TURNING POINT SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2019

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The fifth annual weed control and production practices live polling questionnaire was conducted using Turning Point Technology at the 2020 winter Sugarbeet Grower Seminars. Responses are based on production practices from the 2019 growing season. The survey focuses on responses from growers in attendance at the Fargo, Grafton, Grand Forks, Wahpeton, ND, and Willmar, MN, Growers Seminars. Respondents from each seminar indicated the county in which the majority of their sugarbeet were produced (Tables 1, 2, 3, 4, 5). Survey results represents approximately 160,150 acres reported by 245 respondents (Table 6) compared to 174,032 acres represented in 2018. The average sugarbeet acreage per respondent grown in 2019 was calculated from Table 6 at 662 acres compared to 697 acres in 2018.

Survey participants were asked a series of questions regarding their production practices used in sugarbeet in 2019. Fifty-five percent of respondents indicated wheat was the crop preceding sugarbeet (Table 7), 27% indicated corn, and 9% indicated soybean. Preceding crop varied by location with 92% of Grand Forks growers indicating wheat preceded sugarbeet and 72% of Willmar growers indicated corn as their preceding crop. Seventy percent of growers who participated in the winter meetings used a nurse or cover crop in 2019 (Table 8) which decreased from 77% in 2018. Cover crop species also varied widely by location with barley being used by 43% of growers at the Grand Forks meeting and oat or wheat being used by 40% of growers at the Willmar meeting.

Growers indicated Cercospora Leaf Spot (CLS) was their most serious production problem in sugarbeet in 2019 (Table 9) with 27% of all respondents naming CLS. Rhizoctonia was named the second most serious problem by 26% of participants. In 2018, CLS was named the most serious problem by 42% of all respondents. Weeds or emergence/stand were named as most serious by 16% of respondents.

Waterhemp was named as the most serious weed problem in sugarbeet in 2019 by 56% of respondents (Table 10) compared to 54% in 2018. Nine percent of respondents indicated common lambsquarters, 7% kochia, and 18% said common ragweed were their most serious weed problem in 2019. The increased presence of glyphosate-resistant waterhemp and common ragweed are likely the reason for these weeds being named as the worst weeds. Troublesome weeds varied by location with greater than 96%, 80%, and 94% of Willmar, Wahpeton, and Fargo respondents, respectively, indicating waterhemp was most problematic weed. Common ragweed was the worst weed for respondents of the Grand Forks meeting with 56% of responses.

Respondents to the survey indicated making 0 to 4 glyphosate applications in their 2019 sugarbeet crop (Table 11) with a calculated average of 2.05 applications per acre. The calculated average in 2018 was 2.16 applications per acre.

Glyphosate was most commonly applied with a broadleaf herbicide postemergence in 2019 with 34% of responses indicating this herbicide combination was used (Table 12). Glyphosate applied with a chloroacetamide herbicide postemergence (lay-by) was the second most common herbicide used in sugarbeet in 2019 with 31% of responses. Glyphosate alone and glyphosate plus a grass herbicide were the third and fourth most common at 22% and 10% of the responses.

Satisfaction to weed control from glyphosate applied alone is shown in Table 13 and ranged from 23% of responses indicating excellent control to 2% of responses indicating poor weed control. The majority of responses, 38%, indicated glyphosate was still providing good weed control in sugarbeet in 2019.

Preplant incorporated (PPI) or preemergence (PRE) herbicides were applied by 45% of survey respondents in 2019 (Table 14). The most commonly used soil herbicide was S-metolachlor with 21% of all responses followed by ethofumesate with 14% of responses (Table 14). Of the growers who indicated using a soil-applied herbicide, 72% indicated excellent to good weed control from that herbicide (calculated from Table 15).

The application of soil-residual herbicides applied 'lay-by' to the 2019 sugarbeet crop was indicated by 58% of respondents (Table 16). Outlook was the most commonly applied lay-by herbicide with 28% of responses. The majority of growers responding at the Willmar meeting indicated using Outlook (65% of responses), while S-metolachlor was more commonly applied by growers of the Wahpeton (60% of responses) and Fargo (58% of responses) meetings. Ninety-six percent, 100%, and 74% of Willmar, Wahpeton, and Fargo respondents, respectfully, applied glyphosate with Outlook, S-metolachlor, or Warrant but only 17% and 14% of Grand Forks and Grafton respondents, respectfully, used this combination (Table 16). Use of chloroacetamide herbicides with glyphosate seems to coincide greatest to areas where glyphosate-resistant waterhemp is common.

Satisfaction of weed control from lay-by applications ranged from excellent to unsure (Table 17). Of respondents indicating they applied a lay-by herbicide, 75% indicated excellent or good weed control (calculated from Table 17).

Sixty percent of survey respondents indicated using some form of mechanical weed control or hand labor in 2019 (Table 18). Of the responses given, 38% indicated at least some hand-weeding, 16% used row-cultivation, and 2% indicated using a rotary hoe for weed control in sugarbeet. Sixteen percent reported row-crop cultivation on less than ten percent of their acres (Table 19). Of respondents indicating they used row-cultivation, 49% indicated excellent or good weed control (Table 20).

Hand-weeding the 2019 sugarbeet crop was reported by 50% of respondents (Table 21). Most respondents who hand-weeded indicated less than 10% of their acres were hand-weeded. Fewer than half of the respondents indicated hand-weeding at the Grafton, Wahpeton, and Grand Forks meetings, while greater than half the participants at the Fargo and Willmar meeting reported some hand weeding.

Table 1. 2020 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2019.

County	Number of Responses	Percent of Responses
Becker	1	3
Cass	4	11
Clay	15	41
Norman[1]	10	28
Richland	1	3
Traill	4	11
Wilkin[2]	1	3
Total	36	100

[1]Includes Mahnomen County
[2]Includes Otter Tail County

Table 2. 2020 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2019.

County	Number of Responses	Percent of Responses
Kittson	10	20
Marshall	2	4
Pembina	14	27
Polk	4	8
Walsh	21	41
Total	51	100

Table 3. 2020 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2019.

County	Number of Responses	Percent of Responses
Grand Forks	10	15
Marshall	11	16
Polk	36	54
Traill	4	6
Walsh	4	6
Other	2	3
Total	67	100

Table 4. 2020 Wahpeton Grower Seminar - Number of survey respondents by county growing sugarbeet in 2019.

County	Number of Responses	Percent of Responses
Grant	2	18
Richland	1	9
Wilkin	8	73
Total	11	100

Table 5. 2020 Willmar Grower Seminar - Number of survey respondents by county growing sugarbeet in 2019.

County	Number of Responses	Percent of Responses
Chippewa	31	34
Kandiyohi	10	11
Redwood	3	3
Renville	29	32
Stevens	4	4
Swift	9	10
Other	5	6
Total	91	100

Table 6. Total sugarbeet acreage operated by respondents in 2019.

Location	Responses	Acres of sugarbeet									
		<99	100-199	200-299	300-399	400-599	600-799	800-999	1000-1499	1500-1999	2000+
		% of responses									
Fargo	32	17	9	9	6	25	9	6	3	3	13
Grafton	49	10	6	9	12	16	18	6	4	0	9
Grand Forks	66	9	6	6	5	26	15	6	17	9	1
Wahpeton	8	0	13	13	24	13	13	0	0	24	0
Willmar	90	8	10	14	12	16	20	3	12	4	1
Total	245	9	8	10	10	20	17	5	12	5	4

Table 7. Crop grown in 2018 that preceded sugarbeet in 2019.

Location	Responses	Previous Crop						
		Field Corn	Dry Bean	Potato	Soybean	Wheat	Sweet Corn	Other
		% of responses						
Fargo	32	3	0	0	16	78	3	0
Grafton	55	0	4	7	2	82	0	5
Grand Forks	66	0	2	2	4	92	0	0
Wahpeton	10	20	0	0	10	70	0	0
Willmar	90	72	1	0	15	1	10	1
Total	253	27	2	2	9	55	4	1

Table 8. Nurse or cover crop used in sugarbeet in 2019.

Location	Responses	Barley	Oat	Rye	Wheat	Other[1]	None
		% of responses					
Fargo	36	39	3	0	19	0	39
Grafton	52	33	8	0	17	0	42
Grand Forks	72	43	1	1	18	0	37
Wahpeton	10	50	0	0	50	0	0
Willmar	91	0	40	2	40	0	18
Total	261	26	16	1	27	0	30

[1]Includes Mustard and 'Other'

Table 9. Most serious production problem in sugarbeet in 2019.

Location	Responses	Aph[1]	CLS[2]	Stand[3]	Fusarium	Herbicide Injury	Rhizoc-tonia	Rhizo-mania	Insects	Weeds
		% of responses								
Fargo	39	5	28	5	8	0	21	2	0	31
Grafton	56	14	11	21	0	4	29	7	9	5
Grand Forks	62	3	18	35	0	2	21	0	10	11
Wahpeton	9	0	78	0	0	0	22	0	0	0
Willmar	96	3	37	5	2	1	29	1	0	22
Total	262	6	27	16	2	1	26	2	4	16

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

Table 10. Most serious weed problem in sugarbeet in 2019.

Location	Responses	colq[1]	cora	kochia	gira	rrpw	RR Canola	wahe
		----------% of responses----------						
Fargo	35	3	0	3	0	0	0	94
Grafton	54	24	15	28	2	15	7	9
Grand Forks	66	12	56	5	3	6	0	18
Wahpeton	10	0	0	0	0	10	10	80
Willmar	89	1	0	0	1	0	2	96
Total	254	9	18	7	2	5	3	56

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

Table 11. Average number of glyphosate applications per acre in sugarbeet during 2019 season.

Location	Responses	0	1	2	3	4	5
		----------% of responses----------					
Fargo	38	3	13	63	16	5	0
Grafton	50	0	12	66	22	0	0
Grand Forks	69	0	16	70	14	0	0
Wahpeton	9	0	0	44	56	0	0
Willmar	89	0	24	57	16	3	0
Total	255	<1	17	63	18	2	0

Table 12. Herbicides used in a weed control systems approach in sugarbeet in 2019.

		Glyphosate Application Tank-Mixes					
Location	Responses	Gly Alone	Gly+Lay-by	Gly+Broadleaf	Gly+Grass	Other	None Used
		----------% of responses----------					
Fargo	40	10	38	35	7	3	7
Grafton	54	70	7	19	2	0	2
Grand Forks	72	22	7	67	0	4	0
Wahpeton	13	0	61	23	8	8	0
Willmar	153	9	47	25	18	1	0
Total	332	22	31	34	10	2	1

Table 13. Satisfaction in weed control from glyphosate applied in sugarbeet in 2019.

		Satisfaction of Weed Control from Glyphosate					
Location	Responses	Excellent	Good	Fair	Poor	Unsure	Not Used Alone
		----------% of responses----------					
Fargo	37	5	22	38	8	3	24
Grafton	50	38	44	16	0	0	2
Grand Forks	68	23	46	9	0	0	22
Wahpeton	9	0	11	33	0	0	56
Total	164	23	38	19	2	<1	18

Table 14. Preplant incorporated or preemergence herbicides used in sugarbeet in 2019.

Location	Responses	PPI or PRE Herbicides Applied					
		S-metolachlor	ethofumesate	Ro-Neet SB	S-metolachor +ethofumesate	Other	None
		% of responses					
Fargo	38	39	13	3	3	3	39
Grafton	55	2	5	2	0	2	89
Grand Forks	67	9	0	0	0	9	82
Wahpeton	11	18	27	0	9	0	46
Willmar	92	33	28	0	13	2	24
Total	263	21	14	<1	5	4	56

Table 15. Satisfaction in weed control from preplant incorporated and preemergence herbicides in 2019.

Location	Responses	PPI or PRE Weed Control Satisfaction					
		Excellent	Good	Fair	Poor	Unsure	None Used
		% of responses					
Fargo	35	6	34	14	0	9	37
Grafton	51	2	4	2	0	0	92
Grand Forks	72	10	10	0	0	0	80
Wahpeton	10	40	20	10	0	0	30
Willmar	92	12	42	22	3	1	20
Total	260	10	24	10	1	2	53

Table 16. Soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2019.

Location	Responses	Lay-by Herbicides Applied				
		S-metolachlor	Outlook	Warrant	Other	None
		% of responses				
Fargo	38	58	10	3	3	26
Grafton	44	10	0	2	2	86
Grand Forks	64	16	1	0	0	83
Wahpeton	10	60	30	10	0	0
Willmar	93	4	65	27	0	4
Total	249	18	28	11	1	42

Table 17. Satisfaction of weed control from soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2019.

Location	Responses	Lay-by Weed Control Satisfaction					
		Excellent	Good	Fair	Poor	Unsure	None Used
		% of responses					
Fargo	35	6	57	9	3	11	14
Grafton	48	2	2	8	2	0	86
Grand Forks	64	8	8	2	0	2	80
Wahpeton	10	40	60	0	0	0	0
Willmar	90	16	57	21	2	0	4
Total	247	11	34	11	1	2	41

Table 18. Mechanical weed control methods used in sugarbeet in 2019.

Location	Responses	Rotary Hoe	Row-Cultivation	Hand-Weeded	Other	None
		----------% of responses----------				
Fargo	43	0	19	46	5	30
Grafton	51	2	10	31	2	55
Grand Forks	70	3	4	32	0	61
Wahpeton	10	0	10	20	0	70
Willmar	113	3	26	44	5	22
Total	287	2	16	38	4	40

Table 19. Percent of sugarbeet acres row-crop cultivated in 2019.

		% Acres Row-Cultivated				
Location	Responses	0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	36	69	28	3	0	0
Grafton	51	78	16	4	0	2
Grand Forks	67	81	19	0	0	0
Wahpeton	10	70	20	10	0	0
Willmar	86	63	9	8	8	12
Total	250	72	16	5	3	4

Table 20. Satisfaction of weed control from row-crop cultivation in sugarbeet in 2019.

		Cultivation Weed Control Satisfaction					
Location	Responses	Excellent	Good	Fair	Poor	Unsure	None Used
		----------% of responses----------					
Fargo	36	0	20	11	8	0	61
Grafton	50	0	12	4	0	6	78
Grand Forks	68	1	12	0	0	3	84
Wahpeton	10	20	0	10	0	0	70
Willmar	86	3	10	19	3	2	63
Total	250	2	12	9	1	3	72

Table 21. Percent of sugarbeet acres hand-weeded in 2019.

		% Acres Hand-Weeded				
Location	Responses	0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	35	26	51	17	3	3
Grafton	52	65	29	4	2	0
Grand Forks	71	68	31	1	0	0
Wahpeton	10	80	20	0	0	0
Willmar	88	32	24	27	9	8
Total	256	50	30	13	4	3