# TURNING POINT SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2023

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The eighth annual weed control and production practices live polling questionnaire was conducted using Turning Point Technology at the 2024 winter Sugarbeet Grower Seminars. Responses are based on production practices from the 2023 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 and Minnesota indicated the county in which the majority of their sugarbeet were produced (Tables 1, 2, 3, 4, 5). Survey results represent approximately 210,364 acres reported by 246 respondents (Table 6) compared with 207,360 acres represented in 2022. The average sugarbeet acreage per respondent grown in 2023 was calculated from Table 6 at 855 acres compared with 843 acres in 2022.

Survey participants were asked a series of questions regarding their production practices used in sugarbeet in 2023. Growers were asked about their tillage practices for sugarbeet in 2023 (Table 7). Ninety-six percent of all respondents indicated conventional tillage as their primary with 3% practicing strip tillage and 1% using no tillage. Across locations, 59% of respondents indicated wheat was the crop preceding sugarbeet (Table 8), 27% indicated corn (field or sweet), and 7% indicated soybean. Preceding crop varied by location with 94% of Grand Forks growers indicating wheat preceded sugarbeet and 86% of Willmar growers indicated corn as their preceding crop. Seventy-five percent of growers who participated in the winter meetings used a nurse or cover crop in 2023 (Table 9) which remained the same percentage compared with last year. Cover crop species varied widely by location with spring barley being used by 54% and 51% of growers at the Grand Forks and Wahpeton meeting, respectively, and oat being used by 45% of growers at the Willmar meeting.

Growers indicated weeds were their most serious production problem in sugarbeet for the third year in a row (Table 10) with 54% of participants in 2023 as compared with 55% of participants in 2022. In 2023, emergence or stand was the most serious problem overall for 28% of respondents. Cercospora leaf spot (CLS) was named as most serious overall by 6% of respondents across locations; however, CLS was the most serious problem for 13% of participants in the Grand Forks location.

Waterhemp was named as the most serious weed problem in sugarbeet for the fourth year in a row by 76% of respondents in 2023 (Table 11) compared with 73% in 2022 and 73% in 2021. Sixteen percent of respondents indicated kochia, 2% said common ragweed, and 2% of respondents indicated common lambsquarters was their most serious weed problem in 2023. The increased presence of glyphosate-resistant waterhemp and kochia, along with a dry growing season in 2023, are likely the reasons for these weeds being named as the worst weeds. Troublesome weeds varied by location with 96%, 90%, and 75% 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 58% of responses in 2023.

Preplant incorporated (PPI) or preemergence (PRE) herbicides were applied by 82% of survey respondents in 2023 (Table 12) compared with 71% in 2022. Forty percent of Grafton survey participants applied a PPI or PRE herbicide compared with 37% in 2022. Conversely, 99% of Wahpeton survey participants applied a PPI or PRE herbicide in sugarbeet in 2023 compared with 98% in 2022. 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; however, the prevalence of these troublesome weeds continues to move north, which has been reflected in sugarbeet growers' weed control practices. The most commonly used soil-applied herbicide was *S*-metolachlor with 28% of all responses (Table 12). The second most commonly used soil-applied herbicide was either ethofumesate alone or a combination of *S*-metolachlor plus ethofumesate with each herbicide option having 26% of responses.

Over the last few springs, growers' in the Red River Valley have experienced delayed planting dates; however, when they are able to get sugarbeet planted, rainfall has been severely lacking. Growers' have started to opt into mechanical activation of ethofumesate rather than take a chance on receiving a 1-inch, penetrating rainfall which is needed to activate ethofumesate PRE. We surveyed the growers on activation method of ethofumesate applied PPI or PRE in 2023. Of the growers who applied ethofumesate across locations, 38% elected to apply as a PRE; however, 12% used a field cultivator and 6% used other means to activate ethofumesate.

Regardless of herbicide used and method of activation, of the growers who indicated using a soil-applied herbicide, 54% indicated excellent to good weed control from that herbicide (calculated from Table 14).

The application of soil-residual herbicides applied 'lay-by' to the 2023 sugarbeet crop was indicated by 88% of respondents (Table 15). *S*-metolachlor and Outlook were the most commonly applied lay-by herbicides with 47% and 35%, respectively, of responses. The majority of growers responding at the Willmar meeting indicated using Outlook (74% of responses), while *S*-metolachlor was more commonly applied by growers of the Fargo (80% of responses) and Grand Forks (66% of responses) meetings.

Glyphosate was most commonly applied with a chloroacetamide herbicide postemergence (lay-by) in 2023 with 47% of responses indicating this herbicide combination was used (Table 16). Glyphosate applied with a broadleaf herbicide postemergence was the second most common herbicide used in sugarbeet in 2023 with 36% of responses. Glyphosate alone and glyphosate plus a grass herbicide were the third and fourth most common at 10% and 4% of the responses, respectively.

Growers' were asked about additional POST weed control methods used in 2023 (Table 17). Seventeen percent of growers, across all locations, applied Ultra Blazer under the Section 18 Emergency Exemption label and 16% of growers left escapes in their fields. The majority of growers opted to hand-weed in 2023 with 41% of responses.

Sixty-two percent of growers utilized hand-weeding in 2023 (Table 18). Forty-two percent of respondents had less than ten percent of their acres hand-weeded, 11% had 10-50 percent hand-weeded, and 5% had 100 or more acres hand-weeded in 2023.

Thirty-three percent of participants reported row-crop cultivation (calculated from Table 19). However, most respondents indicated less than ten percent of their acres were cultivated. Conversely, 4% reported row-crop cultivation on 100% of their acres.

It is important for us to promote the maintenance and stewardship of our weed control tools in sugarbeet. One way to do this is to understand what growers are doing which will aid us in our areas of promotion. In 2024, we surveyed sugarbeet growers on their best management practices to protect the viability of current sugarbeet pesticides in 2023. Twenty-five percent of respondents utilize rotating herbicides by planting a diverse crop rotation (Table 20). Growers also protect herbicides by applying herbicides at full label rates with 24% of responses and tank mixing two or more different modes of action with 23% of responses.

**Table 1. 2024 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2023.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Barnes | 1 | 6 |
| Becker | 1 | 6 |
| Cass | 4 | 23 |
| Clay | 6 | 35 |
| Norman[1] | 5 | 30 |
| Total | 17 | 100 |

[1]Includes Mahnomen County

**Table 2. 2024 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2023.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Cavalier | 1 | 3 |
| Grand Forks | 2 | 6 |
| Kittson | 3 | 10 |
| Marshall | 1 | 3 |
| Pembina | 13 | 39 |
| Walsh | 13 | 39 |
| Total | 33 | 100 |

**Table 3. 2024 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2023.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Grand Forks | 16 | 24 |
| Marshall | 6 | 9 |
| Polk | 29 | 44 |
| Traill | 6 | 9 |
| Walsh | 3 | 5 |
| Other | 6 | 9 |
| Total | 66 | 100 |

**Table 4. 2024 Wahpeton Grower Seminar - Number of survey respondents by county growing sugarbeet in 2023.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Cass | 6 | 8 |
| Clay | 11 | 14 |
| Grant | 7 | 9 |
| Otter Tail | 1 | 1 |
| Richland | 13 | 16 |
| Roberts | 1 | 1 |
| Traverse | 3 | 4 |
| Wilkin | 37 | 47 |
| Total | 79 | 100 |

**Table 5. 2024 Willmar Grower Seminar - Number of survey respondents by county growing sugarbeet in 2023.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Chippewa | 20 | 32 |
| Kandiyohi | 7 | 11 |
| Pope | 1 | 2 |
| Redwood | 4 | 6 |
| Renville | 19 | 31 |
| Stevens | 4 | 6 |
| Swift | 6 | 10 |
| Other | 1 | 2 |
| Total | 62 | 100 |

**Table 6. Total sugarbeet acreage operated by respondents in 2023.**

| 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 | 15 | 13 | 13 | 7 | 13 | 27 | 20 | 0 | 7 | 0 | 0 |
| Grafton | 30 | 0 | 10 | 0 | 7 | 13 | 10 | 7 | 36 | 10 | 7 |
| Grand Forks | 65 | 11 | 9 | 5 | 11 | 17 | 10 | 12 | 12 | 5 | 8 |
| Wahpeton | 71 | 3 | 8 | 10 | 13 | 22 | 15 | 6 | 15 | 8 | 0 |
| Willmar | 65 | 8 | 5 | 6 | 14 | 14 | 14 | 12 | 15 | 11 | 1 |
| Total | 246 | 7 | 8 | 6 | 11 | 17 | 13 | 9 | 17 | 8 | 4 |

**Table 7. Tillage system used in sugarbeet in 2023.**

| Location | Responses | Conventional Tillage | Strip Tillage | No Tillage |
|---|---|---|---|---|
| | | % of responses | | |
| Fargo | 17 | 100 | 0 | 0 |
| Grafton | 35 | 100 | 0 | 0 |
| Grand Forks | 67 | 96 | 3 | 1 |
| Wahpeton | 74 | 96 | 4 | 0 |
| Willmar | 62 | 94 | 5 | 1 |
| Total | 255 | 96 | 3 | 1 |

**Table 8. Crop grown in 2022 that preceded sugarbeet in 2023.**

| Location | Responses | Previous Crop | | | | | |
|---|---|---|---|---|---|---|---|
| | | Sweet Corn | Field Corn | Dry Bean | Peas | Soybean | Wheat |
| | | % of responses | | | | | |
| Fargo | 17 | 0 | 18 | 0 | 0 | 6 | 76 |
| Grafton | 30 | 0 | 0 | 10 | 0 | 3 | 87 |
| Grand Forks | 65 | 0 | 2 | 2 | 0 | 2 | 94 |
| Wahpeton | 77 | 2 | 23 | 0 | 0 | 10 | 65 |
| Willmar | 66 | 14 | 72 | 1 | 1 | 12 | 0 |
| Total | 255 | 27 | 4 | 2 | 1 | 7 | 59 |

**Table 9. Nurse or cover crop used in sugarbeet in 2023.**

| Location | Responses | Spring Barley | Spring Oat | Winter Rye | Spring Wheat | Winter Wheat | Other[1] | None |
|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | |
| Fargo | 16 | 6 | 0 | 6 | 19 | 6 | 0 | 63 |
| Grafton | 32 | 50 | 9 | 0 | 13 | 0 | 0 | 28 |
| Grand Forks | 66 | 54 | 0 | 6 | 16 | 2 | 2 | 20 |
| Wahpeton | 76 | 51 | 0 | 11 | 13 | 1 | 1 | 23 |
| Willmar | 66 | 0 | 45 | 5 | 21 | 5 | 0 | 24 |
| Total | 256 | 36 | 14 | 6 | 16 | 2 | 1 | 25 |

[1]Includes Mustard and 'Other'.

**Table 10. Most serious production problem in sugarbeet in 2023.**

| Location | Responses | CLS[1] | Rhizo-mania | Aph[2] | Rhizoc-tonia | Herbicide Injury | Root Maggot | Weeds | Stand[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | | |
| Fargo | 15 | 7 | 0 | 0 | 0 | 0 | 13 | 53 | 27 |
| Grafton | 32 | 9 | 0 | 0 | 3 | 0 | 3 | 47 | 38 |
| Grand Forks | 65 | 13 | 1 | 0 | 1 | 3 | 0 | 51 | 31 |
| Wahpeton | 82 | 3 | 1 | 0 | 5 | 5 | 1 | 53 | 32 |
| Willmar | 65 | 1 | 0 | 1 | 10 | 1 | 0 | 67 | 20 |
| Total | 259 | 6 | 1 | 1 | 5 | 3 | 2 | 54 | 28 |

[1]Cercospora Leaf Spot

[2]Aphanomyces

[3]Emergence/Stand

[4]Includes all root diseases.

**Table 11. Most serious weed problem in sugarbeet in 2023.**

| Location | Responses | grasses | colq[1] | cora | kochia | gira | rrpw | RR Canola | wahe | other |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | | | |
| Fargo | 16 | 0 | 6 | 0 | 19 | 0 | 0 | 0 | 75 | 0 |
| Grafton | 36 | 0 | 0 | 0 | 58 | 0 | 3 | 0 | 39 | 0 |
| Grand Forks | 64 | 0 | 3 | 9 | 20 | 2 | 2 | 0 | 62 | 2 |
| Wahpeton | 77 | 0 | 1 | 0 | 9 | 0 | 0 | 0 | 90 | 0 |
| Willmar | 62 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 96 | 0 |
| Total | 255 | 1 | 2 | 2 | 16 | 1 | 1 | 0 | 76 | 1 |

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

**Table 12. Preplant incorporated or preemergence herbicides used in sugarbeet in 2023.**

| | | PPI or PRE Herbicides Applied | | | | | |
|---|---|---|---|---|---|---|---|
| Location | Responses | *S*-metolachlor | ethofumesate | Ro-Neet SB | *S*-metolachor +ethofumesate | Other | None |
| | | ----------% of responses---------- | | | | | |
| Fargo | 19 | 26 | 37 | 0 | 26 | 11 | 0 |
| Grafton | 37 | 16 | 22 | 0 | 2 | 0 | 60 |
| Grand Forks | 65 | 45 | 13 | 0 | 8 | 0 | 34 |
| Wahpeton | 91 | 33 | 23 | 0 | 42 | 1 | 1 |
| Willmar | 70 | 13 | 42 | 0 | 34 | 4 | 7 |
| Total | 282 | 28 | 26 | 0 | 26 | 2 | 18 |

**Table 13. Activation method of ethofumesate applied preplant incorporated in 2023.**

| Location | Responses | Field Cultivator | Multi-weeder | Harrow-packer | Vertical Tillage | Other | Etho PRE | Did not apply etho |
|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | |
| Fargo | 16 | 44 | 0 | 25 | 12 | 12 | 0 | 7 |
| Grafton | 35 | 0 | 6 | 6 | 0 | 2 | 23 | 63 |
| Grand Forks | 66 | 5 | 3 | 5 | 0 | 3 | 15 | 69 |
| Wahpeton | 79 | 11 | 5 | 4 | 4 | 6 | 51 | 19 |
| Willmar | 70 | 19 | 1 | 0 | 0 | 7 | 62 | 11 |
| Total | 266 | 12 | 3 | 4 | 2 | 6 | 38 | 35 |

**Table 14. Satisfaction in weed control from preplant incorporated and preemergence herbicides in 2023.**

| | | PPI or PRE Weed Control Satisfaction | | | | | |
|---|---|---|---|---|---|---|---|
| Location | Responses | Excellent | Good | Fair | Poor | Unsure | None Used |
| | | ----------% of responses---------- | | | | | |
| Fargo | 16 | 13 | 74 | 13 | 0 | 0 | 0 |
| Grafton | 35 | 0 | 29 | 20 | 6 | 0 | 45 |
| Grand Forks | 63 | 8 | 40 | 16 | 3 | 5 | 28 |
| Wahpeton | 78 | 13 | 55 | 27 | 4 | 0 | 1 |
| Willmar | 63 | 3 | 47 | 43 | 2 | 0 | 5 |
| Total | 255 | 7 | 47 | 26 | 4 | 1 | 15 |

**Table 15. Soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2023.**

| | | Lay-by Herbicides Applied | | | |
|---|---|---|---|---|---|
| Location | Responses | *S*-metolachlor | Outlook | Warrant | None |
| | | ----------% of responses---------- | | | |
| Fargo | 15 | 80 | 7 | 7 | 7 |
| Grafton | 33 | 40 | 12 | 3 | 45 |
| Grand Forks | 64 | 66 | 8 | 0 | 26 |
| Wahpeton | 91 | 64 | 34 | 2 | 0 |
| Willmar | 76 | 8 | 74 | 18 | 0 |
| Total | 279 | 47 | 35 | 6 | 12 |

**Table 16. Herbicides used in a weed control systems approach in sugarbeet in 2023.**

| | | Glyphosate Application Tank-Mixes | | | | | |
|---|---|---|---|---|---|---|---|
| Location | Responses | Gly Alone | Gly+Lay-by | Gly+Broadleaf | Gly+Grass | Other | None Used |
| | | ----------% of responses---------- | | | | | |
| Fargo | 21 | 5 | 47 | 38 | 5 | 5 | 0 |
| Grafton | 37 | 30 | 18 | 43 | 3 | 3 | 3 |
| Grand Forks | 74 | 14 | 32 | 48 | 3 | 3 | 0 |
| Wahpeton | 98 | 6 | 65 | 25 | 2 | 2 | 0 |
| Willmar | 78 | 5 | 51 | 35 | 8 | 1 | 0 |
| Total | 308 | 10 | 47 | 36 | 4 | 2 | 1 |

**Table 17. Other POST weed control methods used in 2023.**

| Location | Responses | Row-Cultivation | Ultra Blazer | Hand Weeding | Electric Weeder | Left Escapes | No Escapes |
|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | |
| Fargo | 14 | 7 | 0 | 29 | 7 | 36 | 21 |
| Grafton | 38 | 8 | 8 | 55 | 0 | 3 | 26 |
| Grand Forks | 75 | 1 | 19 | 53 | 3 | 11 | 13 |
| Wahpeton | 89 | 16 | 34 | 19 | 1 | 20 | 10 |
| Willmar | 92 | 11 | 5 | 49 | 12 | 18 | 5 |
| Total | 308 | 9 | 17 | 41 | 5 | 16 | 12 |

**Table 18. Percent of sugarbeet acres hand-weeded in 2023.**

| Location | Responses | % Acres Hand-Weeded | | | | |
|---|---|---|---|---|---|---|
| | | 0 | < 10 | 10-50 | 51-100 | >100 |
| | | ----------% of responses---------- | | | | |
| Fargo | 17 | 53 | 41 | 6 | 0 | 0 |
| Grafton | 38 | 39 | 53 | 5 | 0 | 3 |
| Grand Forks | 64 | 25 | 64 | 6 | 5 | 0 |
| Wahpeton | 72 | 58 | 31 | 10 | 1 | 0 |
| Willmar | 62 | 24 | 26 | 21 | 11 | 18 |
| Total | 253 | 38 | 42 | 11 | 4 | 5 |

**Table 19. Percent of sugarbeet acres row-crop cultivated in 2023.**

| Location | Responses | % Acres Row-Cultivated | | | | |
|---|---|---|---|---|---|---|
| | | 0 | < 10 | 10-50 | 51-100 | >100 |
| | | ----------% of responses---------- | | | | |
| Fargo | 17 | 88 | 12 | 0 | 0 | 0 |
| Grafton | 34 | 68 | 24 | 5 | 3 | 0 |
| Grand Forks | 63 | 71 | 24 | 5 | 0 | 0 |
| Wahpeton | 75 | 67 | 15 | 13 | 4 | 1 |
| Willmar | 60 | 55 | 8 | 12 | 8 | 17 |
| Total | 249 | 67 | 16 | 10 | 4 | 4 |

**Table 20. Best management practices used to protect the viability of current sugarbeet pesticides in 2023.**

| Location | Responses | Full Herbicide Rates | Tank Mixing | Herbicide Rotation across Crops | Herbicide Layering | Integrated Pest Management[1] | Other |
|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | |
| Fargo | 25 | 28 | 20 | 16 | 16 | 20 | 0 |
| Grafton | 47 | 23 | 45 | 23 | 2 | 7 | 0 |
| Grand Forks | 93 | 29 | 26 | 27 | 6 | 11 | 1 |
| Wahpeton | 122 | 19 | 16 | 30 | 16 | 19 | 0 |
| Willmar | 101 | 27 | 17 | 19 | 18 | 16 | 3 |
| Total | 388 | 24 | 23 | 25 | 12 | 15 | 1 |

[1]Includes a combination of chemical, cultural, and mechanical practices, etc.