# TURNING POINT SURVEY OF WEED CONTROL AND PRODUCTION PRACTICES IN SUGARBEET IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2022

Tom J. Peters[1], Mohamed F.R. Khan[1], Alexa Lystad[2], and Mark A. Boetel[3]

[1]Extension Sugarbeet Specialist and [2]Sugarbeet Research Specialist
North Dakota State University & University of Minnesota, Fargo, ND
and
[3]Professor, Dept. of Entomology, North Dakota State University

The seventh annual weed control and production practices live polling questionnaire was conducted using Turning Point Technology at the 2023 winter Sugarbeet Grower Seminars. Responses are based on production practices from the 2022 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 207,360 acres reported by 246 respondents (Table 6) compared with 162,042 acres represented in 2021. The average sugarbeet acreage per respondent grown in 2022 was calculated from Table 6 at 843 acres compared with 965 acres in 2021.

Survey participants were asked a series of questions regarding their production practices used in sugarbeet in 2022. Growers were asked about their tillage practices for sugarbeet in 2022 (Table 7). Ninety-seven percent of all respondents indicated conventional tillage as their primary with 1% practicing strip tillage and 2% using no tillage. Across locations, 53% of respondents indicated wheat was the crop preceding sugarbeet (Table 8), 28% indicated corn (field or sweet), and 13% indicated soybean. Preceding crop varied by location with 81% of Grand Forks growers indicating wheat preceded sugarbeet and 84% 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 2022 (Table 9) which decreased from 82% in 2021. Cover crop species also varied widely by location with barley being used by 52% and 59% of growers at the Grand Forks and Wahpeton meeting, respectively, and oat being used by 50% of growers at the Willmar meeting.

Growers indicated weeds were their most serious production problem in sugarbeet for the second year in a row (Table 10) with 55% of participants in 2022 as compared with 32% of participants in 2021. In 2022, emergence or stand was the most serious problem overall for 18% of respondents. Cercospora leaf spot (CLS) was named as most serious overall by 8% of respondents across locations; however, was the most serious problem for 27% of participants in the Grafton location.

Waterhemp was named as the most serious weed problem in sugarbeet for the third year in a row by 73% of respondents in 2022 (Table 11) compared with 73% in 2021 and 54% in 2019. Fourteen percent of respondents indicated kochia, 6% said common ragweed, and 2% of respondents indicated common lambsquarters were their most serious weed problem in 2022. The increased presence of glyphosate-resistant waterhemp and kochia, along with a dry growing season in 2022, are likely the reasons for these weeds being named as the worst weeds. Troublesome weeds varied by location with 100%, 89%, and 88% 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 57% of responses.

Respondents to the survey indicated making 0 to 4 glyphosate applications in their 2022 sugarbeet crop (Table 12) with a calculated average of 2.08 applications per acre. The calculated average in 2021 was 1.99 applications per acre.

Glyphosate was most commonly applied with a chloroacetamide herbicide postemergence (lay-by) in 2022 with 49% of responses indicating this herbicide combination was used (Table 13). Glyphosate applied with a broadleaf herbicide postemergence was the second most common herbicide used in sugarbeet in 2022 with 31% of responses.

Glyphosate alone and glyphosate plus a grass herbicide were the third and fourth most common at 14% and 5% of the responses, respectively.

Preplant incorporated (PPI) or preemergence (PRE) herbicides were applied by 71% of survey respondents in 2022 (Table 14). Thirty-seven percent of Grafton survey participants applied a PPI or PRE herbicide compared with 31% in 2021. Conversely, 98% of Wahpeton survey participants applied a PPI or PRE herbicide in sugarbeet in 2022 compared with 90% in 2021. 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. The most commonly used soil-applied herbicide was *S*-metolachlor with 24% of all responses followed by a combination of *S*-metolachlor plus ethofumesate with 22% of responses that utilized a PPI or PRE. Of the growers who indicated using a soil-applied herbicide, 46% indicated excellent to good weed control from that herbicide (calculated from Table 15).

The application of soil-residual herbicides applied 'lay-by' to the 2022 sugarbeet crop was indicated by 79% of respondents (Table 16). *S*-metolachlor and Outlook were the most commonly applied lay-by herbicides with 36% of responses. The majority of growers responding at the Willmar meeting indicated using Outlook (78% of responses), while S-metolachlor was more commonly applied by growers of the Fargo (73% of responses) and Wahpeton (61% of responses) meetings.

The Environmental Protection Agency (EPA) approved a second request for a Section 18 emergency exemption for Ultra Blazer (acifluorfen) in 2022. This provided Minnesota and eastern North Dakota sugarbeet growers a postemergence herbicide to control glyphosate-resistant waterhemp in sugarbeet. The exemption allowed a single Ultra Blazer application at 16 fluid ounces per acre per year. A Section 18 exemption under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) authorizes EPA to allow an unregistered use of a pesticide for a limited time if EPA determines that an emergency condition exists. Twenty-three percent of respondents applied Ultra Blazer in 2022 as compared with 37% of respondents in 2021 (data not shown). Of the growers who used Ultra Blazer, 2% applied Ultra Blazer alone, 10% applied Ultra Blazer with NIS, and 6% tank mixed Ultra Blazer with glyphosate, NIS, and AMS.

Growers' were asked about additional POST weed control methods used in 2022 (Table 17). Hand-weeding and row-crop cultivation were the two most common practices with 40% of respondents hand-weeding and 24% of respondents implementing row-crop cultivation. Thirty-nine percent of respondents had some acres hand-weeded (calculated from Table 18). However, most respondents indicated less than ten percent of their acres were hand-weeded. Sixty-two 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, 7% reported row-crop cultivation on 100% of their acres.

**Table 1. 2023 Fargo Grower Seminar – Number of survey respondents by county growing sugarbeet in 2022.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Cass | 3 | 10 |
| Clay | 11 | 38 |
| Norman[1] | 10 | 35 |
| Traill | 5 | 17 |
| Total | 29 | 100 |

[1]Includes Mahnomen County

**Table 2. 2023 Grafton Grower Seminar – Number of survey respondents by county growing sugarbeet in 2022.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Grand Forks | 4 | 8 |
| Kittson | 6 | 12 |
| Marshall | 6 | 12 |
| Pembina | 14 | 28 |
| Walsh | 19 | 38 |
| Other | 1 | 2 |
| Total | 50 | 100 |

**Table 3. 2023 Grand Forks Grower Seminar – Number of survey respondents by county growing sugarbeet in 2022.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Grand Forks | 15 | 25 |
| Marshall | 4 | 6 |
| Nelson | 2 | 3 |
| Polk | 29 | 48 |
| Traill | 3 | 5 |
| Walsh | 3 | 5 |
| Other | 5 | 8 |
| Total | 61 | 100 |

**Table 4. 2023 Wahpeton Grower Seminar - Number of survey respondents by county growing sugarbeet in 2022.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Cass | 1 | 2 |
| Clay | 3 | 7 |
| Grant | 4 | 10 |
| Richland | 11 | 26 |
| Traverse | 3 | 7 |
| Wilkin | 20 | 48 |
| Total | 42 | 100 |

**Table 5. 2023 Willmar Grower Seminar - Number of survey respondents by county growing sugarbeet in 2022.**

| County | Number of Responses | Percent of Responses |
|---|---|---|
| Chippewa | 30 | 40 |
| Kandiyohi | 7 | 9 |
| Redwood | 2 | 3 |
| Renville | 22 | 29 |
| Stearns | 1 | 1 |
| Stevens | 2 | 3 |
| Swift | 6 | 8 |
| Other | 5 | 7 |
| Total | 75 | 100 |

**Table 6. Total sugarbeet acreage operated by respondents in 2022.**

| | | 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 | 23 | 0 | 0 | 4 | 22 | 26 | 17 | 4 | 13 | 4 | 10 |
| Grafton | 46 | 2 | 11 | 7 | 15 | 17 | 11 | 9 | 15 | 9 | 4 |
| Grand Forks | 63 | 3 | 10 | 6 | 7 | 29 | 16 | 16 | 13 | 0 | 0 |
| Wahpeton[1] | 41 | 0 | 12 | 0 | 0 | 22 | 0 | 24 | 0 | 42 | 0 |
| Willmar | 73 | 7 | 11 | 15 | 11 | 18 | 12 | 10 | 10 | 4 | 2 |
| Total | 246 | 3 | 10 | 8 | 10 | 22 | 11 | 13 | 10 | 10 | 2 |

[1]Acreage categories were <250, 250-500, 500-750, or >750.

**Table 7. Tillage system used in sugarbeet in 2022.**

| Location | Responses | Conventional Tillage | Strip Tillage | No Tillage |
|---|---|---|---|---|
| | | ----------% of responses---------- | | |
| Fargo | 23 | 100 | 0 | 0 |
| Grafton | 47 | 96 | 2 | 2 |
| Grand Forks | 62 | 96 | 2 | 2 |
| Wahpeton | 41 | 98 | 1 | 1 |
| Willmar | 73 | 97 | 3 | 0 |
| Total | 246 | 97 | 1 | 2 |

**Table 8. Crop grown in 2021 that preceded sugarbeet in 2022.**

| | | Previous Crop | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Location | Responses | Sweet Corn | Field Corn | Dry Bean | Potato | Soybean | Wheat | Other |
| | | ----------% of responses---------- | | | | | | |
| Fargo | 27 | 4 | 0 | 0 | 0 | 14 | 78 | 4 |
| Grafton | 44 | 0 | 0 | 9 | 9 | 2 | 80 | 0 |
| Grand Forks | 64 | 0 | 0 | 0 | 6 | 11 | 81 | 2 |
| Wahpeton | 41 | 0 | 21 | 0 | 0 | 24 | 55 | 0 |
| Willmar | 73 | 70 | 14 | 0 | 0 | 15 | 1 | 0 |
| Total | 250 | 24 | 4 | 2 | 3 | 13 | 53 | 1 |

**Table 9. Nurse or cover crop used in sugarbeet in 2022.**

| Location | Responses | Spring Barley | Spring Oat | Winter Rye | Spring Wheat | Winter Wheat | Other[1] | None |
|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | |
| Fargo | 26 | 38 | 0 | 0 | 4 | 0 | 0 | 58 |
| Grafton | 42 | 36 | 5 | 2 | 22 | 2 | 0 | 33 |
| Grand Forks | 62 | 52 | 0 | 8 | 13 | 0 | 0 | 27 |
| Wahpeton | 41 | 59 | 0 | 17 | 4 | 0 | 0 | 20 |
| Willmar | 72 | 0 | 50 | 3 | 36 | 0 | 0 | 11 |
| Total | 243 | 33 | 16 | 6 | 19 | 1 | 0 | 25 |

[1]Includes Mustard and 'Other'.

**Table 10. Most serious production problem in sugarbeet in 2022.**

| Location | Responses | CLS[1] | Rhizo-mania | Aph[2] | Rhizoc-tonia | Fusarium | Herbicide Injury | Root Maggot | Weeds | Stand[3] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | | | |
| Fargo | 24 | 8 | 0 | 0 | 0 | 0 | 13 | 4 | 58 | 17 |
| Grafton | 42 | 27 | 2 | 2 | 7 | 0 | 0 | 7 | 43 | 12 |
| Grand Forks | 59 | 3 | 0 | 0 | 8 | 0 | 0 | 10 | 65 | 14 |
| Wahpeton | 40 | 3 | 0 | 0 | 27[4] | 0 | 0 | 0 | 27 | 43 |
| Willmar | 76 | 5 | 3 | 1 | 12 | 0 | 0 | 0 | 67 | 12 |
| Total | 241 | 8 | 1 | 5 | 7 | 0 | 1 | 4 | 55 | 18 |

[1]Cercospora Leaf Spot
[2]Aphanomyces
[3]Emergence/Stand
[4]Includes all root diseases.

**Table 11. Most serious weed problem in sugarbeet in 2022.**

| Location | Responses | grasses | colq[1] | cora | kochia | gira | rrpw | RR Canola | wahe | other |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | | | | |
| Fargo | 25 | 0 | 0 | 8 | 0 | 0 | 0 | 4 | 88 | 0 |
| Grafton | 48 | 0 | 8 | 8 | 57 | 0 | 2 | 0 | 23 | 2 |
| Grand Forks | 62 | 0 | 2 | 12 | 12 | 2 | 2 | 0 | 70 | 0 |
| Wahpeton | 38 | 0 | 3 | 0 | 5 | 0 | 3 | 0 | 89 | 0 |
| Willmar | 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| Total | 242 | 0 | 2 | 6 | 14 | 1 | 2 | 1 | 73 | 1 |

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

**Table 12. Average number of glyphosate applications per acre in sugarbeet during 2022 season.**

| Location | Responses | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | | |
| Fargo | 24 | 4 | 25 | 58 | 13 | 0 | 0 |
| Grafton | 47 | 0 | 17 | 51 | 30 | 2 | 0 |
| Grand Forks | 62 | 0 | 15 | 66 | 19 | 0 | 0 |
| Wahpeton | 41 | 3 | 20 | 63 | 14 | 0 | 0 |
| Willmar[1] | 75 | 0 | 0 | 75 | 25 | 0 | 0 |
| Total | 249 | 1 | 12 | 65 | 21 | 1 | 0 |

**Table 13. Herbicides used in a weed control systems approach in sugarbeet in 2022.**

| Location | Responses | Glyphosate Application Tank-Mixes | | | | | |
|---|---|---|---|---|---|---|---|
| | | Gly Alone | Gly+Lay-by | Gly+Broadleaf | Gly+Grass | Other | None Used |
| | | % of responses | | | | | |
| Fargo | 31 | 3 | 52 | 36 | 6 | 3 | 0 |
| Grafton | 50 | 44 | 16 | 36 | 4 | 0 | 0 |
| Grand Forks | 72 | 12 | 29 | 51 | 4 | 3 | 1 |
| Wahpeton | 42 | 1 | 98 | -[1] | 0 | 1 | 0 |
| Willmar | 85 | 8 | 61 | 24 | 7 | 0 | 0 |
| Total | 280 | 14 | 49 | 31 | 5 | 1 | 0 |

[1]Most applications included both a lay-by and broadleaf herbicide.

**Table 14. Preplant incorporated or preemergence herbicides used in sugarbeet in 2022.**

| Location | | PPI or PRE Herbicides Applied | | | | | |
|---|---|---|---|---|---|---|---|
| | Responses | S-metolachlor | ethofumesate | Ro-Neet SB | S-metolachor +ethofumesate | Other | None |
| | | % of responses | | | | | |
| Fargo | 34 | 35 | 41 | 3 | 6 | 6 | 9 |
| Grafton | 47 | 11 | 11 | 0 | 11 | 4 | 63 |
| Grand Forks | 62 | 27 | 13 | 0 | 7 | 3 | 50 |
| Wahpeton | 42 | 43 | 12 | 0 | 43 | 0 | 2 |
| Willmar | 76 | 16 | 29 | 0 | 37 | 2 | 16 |
| Total | 261 | 24 | 21 | 1 | 22 | 3 | 29 |

**Table 15. Satisfaction in weed control from preplant incorporated and preemergence herbicides in 2022.**

| Location | Responses | PPI or PRE Weed Control Satisfaction | | | | | |
|---|---|---|---|---|---|---|---|
| | | Excellent | Good | Fair | Poor | Unsure | None Used |
| | | % of responses | | | | | |
| Fargo | 26 | 15 | 66 | 19 | 0 | 0 | 0 |
| Grafton | 43 | 2 | 35 | 5 | 0 | 0 | 58 |
| Grand Forks | 61 | 7 | 34 | 5 | 0 | 2 | 52 |
| Wahpeton | 42 | 0 | 50 | 50 | 0 | 0 | 0 |
| Willmar | 71 | 0 | 38 | 33 | 18 | 0 | 11 |
| Total | 243 | 4 | 42 | 22 | 5 | 0 | 27 |

**Table 16. Soil-residual herbicides applied early postemergence (lay-by) in sugarbeet in 2022.**

| Location | Responses | Lay-by Herbicides Applied | | | |
|---|---|---|---|---|---|
| | | S-metolachlor | Outlook | Warrant | None |
| | | % of responses | | | |
| Fargo | 26 | 73 | 19 | 0 | 8 |
| Grafton | 42 | 29 | 2 | 5 | 64 |
| Grand Forks | 64 | 52 | 12 | 2 | 34 |
| Wahpeton | 41 | 61 | 32 | 0 | 7 |
| Willmar | 86 | 5 | 78 | 16 | 1 |
| Total | 258 | 36 | 36 | 7 | 21 |

**Table 17. Other POST weed control methods used in 2022.**

| Location | Responses | Rotary Hoe | Row-Cultivation | Hand Weeding | Other | None |
|---|---|---|---|---|---|---|
| | | ----------% of responses---------- | | | | |
| Fargo | 25 | 0 | 24 | 56 | 0 | 20 |
| Grafton | 53 | 9 | 23 | 40 | 0 | 28 |
| Grand Forks | 81 | 5 | 17 | 56 | 1 | 21 |
| Wahpeton | 40 | 25 | 0 | 0 | 12 | 63 |
| Willmar | 75 | 3 | 33 | 34 | 6 | 26 |
| Total | 274 | 4 | 24 | 40 | 2 | 30 |

**Table 18. Percent of sugarbeet acres hand-weeded in 2022.**

| | | % Acres Hand-Weeded | | | | |
|---|---|---|---|---|---|---|
| Location | Responses | 0 | < 10 | 10-50 | 51-100 | >100 |
| | | ----------% of responses---------- | | | | |
| Fargo | 25 | 36 | 28 | 16 | 12 | 8 |
| Grafton | 48 | 35 | 48 | 13 | 4 | 0 |
| Grand Forks | 60 | 20 | 55 | 18 | 5 | 2 |
| Wahpeton | 40 | 98 | 2 | 0 | 0 | 0 |
| Willmar | 73 | 25 | 21 | 19 | 16 | 19 |
| Total | 242 | 61 | 18 | 12 | 2 | 7 |

**Table 19. Percent of sugarbeet acres row-crop cultivated in 2022.**

| | | % Acres Row-Cultivated | | | | |
|---|---|---|---|---|---|---|
| Location | Responses | 0 | < 10 | 10-50 | 51-100 | >100 |
| | | ----------% of responses---------- | | | | |
| Fargo | 25 | 56 | 28 | 16 | 0 | 0 |
| Grafton | 46 | 63 | 22 | 9 | 0 | 6 |
| Grand Forks | 59 | 51 | 27 | 22 | 0 | 0 |
| Wahpeton | 40 | 95 | 5 | 0 | 0 | 0 |
| Willmar | 72 | 49 | 14 | 10 | 8 | 19 |
| Total | 246 | 38 | 33 | 14 | 8 | 7 |