TURNING POINT SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2021

Tom J. Peters[1], Mohamed F.R. Khan[1], Alexa Lystad[2], and Mark A. Boetel[3]

[1]Extension Sugarbeet Specialist and [2]Sugarbeet Research Specialist
North Dakota State University & University of Minnesota, Fargo, ND
and
[3]Professor, Dept. of Entomology, North Dakota State University

The sixth annual weed control and production practices live polling questionnaire was conducted using Turning Point Technology at the 2022 winter Sugarbeet Grower Seminars. Responses are based on production practices from the 2021 growing season. The survey focuses on responses from growers in attendance at the Fargo, Grafton, Grand Forks, Wahpeton, ND, and Willmar, MN, Grower Seminars. Respondents from seminars in North Dakota indicated the county in which the majority of their sugarbeet were produced (Tables 1, 2, 3, 4). Survey results represent approximately 162,042 acres reported by 168 respondents (Table 5) compared with 193,050 acres represented in 2019. The average sugarbeet acreage per respondent grown in 2021 was calculated from Table 5 at 965 acres compared with 697 acres in 2019.

Survey participants were asked a series of questions regarding their production practices used in sugarbeet in 2021. Sixty percent of respondents indicated wheat was the crop preceding sugarbeet (Table 6), 26% indicated corn, and 10% indicated soybean. Preceding crop varied by location with 94% of Grand Forks growers indicating wheat preceded sugarbeet and 70% of Willmar growers indicated corn as their preceding crop. Eighty-two percent of growers who participated in the winter meetings used a nurse or cover crop in 2021 (Table 7) which increased from 77% in 2019. Cover crop species also varied widely by location with wheat being used by 40% of growers at the Grafton meeting and barley being used by 57% of growers at the Wahpeton meeting.

Growers indicated weeds were their most serious production problem in sugarbeet in 2021 (Table 8) with 32% of all respondents naming weeds compared with CLS (Cercospora Leaf Spot) being named most serious problem by 42% of participants in 2019. In 2021, CLS was the most serious problem for 29% of respondents and emergence or stand was named as most serious by 23% of respondents.

Waterhemp was named as the most serious weed problem in sugarbeet in 2021 by 73% of respondents (Table 9) compared with 54% in 2019. Thirteen percent of respondents indicated kochia, 7% said common ragweed, and 3% of respondents indicated common lambsquarters were their most serious weed problem in 2021. The increased presence of glyphosate-resistant waterhemp and kochia are likely the reason for these weeds being named as the worst weeds. Troublesome weeds varied by location with greater than 93%, 89%, and 93% of Willmar, Wahpeton, and Fargo respondents, respectively, indicating waterhemp was most problematic weed. Kochia was the worst weed for respondents of the Grafton meeting with 57% of responses.

Respondents to the survey indicated making 0 to 5 glyphosate applications in their 2021 sugarbeet crop (Table 10) with a calculated average of 1.99 applications per acre. The calculated average in 2019 was 2.16 applications per acre.

Glyphosate was most commonly applied with a chloroacetamide herbicide postemergence (lay-by) in 2021 with 49% of responses indicating this herbicide combination was used (Table 11). Glyphosate applied with a broadleaf herbicide postemergence was the second most common herbicide used in sugarbeet in 2021 with 31% of responses. Glyphosate alone and glyphosate plus a grass herbicide were the third and fourth most common at 10% and 7% of the responses, respectively.

Preplant incorporated (PPI) or preemergence (PRE) herbicides were applied by 75% of survey respondents in 2021 (Table 12). Thirty-one percent of Grafton survey participants applied a PPI or PRE herbicide compared with 13% in 2019. Conversely, 90% of Wahpeton survey participants applied a PPI or PRE herbicide in sugarbeet in 2021 compared with 89% in 2019. Once again, a likely reason for this variation is the more common presence of glyphosate-resistant waterhemp in the southern sugarbeet growing areas of the Red River Valley compared with the north end of the Valley. The most commonly used soil herbicide was *S*-metolachlor with 32% of all responses followed by a combination of *S*-metolachlor plus ethofumesate with 25% of responses. Of the growers who indicated using a soil-applied herbicide, 51% indicated excellent to good weed control from that herbicide (calculated from Table 13).

The application of soil-residual herbicides applied 'lay-by' to the 2021 sugarbeet crop was indicated by 86% of respondents (Table 14). *S*-metolachlor was the most commonly applied lay-by herbicide with 45% of responses. The majority of growers responding at the Willmar meeting indicated using Outlook (83% of responses), while S-metolachlor was more commonly applied by growers of the Fargo (93% of responses) and Wahpeton (62% of responses) meetings.

Satisfaction of weed control from lay-by applications ranged from excellent to unsure (Table 15). Of respondents indicating they applied a lay-by herbicide, 78% indicated good or fair weed control (calculated from Table 15). Less than normal rainfall in April and May reduced the efficacy of PRE, early postemergence (EPOST), and postemergence (POST) applied soil-residual herbicides.

The Environmental Protection Agency (EPA) approved a request for a Section 18 emergency exemption for Ultra Blazer (acifluorfen) which provided Minnesota and eastern North Dakota sugarbeet growers a postemergence herbicide to control glyphosate-resistant waterhemp in sugarbeet in 2021. The exemption allowed a single Ultra Blazer application at 16 fluid ounces per acre per year. A Section 18 exemption under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) authorizes EPA to allow an unregistered use of a pesticide for a limited time if EPA determines that an emergency condition exists. Thirty-seven percent of respondents applied Ultra Blazer in 2021 (Table 16). Of the growers who used Ultra Blazer, 14% applied Ultra Blazer alone, 12% applied Ultra Blazer with NIS and 8% tank mixed Ultra Blazer with glyphosate, NIS, and AMS.

Satisfaction of weed control from Ultra Blazer ranged from excellent to poor (Table 17). Of respondents indicating they applied Ultra Blazer, 27% indicated excellent to good weed control (calculated from Table 17).

Row-crop cultivation of the 2021 sugarbeet crop was reported by 32% of respondents (calculated from Table 18). Twelve percent reported row-crop cultivation on less than ten percent of their acres (Table 18). Conversely, 8% reported row-crop cultivation on 100% of their acres.

Hand-weeding the 2021 sugarbeet crop was reported by 75% of respondents (Table 19). Most respondents who hand-weeded indicated 10-50% of their acres were hand-weeded. Fewer than half of the respondents indicated hand-weeding at the Fargo meeting, while greater than half the participants at the Grafton, Grand Forks, and Willmar meetings reported some hand weeding.

Table 1. 2022 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2021.

County	Number of Responses	Percent of Responses
Cass	2	29
Clay	1	14
Norman[1]	2	29
Richland	1	14
Traill	1	14
Total	7	100

[1]Includes Mahnomen County

Table 2. 2022 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2021.

County	Number of Responses	Percent of Responses
Grand Forks	1	6
Kittson	1	6
Marshall	2	13
Pembina	4	25
Walsh	6	37
Other	2	13
Total	16	100

Table 3. 2022 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2021.

County	Number of Responses	Percent of Responses
Grand Forks	7	18
Mahnomen	1	3
Marshall	2	5
Polk	17	43
Traill	1	3
Walsh	2	5
Other	9	23
Total	39	100

Table 4. 2022 Wahpeton Grower Seminar - Number of survey respondents by county growing sugarbeet in 2021.

County	Number of Responses	Percent of Responses
Clay	7	10
Grant	6	9
Richland	16	25
Traverse	3	5
Wilkin	33	51
Total	65	100

Table 5. Total sugarbeet acreage operated by respondents in 2021.

		Acres of sugarbeet									
Location	Responses	<99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1499	1500-1999	2000+
		----------% of responses----------									
Fargo	12	17	0	0	17	17	8	0	17	17	8
Grafton	16	13	6	0	13	19	6	19	13	6	6
Grand Forks	38	13	8	2	11	16	11	11	8	2	18
Wahpeton[1]	65	0	11	0	34	0	17	38	0	0	0
Willmar	37	24	5	11	3	16	14	3	16	5	3
Total	168	11	8	3	5	23	7	11	8	18	6

[1]Acreage categories were <250, 250-500, 500-750, or >750.

Table 6. Crop grown in 2020 that preceded sugarbeet in 2021.

		Previous Crop								
Location	Responses	Barley	Canola	Sweet Corn	Field Corn	Dry Bean	Potato	Soybean	Wheat	Other
		----------% of responses----------								
Fargo	14	0	0	0	0	0	0	7	86	7
Grafton	15	0	0	0	0	20	7	7	66	0
Grand Forks	39	0	0	0	3	0	0	0	94	3
Wahpeton	65	0	0	0	14	0	0	20	66	0
Willmar	40	0	0	20	70	0	0	8	3	0
Total	173	0	0	5	21	2	1	10	60	1

Table 7. Nurse or cover crop used in sugarbeet in 2021.

Location	Responses	Barley	Oat	Rye	Wheat	Other[1]	None
		----------% of responses----------					
Fargo	10	30	0	0	30	0	40
Grafton	15	40	7	0	40	0	13
Grand Forks	38	55	0	3	18	0	24
Wahpeton	62	57	3	8	19	2	11
Willmar[2]	-	-	-	-	-	-	-
Total	125	52	2	5	22	1	18

[1]Includes Mustard and 'Other'
[2]Information not collected during Wilmar Grower Seminar.

Table 8. Most serious production problem in sugarbeet in 2021.

Location	Responses	CLS[1]	Rhizo-mania	Aph[2]	Rhizoc-tonia	Fusarium	Herbicide Injury	Root Maggot	Weeds	Stand[3]
		----------% of responses----------								
Fargo	14	58	0	0	14	7	0	0	7	14
Grafton	17	59	0	6	0	0	0	12	6	17
Grand Forks	39	36	0	0	8	0	0	2	26	28
Wahpeton	63	21	0	0	13	0	2	0	41	23
Willmar	40	15	0	0	13	0	5	0	43	24
Total	173	29	0	1	10	1	2	2	32	23

[1]Cercospora Leaf Spot
[2]Aphanomyces
[3]Emergence/Stand

Table 9. Most serious weed problem in sugarbeet in 2021.

Location	Responses	palmer[1]	colq	cora	kochia	gira	rrpw	RR Canola	wahe
		----------% of responses----------							
Fargo	14	0	0	7	0	0	0	0	93
Grafton	14	0	7	0	57	0	7	7	22
Grand Forks	39	0	8	26	23	5	3	3	32
Wahpeton	65	0	2	2	5	0	2	0	89
Willmar	43	0	2	0	5	0	0	0	93
Total	175	0	3	7	13	1	2	1	73

[1]palmer=palmer amaranth, colq=common lambsquarters, cora=common ragweed, gira=giant ragweed, rrpw=redroot pigweed, wahe=waterhemp

Table 10. Average number of glyphosate applications per acre in sugarbeet during 2021 season.

Location	Responses	0	1	2	3	4	5
		----------% of responses----------					
Fargo	11	0	27	73	0	0	0
Grafton	11	0	27	55	18	0	0
Grand Forks	39	3	5	82	10	0	0
Wahpeton	64	0	16	64	20	0	0
Willmar[1]	-	-	-	-	-	-	-
Total	125	1	14	70	15	0	0

[1]Information not collected during Wilmar Grower Seminar.

Table 11. Herbicides used in a weed control systems approach in sugarbeet in 2021.

		Glyphosate Application Tank-Mixes					
Location	Responses	Gly Alone	Gly+Lay-by	Gly+Broadleaf	Gly+Grass	Other	None Used
		----------% of responses----------					
Fargo	17	6	59	35	0	0	0
Grafton[1]	-	-	-	-	-	-	-
Grand Forks	30	18	43	37	0	0	2
Wahpeton[1]	-	-	-	-	-	-	-
Willmar	40	5	78	35	25	5	0
Total	87	10	49	31	7	2	1

[1]Information not collected during Grafton or Wahpeton Grower Seminar.

Table 12. Preplant incorporated or preemergence herbicides used in sugarbeet in 2021.

		PPI or PRE Herbicides Applied					
Location	Responses	S-metolachlor	ethofumesate	Ro-Neet SB	S-metolachor +ethofumesate	Other	None
		----------% of responses----------					
Fargo	17	53	23	0	12	0	12
Grafton	13	15	8	0	8	0	69
Grand Forks	43	22	12	0	12	5	49
Wahpeton	67	42	12	0	33	3	10
Willmar	41	22	27	0	37	0	15
Total	181	32	16	0	25	2	25

Table 13. Satisfaction in weed control from preplant incorporated and preemergence herbicides in 2021.

		PPI or PRE Weed Control Satisfaction					
Location	Responses	Excellent	Good	Fair	Poor	Unsure	None Used
		----------% of responses----------					
Fargo	14	21	50	21	0	0	7
Grafton	10	0	20	10	10	0	60
Grand Forks	38	0	40	13	0	0	47
Wahpeton	65	3	62	25	6	0	4
Willmar	42	2	36	40	7	5	10
Total	169	4	47	25	5	1	18

Table 14. Soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2021.

		Lay-by Herbicides Applied				
Location	Responses	S-metolachlor	Outlook	Warrant	Other	None
		----------% of responses----------				
Fargo	14	93	7	0	0	0
Grafton	11	18	9	0	0	73
Grand Forks	41	49	10	2	2	37
Wahpeton	64	62	34	2	0	2
Willmar	41	10	83	15	2	2
Total	171	45	35	5	1	14

Table 15. Satisfaction of weed control from soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2021.

		Lay-by Weed Control Satisfaction					
Location	Responses	Excellent	Good	Fair	Poor	Unsure	None Used
		----------% of responses----------					
Fargo	12	34	50	8	8	0	0
Grafton	12	0	8	17	17	0	58
Grand Forks	46	9	48	9	4	4	26
Wahpeton	61	2	57	36	3	0	2
Willmar	43	5	37	51	5	0	2
Total	174	7	46	29	5	1	12

Table 16. Herbicides applied with Ultra Blazer in sugarbeet in 2021.

		Ultra Blazer Application Tank-Mixes					
Location	Responses	UB Alone	UB+NIS	UB+Gly	UB+Gly+NIS+AMS	Unsure	None Used
		----------% of responses----------					
Fargo	11	0	27	0	9	0	64
Grafton	12	0	0	0	0	0	100
Grand Forks	46	4	10	4	4	0	78
Wahpeton	62	32	13	2	8	0	45
Willmar	37	3	14	5	16	0	62
Total	168	14	12	3	8	0	63

Table 17. Satisfaction in weed control from Growers' reporting Ultra Blazer applied in sugarbeet in 2021.

Location	Responses	Satisfaction of Weed Control from Ultra Blazer			
		Excellent	Good	Fair	Poor
		----------% of responses----------			
Fargo	3	0	33	67	0
Grafton	1	0	0	100	0
Grand Forks	11	0	45	55	0
Wahpeton	33	4	18	42	36
Wilmar	13	0	23	46	31
Total	61	2	25	47	26

Table 18. Percent of sugarbeet acres row-crop cultivated in 2021.

Location	Responses	% Acres Row-Cultivated				
		0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	9	67	22	11	0	0
Grafton	13	62	23	15	0	0
Grand Forks	45	84	13	3	0	2
Wahpeton[1]	-	-	-	-	-	-
Willmar	36	53	6	14	6	22
Total	103	68	12	10	2	8

[1]Information not collected during Wahpeton Grower Seminar.

Table 19. Percent of sugarbeet acres hand-weeded in 2021.

Location	Responses	% Acres Hand-Weeded				
		0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	11	55	36	0	0	9
Grafton	11	46	36	18	0	0
Grand Forks	45	31	53	16	0	0
Wahpeton[1]	-	-	-	-	-	-
Willmar	34	35	29	15	12	9
Total	101	25	29	40	3	3

[1]Information not collected during Wahpeton Grower Seminar.