

TURNING POINT SURVEY OF FUNGICIDE USE IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2017

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The ~~third~~^{second} annual fungicide practices live polling questionnaire was conducted using Turning Point Technology at the 2018 Winter Sugarbeet Growers' Seminars. Responses are based on production practices from the 2017 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 each seminar indicated the county in which the majority of their sugarbeets were produced (Tables 1- 5). The average sugarbeet acreage per respondent grown in 2017 was calculated from Table 6 at between 400 and 599 acres.

Survey participants were asked about soil-borne diseases and control practices. Seventy eight percent ~~percent~~ said their fields were affected by ~~R~~hizoctonia, 8% said they had no soil borne disease issues, 7% said Aphanomyces was the biggest issues, 6% said they had issues with multiple diseases including Rhizoctonia, Aphanomyces, Fusarium and Rhizomania and 1% each listed either Fusarium or Rhizomania as their biggest issue (Table 7).

Participants were asked what methods were used to control ~~R~~hizoctonia and 52% said they used a seed treatment only, 41% used a seed treatment and a POST fungicide, 4% used a seed treatment plus an in-furrow fungicide while 4% also said they used a seed treatment, in-furrow fungicide and a POST fungicide (Table 8). Seventy one percent of respondents used a Kabina seed treatment while 14% used a Rizolex + Metlock + Kabina mixture, 8% used a Systiva seed treatment, 4% used a Vibrance seed treatment and 3% reported using no seed treatment to control rhizoctonia (Table 9). Seventy seven percent of respondents did not use an in-furrow fungicide but 18% of respondents used Quadris (or generic) in-furrow, 1% used Headline (or generic) in-furrow to control ~~R~~hizoctonia and 5% used a different fungicide (Table 10).

Respondents were asked what POST fungicides were used to control ~~R~~hizoctonia and ~~the plurality~~, 41%, did not use a POST fungicide to control ~~R~~hizoctonia. Of the remaining 59%, 47% used Quadris, 6% used Proline, 3% used Priaxor, 1% used Headline while 1% used a different fungicide (Table 11). Participants were then asked to grade the effectiveness of the POST fungicides that were used. Thirty nine percent said they received good results, 36% said they were unsure of their results, 11% reported excellent results, another 11% said the fungicides performed fair and 3% said they performed poorly (Table 12).

Growers were asked if they applied any type of in-furrow starter fertilizer. Eighty two percent of respondents said that they did apply in-furrow starter fertilizer while 18% did not (Table 13).

Participants were also asked about use of waste lime to control ~~A~~aphanomyces. Sixty six percent of participants did not use waste lime in their fields while 22% used between 6 and 10 tons/acre while 13% used less than 5 tons/acre (Table 14). Respondents were also asked about their soil pH. Forty percent said it was between 7.5 and 8.0, 34% said between 8.0 and 8.5, 15% between 7.0 and 7.5, 7% between 6.5 and 7.0 2% said between 6.0 and 6.5 and another 2% said between 8.5 and 9.0 (Table 15). As a follow-up question, growers were asked whether or not they were concerned about using waste lime on soils above 8.0 pH. Seventy seven percent said no while the remaining 23% said they were concerned (Table 16). Finally, the growers were asked how effective their waste lime was. Fifty seven percent of respondents did not apply lime, 17% said they had good results, 16% said excellent, 6% were unsure and 3% reported fair results (Table 17).

Survey participants were then asked a series of questions regarding their CLS fungicide practices on sugarbeet in 2017. Twenty percent said that they used 5 sprays to control CLS, 19% used four applications, 18% used three applications, 15% used two applications, 12% used six applications, 7% used seven applications, 6% used one

application, 2% did not use a CLS application and 1% applied more than seven CLS applications (Table 18). Respondents were then asked about the effectiveness of their CLS sprays. Fifty four percent said they had good results, 34% said they had excellent results, 10% reported fair results, 2% were unsure and 1% said they had poor results (Table 19). Participants were then asked if they experienced field failure and what date that occurred. Seventy six percent said they did not experience field failure, 8% said it occurred around August 31, 6% said September 15, 4% said September 30, 3% said August 15, 2% said after September 30 and 1% said July 31 (Table 20).

Respondents were asked about when their CLS application started and ended. Forty six percent of participants said that they began their applications between July 1 and 10, 22% said it started between July 11 and 20, 16% said it was between July 21 and 31, 10% said before July 1, 4% said that CLS sprays started between August 1 and 10 and 1% said after August 10 (Table 21). Forty nine percent of respondents said that their last CLS spray was between September 1 and 10, 23% said between August 21 and 31, 20% said between September 11 and 20, 6% said between August 11 and 20, 2% said after September 20 and 1% said they only made one or zero CLS applications (Table 22).

Participants were then asked about their specific fungicide use to control CLS. Sixty two percent of growers said that their first application was Tin + Topsin, 17% said EBDC + Triazole, Tin + Triazole, 5% said Tin + QOI, 4% said they used a single chemistry application, 3% said Triazole + QOI and 1% said EBDC + QOI. (Table 23). For the second application, 40% of respondents said they used Tin + Topsin, 34% said EBDC + Triazole, 8% said Tin + QOI, 5% said Tin + Triazole, 4% used a single chemistry application, 3% said Triazole + QOI and 2% each said EBDC + QOI, EPDC + Copper and Other while 1% said they sprayed Triazole + Copper for the second application (Table 24). For the third application, 19% said EBDC + Triazole, 15% said a single chemistry application, 13% said Tin + QOI, 12% said Tin + Triazole and EBDC + QOI, 11% said EBDC + Copper, 6% said Triazole + QOI, 4% said Triazole + Copper as well as Other and 3% used Tin + Topsin for the third CLS application in 2018 (Table 25). For the fourth application, 24% applied Tin + Topsin, 15% used Tin + Triazole, 14% used a single chemistry application, 11% used an EBDC + Triazole, 8% used an EBDC + QOI, 7% used Tin + QOI and Other, 6% said they used Triazole + QOI, 4% used EBDC + Copper and 3% used Triazole + Copper for the fourth application (Table 26). For the fifth application in 2017, 28% used a single chemistry application, 20% used Tin + Topsin, 15% used an EBDC + QOI, 13% used EBDC + Copper, 8% used Tin + QOI and Triazole + Copper and 5% each used Tin + Triazole and Triazole + QOI (Table 27). For the sixth application, 64% of used a single chemistry application and 7% used Tin + Topsin, EBDC + QOI, EBDC + Copper, Triazole + QOI and Triazole + Copper (Table 28). For the seventh application in 2017, 44% of respondents used a single chemistry application, 22% used Triazole + QOI and 11% each used Tin + Topsin, Tin + Triazole and Triazole + Copper in 2017 (Table 29).

Table 1. 2018 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2017.

County	Number of Responses	Percent of Responses
Barnes	-	-
Becker	2	4
Cass	7	14
Clay	11	23
Norman ¹	22	45
Ransom	-	-
Richland	1	2
Steele	1	2
Trail	4	8
Wilkin ²	1	2
Total	34	100

¹Includes Mahnomon County

²Includes Otter Tail County

Table 2. 2018 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2017.

County	Number of Responses	Percent of Responses
Cavalier	-	-
Grand Forks	5	8
Kittson	7	12
Marshall	5	8
Nelson	-	-
Pembina	16	27
Polk	1	2
Ramsey	1	2
Walsh	25	42
Other	-	-
Total	60	100

Table 3. 2018 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2017.

County	Number of Responses	Percent of Responses
Grand Forks	23	28
Mahnomen	1	1
Marshall	10	12
Nelson	-	-
Pennington/Red Lake	-	-
Polk	35	43
Steele	-	-
Traill	4	5
Walsh	3	4
Other	5	6
Total	81	100

Table 4. 2018 Wahpeton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2017.

County	Number of Responses	Percent of Responses
Cass	-	-
Clay	2	5
Grant	5	12
Otter Tail	-	-
Ransom	-	-
Richland	10	24
Roberts	-	-
Stevens	-	-
Traverse	2	5
Wilkin	22	54
Total	41	100

Table 5. 2018 Willmar Grower Seminar - Number of survey respondents by county growing sugarbeet in 2017.

County	Number of Responses	Percent of Responses
Chippewa	34	34
Kandiyohi	15	15
Pope	-	-
Redwood	5	5
Renville	31	31
Stearns	-	-
Stevens	4	4
Swift	7	7
Other	4	4
Total	100	100

Table 6. Total sugarbeet acreage operated by respondents in 2017.

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	46	4	4	4	22	20	15	9	9	7	7
Grafton	56	4	14	7	20	23	14	5	7	4	2
Grand Forks	72	6	8	10	14	22	13	11	10	1	6
Wahpeton	40	-	13	13	15	15	13	18	10	3	3
Willmar	99	1	12	13	8	24	17	5	13	4	2
Total	313	3	11	10	14	22	15	9	10	4	4

Table 7. What soil-borne diseases affected your sugarbeet production in 2017?

Location	Respondents	Root disease					
		Rhizoctonia	Aphanomyces	Fusarium	Rhizomania	All	Neither
		-----% of respondents-----					
Fargo	47	70	11	-	-	13	6
Grafton	54	72	15	-	6	-	7
Grand Forks	79	85	3	1	-	5	6
Wahpeton	44	82	5	-	-	5	9
Willmar	101	76	6	1	-	6	11
Total	325	78	7	1	1	6	8

Table 8. What methods were used to control *Rhizoctonia solani* in 2017?

Location	Respondents	Seed Treatment Only	Seed Treatment + In-Furrow	Seed Treatment + POST	Seed Treatment + In-Furrow + POST
		-----% respondents-----			
Fargo	44	57	2	36	5
Grafton	54	28	6	61	6
Grand Forks	81	42	6	47	5
Wahpeton	45	82	4	13	-
Willmar	100	56	1	40	3
Total	324	52	4	41	4

Table 9. Which seed treatment did you use to control *Rhizoctonia solani* in 2017?

Location	Respondents	Seed treatment				
		Kabina	Rizolex + Metlock + Kabina	Vibrance	Systiva	None
-----% of respondents-----						
Fargo	40	83	13	-	3	3
Grafton	53	60	13	8	13	6
Grand Forks	80	65	20	4	10	1
Wahpeton	41	88	5	2	2	2
Total	214	71	14	4	8	3

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Table 10. Which fungicide did you apply in-furrow to control *R. solani* in 2017?

Location	Respondents	In-furrow fungicide use			
		Headline or generic	Quadris or generic	Other	None
-----% of respondents-----					
Fargo	45	2	7	2	89
Grafton	53	-	15	4	81
Grand Forks	74	4	10	-	87
Wahpeton	42	-	2	-	98
Willmar	96	4	13	1	82
Total	310	1	18	5	77

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Table 11. Which POST fungicide did you use to control *R. solani* in 2017?

Location	Respondents	POST fungicide				
		Headline	Quadris	Proline	Priaxor	Other
-----% of respondents-----						
Fargo	43	2	54	2	7	2
Grafton	51	-	71	2	6	-
Grand Forks	79	1	62	5	3	1
Wahpeton	42	5	12	5	-	2
Willmar	99	-	36	10	2	-
Total	314	1	47	6	3	1

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Table 12. How effective were your POST fungicides at controlling *Rhizoctonia solani* in 2017?

Location	Respondents	Effectiveness of fungicides				
		Excellent	Good	Fair	Poor	Unsure
-----% of respondents-----						
Fargo	36	3	58	8	8	22
Grafton	50	14	60	14	-	12
Grand Forks	64	28	45	6	2	19
Wahpeton	32	6	3	19	3	69
Willmar	91	2	28	12	2	56
Total	273	11	39	11	3	36

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Table 13. Did you apply any in-furrow starter fertilizer in 2017?

Location	Respondents	Variety type	
		Yes	No
		-----% respondents-----	
Fargo	45	91	9
Grafton	56	79	21
Grand Forks	83	89	11
Wahpeton	45	51	49
Willmar	101	86	14
Total	330	82	18

Table 14. What rate of precipitated calcium carbonate (waste lime) did you use in 2017?

Location	Respondents	Lime use rate		
		None	>5 T/A	6-10 T/A
		-----% of respondents-----		
Fargo	42	67	2	31
Grafton	50	70	-	30
Grand Forks	80	86	-	14
Wahpeton	45	36	16	49
Willmar	102	60	31	9
Total	319	66	13	22

Table 15. 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	45	2	2	16	40	38	2
Grafton	50	2	16	16	34	30	2
Grand Forks	79	3	6	11	35	42	3
Wahpeton	42	-	2	19	57	21	-
Total	216	2	7	15	40	34	2

Table 16. Are you concerned about using waste lime on pH soils above 8.0?

Location	Respondents	Safety concerns	
		Yes	No
		-----% respondents-----	
Fargo	43	40	61
Grafton	51	26	75
Grand Forks	72	19	81
Wahpeotn	43	12	88
Total	209	23	77

Table 17. How effective was waste lime at controlling *Aphanomyces* in 2017?

Location	Respondents	Waste lime effectiveness					
		Excellent	Good	Fair	Poor	Unsure	No Lime
		-----% of respondents-----					
Fargo	47	13	17	2	-	9	60
Grafton	50	12	16	2	-	6	64

Grand Forks	76	11	9	1	-	3	76
Wahpeton	43	35	33	9	-	9	14
Total	216	16	17	3	0	6	57

Table 18. How many fungicide application did you make to control CLS in 2017?

Location	Respondents	Number of applications								
		0	1	2	3	4	5	6	7	>7
		-----% of respondents-----								
Fargo	46	2	2	22	33	28	7	4	-	2
Grafton	55	4	18	42	36	-	-	-	-	-
Grand Forks	80	1	9	19	25	36	8	3	-	-
Wahpeton	46	-	-	2	9	26	59	4	-	-
Willmar	98	1	-	-	-	7	31	35	24	3
Total	325	2	6	15	18	19	20	12	7	1

Table 19. How effective were your fungicide applications on CLS in 2017?

Location	Respondents	Effectiveness of CLS sprays					No applications
		Excellent	Good	Fair	Poor	Unsure	
		-----% of respondents-----					
Fargo	43	35	54	9	-	-	2
Grafton	54	41	56	-	-	4	-
Grand Forks	79	71	27	1	-	1	-
Wahpeton	46	4	80	13	-	2	-
Willmar	99	14	62	20	3	1	-
Total	321	34	54	10	1	2	0

Table 20. When did you experience failure of fungicides to control CLS in 2017?

Location	Respondents	Date of fungicide failure						
		No failure	July 31	August 15	August 31	September 15	September 30	After September 30
		-----% of respondents-----						
Fargo	42	98	-	-	-	-	-	2
Grafton	50	100	-	-	-	-	-	-
Grand Forks	76	99	-	-	-	-	1	-
Wahpeton	46	70	2	4	11	7	4	2
Willmar	94	39	3	6	22	16	9	4
Total	308	76	1	3	8	6	4	2

Table 21. 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	45	2	24	36	33	2	2
Grafton	52	-	14	29	42	15	-
Grand Forks	78	1	47	28	17	5	1
Wahpeton	46	9	72	17	-	-	2
Willmar	98	28	61	10	1	-	-
Total	319	10	46	22	16	4	1

Table 22. What date was your last CLS application in 2017?

Location	Respondents	Date of last CLS application							Later than Sept 20	Made zero or 1 CLS applications
		Before August 1	August 1-10	August 11-20	August 21-31	Sept 1-10	Sept 11-20	Sept 20		
		-----% of respondents-----								
Fargo	43	-	-	5	35	47	12	2	-	
Grafton	52	-	-	14	23	54	8	-	2	
Grand Forks	76	-	1	5	28	50	9	3	4	
Wahpeton	41	-	-	-	37	51	12	-	-	
Willmar	96	-	-	4	7	45	42	2	-	
Total	308	0	0	6	23	49	20	2	1	

Table 23. What fungicides did you apply with your first CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	EBDC + QOI	Triazole	Tin + Triazole	EBD C + QOI	EBD C + Copper	Triazole + QOI	Triazole + Copper	Single Chemistry	Other
		-----% of respondents-----									
Fargo	38	40	-	34	11	-	-	3	-	11	3
Grafton	48	69	4	6	8	2	2	8	-	-	-
Grand Forks	73	51	11	26	5	1	-	1	-	4	-
Wahpeton	42	93	2	-	-	-	-	-	2	2	-
Total	201	62	5	17	6	1	0	3	0	4	0

Table 24. What fungicides did you apply with your second CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	EBDC + QOI	Triazole	Tin + Triazole	EBD C + QOI	EBD C + Copper	Triazole + QOI	Triazole + Copper	Single Chemistry	Other
		-----% of respondents-----									
Fargo	36	58	3	22	6	-	-	3	3	6	-
Grafton	42	45	14	17	7	7	-	2	-	7	-
Grand Forks	67	49	3	31	3	2	3	3	2	2	3
Wahpeton	40	3	13	65	5	-	5	3	-	5	3
Total	185	40	8	34	5	2	2	3	1	4	2

Table 25. What fungicides did you apply with your third CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	Tin + QOI	EBDC + Triazole	Tin + Triazole	EBD C + QOI	EBD C + Copper	Triazole + QOI	Triazole + Copper	Single Chemist ry	Other
-----% of respondents-----											
Fargo	36	3	8	31	14	8	3	6	3	25	-
Grafton	33	-	24	9	3	9	3	9	-	36	6
Grand Forks	57	7	16	23	21	18	-	7	2	4	4
Wahpeton	35	-	3	9	6	11	46	3	11	3	9
Total	161	3	13	19	12	12	11	6	4	15	4

Table 26. What fungicides did you apply with your fourth CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	Tin + QOI	EBDC + Triazole	Tin + Triazole	EBD C + QOI	EBD C + Copper	Triazole + QOI	Triazole + Copper	Single Chemist ry	Other
-----% of respondents-----											
Fargo	19	11	5	5	5	5	5	21	5	37	-
Grafton	1	-	-	-	-	100	-	-	-	-	-
Grand Forks	41	5	15	15	20	12	2	2	-	17	12
Wahpeton	38	53	-	11	16	3	5	3	5	-	5
Total	99	24	7	11	15	8	4	6	3	14	7

Table 27. What fungicides did you apply with your fifth CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	Tin + QOI	EBDC + Triazole	Tin + Triazole	EBD C + QOI	EBD C + Copper	Triazole + QOI	Triazole + Copper	Single Chemist ry	Other
-----% of respondents-----											
Fargo	5	-	20	-	-	20	20	20	-	20	-
Grafton	1	-	100	-	-	-	-	-	-	-	-
Grand Forks	14	14	7	-	7	29	-	-	-	43	-
Wahpeton	20	30	-	-	5	5	20	5	15	20	-
Total	40	20	8	-	5	15	13	5	8	28	-

Table 28. What fungicides did you apply with your sixth CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	Tin + QOI	EBDC + Triazole	Tin + Triazole	EBD C + QOI	C + Copper	Triazole + QOI	Triazole + Copper	Single Chemistry	Other
-----% of respondents-----											
Fargo	3	-	-	-	-	33	-	-	33	33	-
Grafton	-	-	-	-	-	-	-	-	-	-	-
Grand Forks	7	-	-	-	-	-	14	14	-	71	-
Wahpeton	4	25	-	-	-	-	-	-	-	75	-
Total	14	7	-	-	-	7	7	7	7	64	-

Table 29. What fungicides did you apply with your seventh CLS application in 2017?

Location	Respondents	Fungicide									
		Tin + Topsin	Tin + QOI	EBDC + Triazole	Tin + Triazole	EBD C + QOI	C + Copper	Triazole + QOI	Triazole + Copper	Single Chemistry	Other
-----% of respondents-----											
Fargo	-	-	-	-	-	-	-	-	-	-	-
Grafton	-	-	-	-	-	-	-	-	-	-	-
Grand Forks	3	33	-	-	-	-	-	-	-	67	-
Wahpeton	6	-	-	-	17	-	-	33	17	33	-
Total	9	11	-	-	11	-	-	22	11	44	-