TURNING POINT SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2018

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The fourth annual weed control and production practices live polling questionnaire was conducted using Turning Point Technology at the 2019 winter Sugarbeet Grower Seminars. Responses are based on production practices from the 2018 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 193,050 acres reported by 277 respondents (Table 6) compared to 198,500 acres represented in 2017. The average sugarbeet acreage per respondent grown in 2018 was calculated from Table 6 at 697 acres compared to 634 acres in 2017.

Survey participants were asked a series of questions regarding their production practices used in sugarbeet in 2018. Fifty-four percent of respondents indicated wheat was the crop preceding sugarbeet (Table 7), 23% indicated corn, and 13% indicated soybean. Preceding crop varied by location with 84% of Grand Forks growers indicating wheat preceded sugarbeet and 73% of Willmar growers indicated corn as their preceding crop. Seventy-seven percent of growers who participated in the winter meetings used a nurse or cover crop in 2018 (Table 8) which increased from 74% in 2017. Cover crop species also varied widely by location with barley being used by 63% of growers at the Fargo meeting and oat being used by 46% of growers at the Willmar meeting.

Growers indicated Cercospora Leaf Spot (CLS) was their most serious production problem in sugarbeet in 2018 (Table 9) with 42% of all respondents naming CLS compared to Rhizoctonia being named most serious problem by 27% of participants in 2017. In 2018, Rhizoctonia was the most serious problem for 22% of respondents and weeds were named as most serious by 14% of respondents.

Waterhemp was named as the most serious weed problem in sugarbeet in 2018 by 54% of respondents (Table 10) compared to 48% in 2017. Six percent of respondents indicated common lambsquarters, 9% kochia, and 18% said common ragweed were their most serious weed problem in 2018. 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 91%, 90%, and 81% 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 46% of responses.

Respondents to the survey indicated making 0 to 5 glyphosate applications in their 2018 sugarbeet crop (Table 11) with a calculated average of 2.16 applications per acre. The calculated average in 2017 was 2.21 applications per acre.

Glyphosate was most commonly applied with a broadleaf herbicide postemergence in 2018 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 2018 with 30% of responses. Glyphosate alone and glyphosate plus a grass herbicide were the third and fourth most common at 24% and 8% of the responses.

Satisfaction to weed control from glyphosate applied alone is shown in Table 13 and ranged from 17% of responses indicating excellent control to 6% of responses indicating poor weed control. The majority of responses, 40%, indicated glyphosate was still providing good weed control in sugarbeet in 2018.

Preplant incorporated (PPI) or preemergence (PRE) herbicides were applied by 46% of survey respondents in 2018 (Table 14). Less than 10% of Grand Forks survey participants applied a PPI or PRE herbicide. Conversely, 89% of Wahpeton survey participants did apply a PPI or PRE herbicide in sugarbeet in 2018 compared to 83% in 2017. 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 to the north end of the Valley. The most commonly used soil herbicide was S-metolachlor with 25% of all responses followed by ethofumesate with 9% of responses (Table 14). Of the growers who indicated using a soil-applied herbicide, 67% indicated excellent to good weed control from that herbicide (calculated from Table 15).

The application of soil-residual herbicides applied 'lay-by' to the 2018 sugarbeet crop was indicated by 63% of respondents (Table 16). Outlook was the most commonly applied lay-by herbicide with 31% of responses. The majority of growers responding at the Willmar meeting indicated using Outlook (69% of responses), while S-metolachlor was more commonly applied by growers of the Wahpeton (68% of responses) and Fargo (64% of responses) meetings. Ninety-five percent, 95%, and 82% of Willmar, Wahpeton, and Fargo respondents, respectfully, applied glyphosate with Outlook, S-metolachlor, or Warrant but only 21% and 6% 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 glyhphosate-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, 73% indicated excellent or good weed control (calculated from Table 17).

Fifty-eight percent of survey respondents indicated using some form of mechanical weed control or hand labor in 2018 (Table 18). Of the responses given, 39% indicated at least some hand-weeding, 15% used row-cultivation, and 1% indicated using a rotary hoe for weed control in sugarbeet. Fifteen percent reported row-crop cultivation on less than ten percent of their acres (Table 19).

Hand-weeding the 2018 sugarbeet crop was reported by 54% of respondents (Table 20). 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. 2019 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2018.

County	Number of Responses	Percent of Responses
Becker	1	3
Cass	12	32
Clay	10	26
Norman[1]	12	32
Richland	2	4
Traill	1	3
Total	38	100

[1]Includes Mahnomen County

Table 2. 2019 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2018.

County	Number of Responses	Percent of Responses
Grand Forks	3	8
Kittson	5	13
Marshall	2	5
Pembina	13	33
Walsh	14	36
Other	2	5
Total	39	100

Table 3. 2019 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2018.

County	Number of Responses	Percent of Responses
Grand Forks	19	21
Mahnomen	1	1
Marshall	9	10
Pennington[1]	1	1
Polk	45	51
Traill	2	2
Walsh	4	5
Other	8	9
Total	89	100

[1]Includes Red Lake

Table 4. 2019 Wahpeton Grower Seminar - Number of survey respondents by county growing sugarbeet in 2018.

County	Number of Responses	Percent of Responses
Clay	3	10
Grant	4	13
Richland	6	20
Traverse	1	3
Wilkin	16	54
Total	30	100

Table 5. 2019 Willmar Grower Seminar - Number of survey respondents by county growing sugarbeet in 2018.

County	Number of Responses	Percent of Responses
Chippewa	27	33
Kandiyohi	8	10
Pope	1	1
Redwood	4	5
Renville	26	32
Stevens	5	6
Swift	6	8
Other	4	5
Total	81	100

Table 6. Total sugarbeet acreage operated by respondents in 2018.

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	36	6	6	8	2	28	17	6	8	11	8
Grafton	42	5	14	0	10	33	14	17	5	2	0
Grand Forks	83	11	7	5	4	16	20	7	17	8	5
Wahpeton	30	7	3	0	30	20	10	7	13	7	3
Willmar	82	7	12	10	6	17	18	4	15	10	1
Total	273	8	9	5	8	21	17	7	13	8	4

Table 7. Crop grown in 2017 that preceded sugarbeet in 2018.

Location	Responses	Previous Crop								
		Barley	Canola	Sweet Corn	Field Corn	Dry Bean	Potato	Soybean	Wheat	Other
		% of responses								
Fargo	37	11	0	0	0	0	0	22	67	0
Grafton	44	0	0	0	0	7	9	7	77	0
Grand Forks	86	3	0	0	1	3	6	3	84	0
Wahpeton	30	0	0	0	13	3	0	17	67	0
Willmar	82	0	0	5	73	1	0	20	0	1
Total	279	2	0	1	23	3	3	13	54	<1

Table 8. Nurse or cover crop used in sugarbeet in 2018.

Location	Responses	Barley	Oat	Rye	Wheat	Other[1]	None
		% of responses					
Fargo	38	63	3	0	8	0	26
Grafton	45	24	11	0	29	0	36
Grand Forks	93	44	0	1	25	0	30
Wahpeton	28	54	0	0	36	0	10
Willmar	83	2	46	3	37	0	12
Total	287	32	15	2	28	0	23

[1]Includes Mustard and 'Other'

Table 9. Most serious production problem in sugarbeet in 2018.

Location	Responses	CLS[1]	Rhizo-mania	Aph[2]	Rhizoc-tonia	Fusarium	Herbicide Injury	Root Maggot	Weeds	Stand[3]
		% of responses								
Fargo	38	26	0	5	32	0	3	0	26	8
Grafton	43	16	0	14	26	0	5	18	16	5
Grand Forks	84	32	2	8	24	1	1	4	16	12
Wahpeton	31	55	0	0	16	3	0	0	10	16
Willmar	82	68	1	3	16	0	0	0	7	5
Total	278	42	1	6	22	<1	1	4	14	9

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

Table 10. Most serious weed problem in sugarbeet in 2018.

Location	Responses	biww[1]	colq	cora	kochia	gira	rrpw	RR Canola	wahe
		----------% of responses----------							
Fargo	38	3	0	8	5	3	0	0	81
Grafton	46	2	13	11	21	2	20	11	20
Grand Forks	87	0	10	46	15	9	5	1	14
Wahpeton	29	0	0	7	3	0	0	0	90
Willmar	80	0	4	0	0	4	0	1	91
Total	280	<1	6	18	9	5	5	2	54

[1]biww=biennial wormwood, 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 2018 season.

Location	Responses	0	1	2	3	4	5
		----------% of responses----------					
Fargo	38	0	16	63	21	0	0
Grafton	43	0	7	65	28	0	0
Grand Forks	86	1	13	57	27	1	1
Wahpeton	30	0	10	57	33	0	0
Willmar	80	0	19	54	24	1	2
Total	277	<1	14	57	26	<1	1

Table 12. Herbicides used in a weed control systems approach in sugarbeet in 2018.

		Glyphosate Application Tank-Mixes					
Location	Responses	Gly Alone	Gly+Lay-by	Gly+Broadleaf	Gly+Grass	Other	None Used
		----------% of responses----------					
Fargo	37	19	35	38	5	3	0
Grafton	39	67	0	28	0	3	3
Grand Forks	83	33	2	57	1	5	2
Wahpeton	30	7	50	33	10	0	0
Willmar	79	3	65	10	19	3	1
Total	268	24	30	34	8	3	1

Table 13. Satisfaction in weed control from glyphosate applied in sugarbeet in 2018.

		Satisfaction of Weed Control from Glyphosate					
Location	Responses	Excellent	Good	Fair	Poor	Unsure	Not Used Alone
		----------% of responses----------					
Fargo	39	5	26	46	13	0	10
Grafton	41	37	56	7	0	0	0
Grand Forks	79	20	43	16	4	3	14
Wahpeton	30	0	30	23	10	0	37
Total	189	17	40	22	6	1	14

Table 14. Preplant incorporated or preemergence herbicides used in sugarbeet in 2018.

Location	Responses	PPI or PRE Herbicides Applied					
		S-metolachlor	ethofumesate	Ro-Neet SB	S-metolachor +ethofumesate	Other	None
		% of responses					
Fargo	40	50	8	0	2	5	35
Grafton	39	0	0	3	7	3	87
Grand Forks	82	6	0	0	0	1	93
Wahpeton	28	50	11	0	28	0	11
Willmar	82	36	22	1	6	12	23
Total	271	25	9	<1	6	5	54

Table 15. Satisfaction in weed control from preplant incorporated and preemergence herbicides in 2018.

Location	Responses	PPI or PRE Weed Control Satisfaction					
		Excellent	Good	Fair	Poor	Unsure	None Used
		% of responses					
Fargo	37	16	30	27	0	0	27
Grafton	40	2	5	8	0	2	83
Grand Forks	84	3	10	0	0	2	85
Wahpeton	31	3	70	10	7	3	7
Willmar	81	7	43	24	6	0	20
Total	273	6	29	13	3	1	48

Table 16. Soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2018.

Location	Responses	Lay-by Herbicides Applied				
		S-metolachlor	Outlook	Warrant	Other	None
		% of responses				
Fargo	62	64	13	3	2	18
Grafton	52	4	2	0	0	94
Grand Forks	94	7	12	1	1	79
Wahpeton	41	68	27	0	0	5
Willmar	123	6	69	20	0	5
Total	372	23	31	8	<1	38

Table 17. Satisfaction of weed control from soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2018.

Location	Responses	Lay-by Weed Control Satisfaction					
		Excellent	Good	Fair	Poor	Unsure	None Used
		% of responses					
Fargo	36	8	53	14	3	0	22
Grafton	39	5	0	5	0	0	90
Grand Forks	79	9	6	1	0	3	81
Wahpeton	30	3	77	10	7	0	3
Willmar	79	5	61	29	3	1	1
Total	263	7	36	13	2	1	41

Table 18. Mechanical weed control methods used in sugarbeet in 2018.

Location	Responses	Rotary Hoe	Row-Cultivation	Hand-Weeded	Other	None
		----------% of responses----------				
Fargo	44	0	18	46	0	36
Grafton	44	2	9	25	2	62
Grand Forks	92	1	3	29	6	61
Wahpeton	30	0	3	47	3	47
Willmar	102	1	29	49	2	19
Total	312	1	15	39	3	42

Table 19. Percent of sugarbeet acres row-crop cultivated in 2018.

		% Acres Row-Cultivated				
Location	Responses	0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	39	77	13	10	0	0
Grafton	41	85	12	3	0	0
Grand Forks	84	80	18	0	0	2
Wahpeton	30	74	20	3	0	3
Willmar	81	51	12	9	13	15
Total	275	71	15	5	4	5

Table 20. Percent of sugarbeet acres hand-weeded in 2018.

		% Acres Hand-Weeded				
Location	Responses	0	< 10	10-50	51-100	>100
		----------% of responses----------				
Fargo	39	33	54	13	0	0
Grafton	42	62	31	7	0	0
Grand Forks	85	56	36	4	4	0
Wahpeton	30	60	20	17	3	0
Willmar	82	28	23	32	4	13
Total	278	46	32	15	3	4