sugarbeet growers in western North Dakota and eastern Montana. The last survey was conducted in 2007. 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, acreage by sugarbeet type, acres of hand-weeded sugarbeet, herbicide application methods, and cost of hand thinning and hand weeding. Growers were also requested to provide the number of row cultivations by sugarbeet type, whether conventional herbicide rates increased, if any glyphosate-resistant weeds were observed, and list suspected glyphosate-resistant weed species. Insecticide use and fungicide use portions of the survey can be found in the Entomology and Plant Pathology sections.

Growers planted 24,500 acres of sugarbeet in western North Dakota and eastern Montana in 2009. Fifteen growers representing 14% of the total acres responded to the survey. Of the 3,441 acres reported, only 2 acres were conventional sugarbeet and will be ignored throughout the remainder of the report, except for Tables 1 and 2. The remaining 3,439 acres were Roundup Ready® (RR) sugarbeet. Growers in western North Dakota and eastern Montana have rapidly and nearly completely switched to planting RR sugarbeet since the last survey in 2007. No other transgenic crop has been adopted as rapidly. Other portions of the survey are reported in the Entomology and Plant Pathology sections.

Table 1 is a summary of herbicide use and performance averaged over all counties. The number of growers reporting the use of 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 growers reporting in Table 1 exceeds the total number of responses. 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 trade names listed in Table 1 for the herbicides are the original trade names. These old trade names also represent the generic formulations of the same active ingredient. Thus Nortron also represents Etho SC and Ethotron; Betamix represents D-P Mix and Phen-Des; Betanex represents Des and Alphanex; Progress represents Des-Phen-Etho; Stinger represents ClopyrAg; and Select represents Select Max, Prism, and Arrow.

Total sugarbeet acreage treated with herbicides in 2009 was 237% (Table 1), compared to 411% in 2007, 400% in 2005, 440% in 2003, and 408% in 2001. Total acreage treated with herbicides declined 42% compared to 2007. In other words, survey respondents have reduced the number of herbicide applications by 42% since 2007. Postemergence herbicides were the only type of herbicides or method of control reported in 2009 (Table 1). Postemergence herbicide use was 237% in 2009, 277% in 2007, 311% in 2005, 312% in 2003, and 335% in 2001. Postemergence herbicides were applied only 2.4 times in 2009, compared to 2.8

times in 2007. Postemergence herbicide use only declined 14% since 2007. Only glyphosate, Poast, Select, and Stinger were reportedly applied to sugarbeets in western North Dakota and eastern Montana in 2009. The most common herbicide treatment in 2009 was glyphosate applied at 1.0 pound acid equivalent per acre (lb ae/A). The average total rate of glyphosate applied per acre by survey respondents in 2009 was 2.4 lb ae/A (calculated from Table 1), compared to 1.85 lb ae/A in eastern North Dakota and Minnesota. Stinger was only applied by survey respondents to 1.4% of the total treated acreage in 2009 (Table 1), compared to 245% in 2007, 269% in 2005, 302% in 2003, and 269% in 2001. Select was applied to 1%, Poast to 1%, and Assure II to 0% of the acreage in 2009, compared to 84, 99, and 6% of the acreage, respectively, in 2007. Herbicide use and weed control practices have likely never changed as dramatically between surveys as is currently being reported.

Fifty-five percent of survey respondents reported excellent weed control in 2009, compared to 16% in 2007 and 11% in 2005. Sixty-five percent of survey respondents reported no sugarbeet injury in 2009, compared to 10% in 2007 and 28% in 2005. Never in the history of this survey has so many respondents reported excellent weed control and no sugarbeet injury, thanks to the availability and adoption of RR sugarbeet.

Averaged over all herbicides applied in 2009, 100% were broadcast applied with a ground sprayer (Table 2). No respondents reported application of herbicides by aircraft or in a band.

A summary of the “most serious production problem” responses from 1989 to 2009 is shown in Table 3. In 2009, 29% of respondents indicated root diseases (including aphanomyces, fusarium, rhizoctonia, and rhizomania) as their “most serious production problem” in sugarbeet, compared to 17% in 2005, 22% in 2003, and 25% in 1991. Also, 29% of respondents indicated emergence or stand establishment as their most serious problem in 2009. Twenty-one percent of respondents reported no problems in 2009, the highest response in the history of this survey. Cercospora leaf spot was named as a “most serious production problem” by 7% of the respondents. For the first time in the history of conducting this survey, NO respondents reported weeds as a “most serious production problem”. Respondents annually report weeds as the “most serious production problem”, except for 2001, 1993, 1992, 1991, and 1989.

Kochia was named most often as the “worst weed” problem by 75% of the survey respondents in 2007 and 2005 (Table 4), but only 17% of respondents reported kochia as a problem in 2009. In 2009, common lambsquarters was named the “worst weed” problem by 22% of respondents, the greatest percentage of responses ever recorded. For the first time in the history of the survey, 22% of respondents reported no weed problems. Milkweed was reported by two respondents as an “other” “worst weed” problem. The effectiveness of glyphosate compared to conventional herbicides greatly enhances weed control in sugarbeet. One grower reported the presence of glyphosate-resistant weeds and listed kochia as the suspected glyphosate-resistant weed.

Hand weeding has virtually disappeared in western North Dakota and eastern Montana with less than 1% of acres reported receiving hand weeding (Table 5). The effectiveness of glyphosate applied to RR sugarbeet has allowed for the near disappearance of hand weeding.

Sugarbeet acreage operated by survey respondents in 2009 varied from less than 50 acres to 650 acres (Table 7). The average and median number of sugarbeet acres per respondent was 230 and 110 acres, respectively, in 2009.

Row crop cultivation was used by one third of survey respondents in 2009 (Table 8). Sixty seven percent of respondents indicated zero cultivation per field, the largest percentage in the history of the survey. The average number of row crop cultivations was 0.4 per field in 2009, compared to 1.7 cultivations per field in 2007. The number of row crop cultivations declined sharply due to the effectiveness of glyphosate in RR sugarbeet.

TABLE 1. SUMMARY OF ALL HERBICIDES USED IN SUGARBEET IN EASTERN NORTH DAKOTA AND WESTERN MONTANA REPORTED IN 2009. 15 GROWERS REPORTED ON 3,441 ACRES.

HERBICIDES (IN ORDER OF ACRES TREATED)	NUMBER GROWERS RPTG.	ACRES TREATED % OF TOTAL	Avg no. of appl	% GROWERS REPORTING WEED CONTROL					% GROWERS REPORTING CROP INJURY				
				NR*	EXC	GD	FR	PR	NR	None	Slt	Mod	Sev
B. POSTEMERGENCE HERBICIDES:													
GLYP 1.0 LB	9	154.4	2.3	44	56	0	0	0	44	56	0	0	0
GLYP 1.125 LB	3	62.0	1.7	33	33	33	0	0	33	67	0	0	0
GLYP 0.75 LB	4	18.0	2.5	0	50	25	0	25	0	75	25	0	0
GLYP+STINGER	1	1.2	2.0	0	100	0	0	0	0	100	0	0	0
POAST	1	0.9	1.0	0	100	0	0	0	0	100	0	0	0
GLYP+SELECT	1	0.9	1.0	0	100	0	0	0	0	100	0	0	0
BNEX+STING+UPBET	1	0.2	3.0	0	0	0	100	0	0	0	100	0	0
TOTAL TREATMENTS	20	237.4	2.2	25	55	10	5	5	25	65	10	0	0

*NR=NO RESPONSE; EXC=EXCELLENT; GD=GOOD; FR=FAIR; PR=POOR.

Table 2. Method of herbicide application in sugarbeet in 2009.

Herbicide	Acres treated	Band	Broadcast with	Broadcast with
			ground sprayer	aerial application
-----% of acres treated-----				
Poast	30	-	100	-
Bnex/Bmix/Prog+Stinger+UpBeet	6	-	100	-
Glyphosate – 0.75 lb ae/A	618	-	100	-
Glyphosate – 1.0 lb ae/A	4254	-	100	-
Glyphosate – 1.125 lb ae/A	2022	-	100	-
Glyphosate + Stinger	40	-	100	-
Glyphosate + Select	30	-	100	-
Total	27309	0	100	0

Table 3. A summary of the most serious production problem responses from 1989 to 2009.

Year	Number of Respondents	Weeds	Weather	Root Diseases ¹	Labor Management	Emergence/ Stand	Cercospora Leaf Spot	No Problem
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.

Table 4. A summary of the worst weed responses from 1989 to 2009.

Year	Number of Responses	RRPW ¹	COLQ	KOCZ	NISH	WIOA	NONE
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

Table 5. A summary of hand weeded acres as a percent of acres planted in eastern Montana and western North Dakota from 1989 to 2009.

Year	Respondent Acres Planted	Hand Weeded
		% of acres planted
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 6. A summary of the cost of hand weeding plus hand thinning from 1991 to 2009.

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
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 7. A summary of sugarbeet acres produced by survey respondents from 1997 to 2007.

Year	Responses number	Sugarbeet Acres									
		1-49	50-99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1500	>1500
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 8. A summary of the number of row crop cultivations per field for weeds from 1989 to 2007.

Year*	Responses number	Number of cultivations					
		0	1	2	3	4	5
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