TURNING POINT SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2019

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The fifth annual fungicide practices live polling questionnaire was conducted using Turning Point Technology at the 2020 Winter Sugarbeet Growers' Seminars held during January and February 2020. Responses are based on production practices from the 2019 growing season. The survey focuses on responses from growers in attendance at the Fargo, Grafton, Wahpeton, ND and Willmar, MN Grower Seminars. Respondents from each seminar indicated the county in which the majority of their sugarbeets were produced (Table 1-5). The average sugarbeet acreage per respondent grown in 2019 was calculated from Table 6 at between 400 and 599 acres.

Survey respondents were asked about soilborne disease and control practices. Sixty-six percent said their fields were affected by Rhizoctonia, 11% said Aphanomyces was the biggest issue, 11% said they had issues with multiple disease including Rhizoctonia, Aphanomyces, Fusarium and Rhizomania, six percent said they had no soilborne disease issues and three percent each listed either Fusarium or Rhizomania as their biggest issue (Table 8). Additionally, participants were asked about the prevalence of Rhizoctonia in sugarbeet with which preceding crops. Sixty one percent of respondents said they saw more rhizoctonia when soybeans preceded their sugarbeet crop. Fourteen percent reported more Rhizoctonia following dry beans, 11% saw more Rhizoctonia following any crop, &% said field corn, 3% said potatoes, 2% each stated small grains or other as the crop preceding sugarbeets they saw the most Rhizoctonia develop and less than 1% said sweet corn (Table 9). Of the respondents to the question regarding whether a specialty variety was used for Rhizoctonia, 67% respondents said yes they did use a specialty variety for Rhizoctonia while 33% said no (Table 10).

Participants were asked what methods were used to control Rhizoctonia and 39% said they used a seed treatment only, 27% used a seed treatment and a POST fungicide, 22% used a seed treatment plus an in-furrow fungicide while 11% also said they used a seed treatment, in-furrow fungicide and a POST fungicide, and 1% said they used seed treatment, in-furrow and a double POST application (Table 11). Seventy eight percent of respondents used a Kabina seed treatment while 10% used Systiva, 6% used Metlock Suite + Kabina, 4% used Vibrance, and 2% used Metlock Suite and Vibrance (Table 12). Ninety percent used an in-furrow starter fertilizer and 10% did not (Table 13). Of the respondents who applied an in-furrow fungicide, 38% used Azteroid, 11% used Quadris or generic and 4% used other; 48% of respondents used no fungicide in-furrow (Table 14).

Respondents were asked what POST fungicides were used to control Rhizoctonia and 44% did not use a POST fungicide to control Rhizoctonia. Forty two percent used Quadris or generic, 10% used Proline, 2% used Priaxor, 2% used Azteroid and 1% used other (Table 15). Participants were then asked to grade the effectiveness of the POST fungicides that were used. Thirty nine percent were unsure of their results, 37% said they had good results, 16% reported fair results, 7% said the fungicides performed excellently and 1% said they performed poorly (Table 16). Respondents were also asked how they applied POST fungicide and 57% stated they used a broadcast application and 43% used a band application (Table 17).

Participants were also asked about use of waste lime to control Aphanomyces. Seventy one percent of participants did not use waste lime in their fields while 19% used between 5 and 10 tons/acre while 10% used less than 5 tons/acre (Table 18). Respondents were also asked about their soil pH. Forty one percent said it was between 8.0 and

8.5, 33% said between 7.5 and 8.0, 18% between 7.0 and 7.5, 7% between 6.5 and 7.0, 1% said between 6.0 and 6.5 and another 1% said between 8.5 and 9.0 (Table 19). The growers were asked how effective their waste lime application was. Sixty seven percent of respondents did not apply lime, 15% said they had good results, 9% said excellent, 6% were unsure, 2% reported fair results and 1% said poor (Table 20).

One of the survey questions also asked if growers had used a specialty variety for Aphanomyces in 2019. Fifty eight percent of respondents said yes and 42% said no (Table 21).

Survey participants were then asked a series of questions regarding their CLS fungicide practices on sugarbeet in 2019. Twenty-five percent said that they used 4 sprays to control CLS, 19% used three applications, 16% used two applications, 14% used five applications, 11% used six applications, 8% used one application, 6% used seven applications, 1% applied more than seven application and less than 1% applied no CLS applications (Table 22). Respondents were then asked about the effectiveness of their CLS sprays. Sixty percent said they had good results, 22% said they had excellent results, 13% reported fair results, 3% reported poor results, 1% of respondents were unsure and less than 1% had no CLS applications (Table 23).

Respondents were asked about when their CLS application started and ended. Forty percent of participants said that they began their applications between July 1 and 10, 32% said it started between July 11 and 20, 16% said it was between July 21 and 31, 6% said before July 1, 6% said that CLS sprays started between August 1 and 10 and 1% said after August 10 (Table 24). Fifty two percent of respondents said that their last CLS spray was between September 1 and 10, 22% said between August 21 and 31, 16% said between September 11 and 20, 4% said they only made one or zero CLS applications, 2% said after September 20, 2% said between August 11 and 20, 2% said between August 1-10 and >1% before August 1 (Table 25).

Of the total fungicide applications for CLS, 52% did not use an aerial applicator, 30% used an aerial applicator for 1-20% of their applications, 8% used an aerial applicator for 21-40% of their fungicide applications, 5% said they used an aerial applicator for 100% of applications, 4% fell in the 41-60% range, 1% in the 61-80% range, and <1% in the 81-99% range (Table 26).

Regarding water usage in gallons per acre as applied by tractor, 49% of respondents used 16-20 gallons per acre, 36% used 11-15 gallons per acre, 10% used more than 20 gallons per acre, 4% used 6-10 gallons per acre and 1% used 1-5 gallons per acre (Table 27).

Fifty seven percent of survey respondents made 100% of their CLS applications by ground application. Nineteen percent made 81-99% of their application from the ground, another 10% made between 61 and 80% from the ground. Seven percent made between 41 and 60 percent of their CLS applications from the ground, five percent had all of their application made by air, two percent had between 21 and 40% of their applications made on the ground and 1% had between 1 and 20% of their applications made by ground application rig (Table 28). Survey respondents were also asked if they used mixtures in all of their CLS applications. Eighty seven percent said they used mixtures for all of their applications and 13% said they did not (Table 29).

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

County	Number of Responses	Percent of Responses
Barnes	-	-
Becker	1	3
Cass	4	11
Clay	15	42
Norman[1]	10	28
Ransom	-	-
Richland	1	3
Steele	-	0
Trail	4	11
Wilkin[2]	1	3
Total	36	101

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

County	Number of Responses	Percent of Responses
Cavalier	-	-
Grand Forks	-	-
Kittson	10	20
Marshall	2	4
Nelson	-	-
Pembina	14	27
Polk	4	8
Ramsey	-	-
Walsh	21	41
Other	-	-
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
Mahnomen	-	-
Marshall	11	16
Nelson	-	-
Pennington/Red Lake	-	-
Polk	36	54
Steele	-	-
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
Cass	-	-
Clay	-	-
Grant	2	18
Otter Tail	-	-
Ransom	-	-
Richland	1	9
Roberts	-	-
Stevens	-	-
Traverse	-	-
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
Pope	-	-
Redwood	3	3
Renville	29	32
Stearns	-	-
Stevens	4	4
Swift	9	10
Other	5	6
Total	91	100

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

		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	32	16	9	9	6	25	9	6	3	3	13
Grafton	49	10	6	8	12	16	19	6	14	-	8
Grand Forks	66	9	6	6	5	26	15	6	17	9	2
Wahpeton	8	-	12	13	25	13	13	-	-	25	-
Willmar	90	8	10	13	12	16	20	3	12	4	1
Total	247	9	8	10	10	20	17	5	12	5	4

Table 7. What crop preceded most of your sugarbeet acres?

Location	Respondents	Corn	Sweet Corn	Soybean	Dry edible beans	Potatoes	wheat	other
			----------% respondents----------					
Fargo	32	3	3	16	-	-	78	-
Grafton	55	-	-	2	4	7	82	5
Grand Forks	66	-	-	5	2	2	92	-
Wahpeton	10	20	-	10	-	-	70	-
Willmar	90	72	10	14	1	-	1	1
Total	253	27	4	9	2	2	55	2

Table 8. What soil-borne diseases affected your sugarbeet production in 2019?

		Root disease					
Location	Respondents	Rhizoctonia	Aphanomyces	Fusarium	Rhizomania	All	Neither
		----------% of respondents----------					
Fargo	33	45	9	6	-	24	15
Grafton	49	90	10	-	-	-	-
Grand Forks	69	59	16	-	3	16	6
Wahpeton	10	80	10	-	-	10	-
Willmar	88	64	9	6	6	9	7
Total	249	66	11	3	3	11	6

Table 9. With which of the preceeding crops do you see more Rhizoctonia in sugarbeet? **

Location	Respondents	Field Corn	Sweet Corn	Soybean	Dry edible beans	Potatoes	Small grains	other	Any crop
				----------% respondents----------					
Fargo	27	7	-	81	4	-	4	-	4
Grafton	49	-	-	47	27	12	4	2	8
Grand Forks	58	3	-	53	21	2	2	5	14
Wahpeton	8	13	-	75	-	-	-	-	13
Willmar	77	14	1	66	5	-	-	-	13
Total	219	7	<1	61	14	3	2	2	11

Table 10. Have you used a specialty variety for Rhizoctonia in 2019?

Location	Respondents	Yes	No
		----------% respondents----------	
Fargo	34	71	29
Grafton	49	67	33
Grand Forks	67	61	39
Wahpeton	10	50	50
Wilmar	87	72	28
Total	247	67	33

Table 11. What methods were used to control *Rhizoctonia solani* in 2019?

Location	Respondents	Seed Treatment Only	Seed Treatment + In-Furrow	Seed Treatment + POST	Seed Treatment + In-Furrow + POST	Seed Treatment + In-Furrow + 2x Post
			----------% respondents----------			
Fargo	32	38	31	28	3	-
Grafton	50	20	22	30	26	2
Grand Forks	65	32	26	34	5	3
Wahpeton	10	100	-	-	-	-
Willmar	88	48	19	23	10	-
Total	245	39	22	27	11	1

Table 12. Which seed treatment did you use to control Rhizoctonia solani in 2019?

		Seed treatment				
Location	Respondents	Kabina	Metlock Suite + Kabina	Vibrance	Systiva	Metlock Suite + Vibrance
		----------% of respondents----------				
Fargo	30	79	6	2	11	2
Grafton	48	75	2	6	15	2
Grand Forks	63	79	6	2	11	2
Wahpeton	10	80	10	10	-	-
Total	151	78	6	4	10	2

Table 13. Did you apply any in-furrow starter fertilizer in 2019?

Location	Respondents	Variety type	
		Yes	No
		----------% respondents----------	
Fargo	35	94	6
Grafton	49	88	12
Grand Forks	70	97	3
Wahpeton	10	30	70
Total	164	90	10

Table 14. Which fungicide did you apply in-furrow to control R. solani in 2019?

Location	Respondents	In-furrow fungicide use			
		AZteroid	Quadris or generic	Other	None
		----------% of respondents----------			
Fargo	33	30	15	-	55
Grafton	51	65	10	-	25
Grand Forks	69	49	7	6	38
Wahpeton	10	-	-	-	100
Willmar	87	20	14	6	61
Total	250	38	11	4	48

Table 15. Which POST fungicide did you use to control R. solani in 2019?

Location	Respondents	POST fungicide					
		AZteroid	Quadris or Generic	Proline	Priaxor	Other	None
		----------% of respondents----------					
Fargo	33	-	39	3	3	3	52
Grafton	53	4	57	15	2	-	23
Grand Forks	68	4	50	6	-	-	40
Wahpeton	10	-	-	10	-	-	90
Willmar	86	-	30	14	2	1	52
Total	250	2	42	10	2	1	44

Table 16. How effective were your POST fungicides at controlling Rhizoctonia solani in 2019?

Location	Respondents	Effectiveness of fungicides				
		Excellent	Good	Fair	Poor	Unsure
		----------% of respondents----------				
Fargo	29	7	24	31	-	38
Grafton	48	6	54	25	-	15
Grand Forks	63	13	46	2	-	40
Wahpeton	8	-	-	13	-	88
Willmar	78	3	27	18	3	50
Total	226	7	37	16	1	39

Table 17. How did you apply POST fungicide for controlling Rhizoctonia Solani?

Location	Respondents	Band	Broadcast
		----------% of respondents----------	
Fargo	27	41	59
Grafton	45	20	80
Grand Forks	54	56	44
Wahpeton	1	-	100
Willmar	54	52	48
Total	181	43	57

Table 18. What rate of precipitated calcium carbonate (waste lime) did you use in 2019?

Location	Respondents	Lime use rate		
		None	<5 T/A	5-10 T/A
		----------% of respondents----------		
Fargo	36	61	3	36
Grafton	52	75	-	25
Grand Forks	69	77	-	23
Wahpeton	9	44	-	56
Willmar	88	70	27	2
Total	254	71	10	19

Table 19. What is your soil pH?

Location	Respondents	Soil pH					
		6.0-6.5	6.5-7.0	7.0-7.5	7.5-8.0	8.0-8.5	8.5-9.0
		----------% of respondents----------					
Fargo	36	-	3	8	47	42	-
Grafton	51	-	12	27	22	35	4
Grand Forks	68	3	4	15	34	44	-
Wahpeton	10	-	10	20	30	40	-
Total	165	1	7	18	33	41	1

Table 20. How effective was waste lime at controlling Aphanomyces in 2019?

Location	Respondents	Waste lime effectiveness					
		Excellent	Good	Fair	Poor	Unsure	No Lime
		----------% of respondents----------					
Fargo	36	11	25	-	-	6	58
Grafton	52	13	8	4	-	4	71
Grand Forks	67	9	12	1	-	4	73
Wahpeton	10	40	20	-	-	10	30
Wilmar	87	2	18	3	2	7	67
Total	252	9	15	2	1	6	67

Table 21. Did you use a specialty variety for Aphanomyces in 2019?

Location	Respondents	Variety type	
		Yes	No
		----------% respondents----------	
Fargo	34	56	44
Grafton	47	49	51
Grand Forks	66	47	53
Wahpeton	10	30	70
Willmar	87	30	70
Total	244	42	58

Table 22. How many fungicide applications did you make to control CLS in 2019?

Location	Respondents	Number of applications								
		0	1	2	3	4	5	6	7	>7
		----------% of respondents----------								
Fargo	39	-	-	5	23	56	13	3	-	-
Grafton	47	2	28	47	21	2	-	-	-	-
Grand Forks	70	-	11	22	34	31	1	-	-	-
Wahpeton	10	-	-	-	-	30	50	20	-	-
Willmar	87	-	-	1	6	17	28	30	16	2
Total	253	0	8	16	19	25	14	11	6	1

Table 23. How effective were your fungicide applications on CLS in 2019?

Location	Respondents	Effectiveness of CLS sprays					
		Excellent	Good	Fair	Poor	Unsure	No applications
		----------% of respondents----------					
Fargo	40	13	75	10	3	-	-
Grafton	51	25	57	14	-	2	2
Grand Forks	71	31	62	6	-	1	-
Wahpeton	10	10	20	60	10	-	-
Willmar	83	18	59	14	7	1	-
Total	255	22	60	13	3	1	0

Table 24. What date was your first CLS application?

Location	Respondents	Date of first CLS application					
		Before July 1	July 1-10	July 11-20	July 21-31	August 1-10	After August 10
		----------% of respondents----------					
Fargo	36	3	47	39	8	3	-
Grafton	51	-	14	31	31	20	4
Grand Forks	68	-	12	57	28	3	-
Wahpeton	10	-	80	20	-	-	-
Willmar	85	15	69	11	1	2	1
Total	250	6	40	32	16	6	1

Table 25. What date was your last CLS application in 2019?

		Date of last CLS application							
Location	Respondents	Before August 1	August 1-10	August 11-20	August 21-31	Sept 1-10	Sept 11-20	Later than Sept 20	Made zero or 1 CLS applications
		----------% of respondents----------							
Fargo	38	-	-	-	26	55	16	3	-
Grafton	49	2	6	-	27	47	4	2	12
Grand Forks	69	-	1	3	26	55	12	-	3
Wahpeton	10	-	-	-	10	50	40	-	-
Willmar	86	-	-	4	16	52	23	4	1
Total	252	0	2	2	22	52	16	2	4

Table 26. What percent of total fungicide applications for CLS were sprayed by an aerial applicator?

		Percentages						
Location	Respondents	0%	1-20%	21-40%	41-60%	61-80%	81-99%	100%
		----------% of respondents----------						
Fargo	38	29	34	26	5	3	-	3
Grafton	50	78	8	-	2	2	-	10
Grand Forks	68	56	26	4	6	-	-	7
Wahpeton	10	60	30	10	-	-	-	-
Willmar	88	44	43	8	2	-	1	1
Total	254	52	30	8	4	1	0	5

Table 27. How many gallons of water per acre did you use to apply CLS fungicides by tractor? **

		Gallons per acre				
Location	Respondents	1-5	6-10	11-15	16-20	20+
		----------% of respondents----------				
Fargo	38	-	-	63	32	5
Grafton	48	2	13	46	38	2
Grand Forks	68	3	7	54	32	3
Wahpeton	10	-	-	20	80	-
Willmar	86	-	-	5	72	23
Total	250	1	4	36	49	10

Table 28. What percent of total fungicide applications for CLS were made by ground application?

		Percentages						
Location	Respondents	0%	1-20%	21-40%	41-60%	61-80%	81-99%	100%
		----------% of respondents----------						
Fargo	38	3	3	8	13	16	21	37
Grafton	50	8	-	-	2	2	10	78
Grand Forks	69	6	-	-	7	13	19	55
Wahpeton	10	-	-	-	-	10	50	40
Total	167	5	1	2	7	10	19	57

Table 29. Did you use fungicide mixtures for all of your CLS applications?

Location	Respondents	Yes	No
		----------% respondents----------	
Fargo	36	86	14
Grafton	49	82	18
Grand Forks	66	94	6
Wahpeton	9	100	-
Wilmar	88	84	16
Total	248	87	13