

**TURNING POINT® SURVEY OF SUGARBEET INSECT PEST PROBLEMS AND MANAGEMENT PRACTICES IN MINNESOTA AND EASTERN NORTH DAKOTA IN 2019**

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Attendees of the 2020 Winter Sugarbeet Grower Seminars were asked about their 2019 insect pest problems and associated management practices in a live polling questionnaire by using a Turning Point® interactive personal response system. Initial questioning identified the county in which respondents produced the majority of their sugarbeet crop in 2019 (Tables 1, 2, 3, and 4).

**Table 1. 2020 Fargo Grower Seminar – county in which sugarbeet was grown in 2019**

| County            | Number of Responses | Percent of Responses |
|-------------------|---------------------|----------------------|
| Becker            | 1                   | 3                    |
| Cass              | 4                   | 11                   |
| Clay              | 15                  | 41                   |
| Norman/Mahnomen   | 10                  | 28                   |
| Richland          | 1                   | 3                    |
| Traill            | 1                   | 11                   |
| Wilkin/Otter Tail | 1                   | 3                    |
| Totals            | 36                  | 100                  |

**Table 2. 2020 Grafton Grower Seminar – county in which sugarbeet was grown in 2019**

| County   | Number of Responses | Percent of Responses |
|----------|---------------------|----------------------|
| Kittson  | 10                  | 20                   |
| Marshall | 2                   | 4                    |
| Pembina  | 14                  | 27                   |
| Polk     | 4                   | 8                    |
| Walsh    | 21                  | 41                   |
| Other    | 0                   | 0                    |
| Totals   | 51                  | 100                  |

**Table 3. 2020 Grand Forks Grower Seminar – county in which sugarbeet was grown in 2019**

| County              | Number of Responses | Percent of Responses |
|---------------------|---------------------|----------------------|
| Grand Forks         | 10                  | 15                   |
| Mahnomen            | 0                   | 0                    |
| Marshall            | 11                  | 16                   |
| Pennington/Red Lake | 0                   | 0                    |
| Polk                | 36                  | 54                   |
| Traill              | 4                   | 6                    |
| Walsh               | 4                   | 6                    |
| Other               | 2                   | 3                    |
| Totals              | 67                  | 100                  |

**Table 4. 2020 Wahpeton Grower Seminar – county in which sugarbeet was grown in 2019**

| County   | Number of Responses | Percent of Responses |
|----------|---------------------|----------------------|
| Clay     | 0                   | 0                    |
| Grant    | 2                   | 18                   |
| Richland | 1                   | 9                    |
| Traverse | 0                   | 0                    |
| Wilkin   | 8                   | 73                   |
| Totals   | 11                  | 100                  |

This report is based on an estimated 110,950 acres of sugarbeet grown in 2019 by 155 survey respondents that attended the 2020 Fargo, Grafton, Grand Forks, and Wahpeton Winter Sugarbeet Grower seminars (Table 5). The majority (37%) of respondents reported growing sugarbeet on between 400 and 799 acres during the 2019 production season. An additional 12% grew sugarbeet on between 1,000 and 1,499 acres, whereas 10% produced sugarbeet on less than 99 acres. Similar to previous years, 12% of respondents reported growing sugarbeet on over 1,500 acres in 2019.

**Table 5. Ranges of sugarbeet acreage operated by respondents in 2019**

| Location    | Number of 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       | 32                  | 16                       | 9       | 9       | 6       | 25      | 9       | 6       | 3         | 3         | 13    |
| Grafton     | 49                  | 10                       | 6       | 8       | 12      | 16      | 18      | 6       | 14        | 0         | 8     |
| Grand Forks | 66                  | 9                        | 6       | 6       | 5       | 26      | 15      | 6       | 17        | 9         | 1     |
| Wahpeton    | 8                   | 0                        | 12      | 12      | 25      | 12      | 12      | 0       | 0         | 25        | 0     |
| Totals      | 155                 | 10                       | 7       | 8       | 8       | 22      | 15      | 6       | 12        | 6         | 6     |

From a combined total of 171 respondents at the Fargo, Grafton, Grand Forks, and Wahpeton seminars, 41% reported that the sugarbeet root maggot was their worst insect pest problem during the 2019 growing season (Table 6). That was a significant increase from 2017 and 2018, for which only 27 and 36% of growers, respectively, viewed the root maggot as their worst insect pest problem. The majority of respondents at both Grafton (62% of respondents) and Grand Forks (45% of respondents) identified the sugarbeet root maggot as their worst insect pest problem in 2019. Other significant insect pest problems reported included Lygus bugs (30% of respondents at Wahpeton), grasshoppers (16, and 17% of respondents at Fargo and Grafton, respectively), and springtails (8, 15, and 10% of respective respondents at Fargo, Grand Forks, and Wahpeton).

**Table 6. Worst insect pest problem in sugarbeet in 2019**

| Location    | Number of Responses | Springtails              | Cutworms | Lygus |           | Root maggot | White grubs | Grass-hoppers | None |  |
|-------------|---------------------|--------------------------|----------|-------|-----------|-------------|-------------|---------------|------|--|
|             |                     |                          |          | bugs  | Wireworms |             |             |               |      |  |
|             |                     | -----% of responses----- |          |       |           |             |             |               |      |  |
| Fargo       | 38                  | 8                        | 11       | 3     | 5         | 16          | 0           | 16            | 42   |  |
| Grafton     | 52                  | 2                        | 0        | 2     | 0         | 62          | 0           | 17            | 17   |  |
| Grand Forks | 71                  | 15                       | 3        | 0     | 3         | 45          | 0           | 4             | 30   |  |
| Wahpeton    | 10                  | 10                       | 10       | 30    | 0         | 0           | 0           | 10            | 40   |  |
| Totals      | 171                 | 9                        | 4        | 3     | 2         | 41          | 0           | 11            | 29   |  |

The majority (67%) of grower respondents, averaged across all four seminar locations, indicated that they planted seed treated with Poncho Beta insecticidal seed treatment in 2019, whereas Cruiser- and NipsIt Inside-treated seed were used by 7 and 4% of respondents, respectively (Table 7). Growers at the Fargo, Grafton, and Grand Forks seminars accounted for most of the seed treatment use for the production area in 2019. The highest use

of Poncho Beta in 2019 was reported by seminar attendees at Fargo (71%), Grafton (71%), and Grand Forks (72%); whereas, Wahpeton seminar attendees reported the highest use of Cruiser-treated seed (20% of producers) and the highest use of seed treated with NipsIt Inside (10%). Averaged across seminar locations, 22% of respondents reported not using an insecticidal seed treatment. Wahpeton seminar attendees significantly influenced this figure, with 90% at that location reporting no seed treatment insecticide use in 2019.

**Table 7. Seed treatment insecticide use for sugarbeet insect pest management in 2019**

| Location    | Number of Responses | -----% of responses----- |         |               |      |
|-------------|---------------------|--------------------------|---------|---------------|------|
|             |                     | Poncho Beta              | Cruiser | NipsIt Inside | None |
| Fargo       | 35                  | 71                       | 6       | 3             | 20   |
| Grafton     | 49                  | 71                       | 6       | 2             | 20   |
| Grand Forks | 67                  | 72                       | 6       | 6             | 16   |
| Wahpeton    | 7                   | 0                        | 20      | 10            | 70   |
| Totals      | 161                 | 67                       | 7       | 4             | 22   |

Planting-time granular insecticides were used in 2019 by an average of 31% of grower attendees of the Fargo, Grafton, Grand Forks, and Wahpeton seminars (Table 8). An overall average of 29% of growers at these meetings reported using Counter 20G at planting time, whereas only 1% of attendees reported applying Lorsban 15G for planting-time protection of their sugarbeet crop from insect pests. Grower-reported use of Counter 20G as a planting-time treatment by Fargo and Grand Forks seminar respondents was at 50 and 28%; whereas only 20 and 10% of growers at the Grafton and Wahpeton locations, respectively, reported using Counter 20G at planting to protect their sugarbeet crop. Overall, 69% of respondents across all four grower seminars reported that they did not use a granular insecticide at planting in 2019.

**Table 8. Planting-time granular insecticides used for insect pest management in sugarbeet during 2019**

| Location    | Number of Responses | -----% of responses----- |             |            |       |      |
|-------------|---------------------|--------------------------|-------------|------------|-------|------|
|             |                     | Counter 20G              | Lorsban 15G | Thimet 20G | Other | None |
| Fargo       | 38                  | 50                       | 0           | 0          | 0     | 50   |
| Grafton     | 51                  | 20                       | 2           |            | 2     | 76   |
| Grand Forks | 65                  | 28                       | 0           | 0          | 1     | 71   |
| Wahpeton    | 9                   | 10                       | 0           | 0          | 0     | 90   |
| Totals      | 164                 | 29                       | 1           | 0          | 1     | 69   |

Averaged across all seminar locations, Counter 20G was most commonly (15% of all grower seminar attendees) applied at its moderate rate of 7.5 lb product/ac (Table 9). An additional 7% used Counter 20G at its highest labeled application rate (9 lb/ac), and another 8% applied it at the low labeled rate of 5.25 lb/ac.

The majority (53%) of Fargo respondents reported no use of Counter 20G, but 22% reported using it at its moderate (7.5-lb) rate, and 19% used the low rate (5.25 lb product/ac). The majority of growers surveyed at Grafton and Wahpeton (76 and 90%, respectively) reported no granular insecticide use at planting. Similarly, 64% of Grand Forks attendees reported opting to not use a planting-time granular insecticide. However, a total of 33% of Grand Forks attendees used Counter 20G, and most (23%) reported using it at the 7.5-lb application rate.

**Table 9. Application rates of *planting-time granular insecticides* used for sugarbeet insect pest management in 2019**

| Location                 | Number of Responses | Counter 20G |        |         | Lorsban 15G |       |        | Other | None |
|--------------------------|---------------------|-------------|--------|---------|-------------|-------|--------|-------|------|
|                          |                     | 9 lb        | 7.5 lb | 5.25 lb | 13.4 lb     | 10 lb | 6.7 lb |       |      |
| -----% of responses----- |                     |             |        |         |             |       |        |       |      |
| Fargo                    | 36                  | 6           | 22     | 19      | 0           | 0     | 0      | 0     | 53   |
| Grafton                  | 50                  | 14          | 4      | 0       | 4           | 0     | 0      | 2     | 76   |
| Grand Forks              | 61                  | 3           | 23     | 7       | 0           | 0     | 0      | 3     | 64   |
| Wahpeton                 | 10                  | 0           | 0      | 10      | 0           | 0     | 0      | 0     | 90   |
| Totals                   | 157                 | 7           | 15     | 8       | 1           | 0     | 0      | 2     | 67   |

As presented in Table 9 above, just 10% of Wahpeton seminar attendees reported using Counter 20G for planting-time-applied protection from insect pests; however, all reported use of Counter by Wahpeton attendees was at the 5.25-lb rate. A small number (4%) of growers at the Grafton seminar reported using Lorsban 15G (or a generic granular chlorpyrifos product) for planting-time insecticide protection, and all applied it at the highest labeled rate of 13.4 lb of product per acre.

Averaged across all seminar locations, 55% of grower respondents reported using a postemergence insecticide for root maggot control in 2019 (Table 10). That was a 17% increase over what was reported for 2018. The majority (33%) of postemergence insecticide use for root maggot control in 2019 involved applications of Lorsban 4E, Lorsban Advanced, or a similar chlorpyrifos-containing sprayable liquid insecticide. Mustang Maxx, Lorsban 15G, and Thimet were also used for this purpose, but only 6, 6, and 5% of respondents, respectively.

At the Fargo grower seminar, 18% of respondents reported using Mustang Maxx and 10% used a sprayable liquid formulation of chlorpyrifos, whereas just 5% of respondents applied Counter 20G for postemergence root maggot management in 2019. In contrast, 50 and 35% of the Grafton and Grand Forks seminar attendees, respectively, reported using postemergence applications of sprayable liquid chlorpyrifos products for root maggot control. Lorsban 15G was reported as being used for this purpose by 8, 7, and 11% of the seminar attendees as Grafton, Grand Forks, and Wahpeton attendees. Grafton seminar attendees indicated the highest incidence of using Thimet 20G for postemergence root maggot control (13% of respondents), whereas just 3% of Fargo seminar attendees used Thimet.

An average of 45% of survey respondents across all locations indicated that they did not apply a postemergence insecticide to manage the sugarbeet root maggot in 2019. The majority of those respondents were attendees of the Fargo and Wahpeton locations, where a respective 60 and 89% of respondents reported no use of a postemergence insecticide for root maggot control.

**Table 10. Postemergence insecticide use for sugarbeet root maggot management in 2019**

| Location                 | Number of Responses | Lorsban                      |              |       |              | Counter 20G | Lorsban 15G | Thimet 20G | None |
|--------------------------|---------------------|------------------------------|--------------|-------|--------------|-------------|-------------|------------|------|
|                          |                     | (4E, Advanced, or a generic) | Mustang Maxx | Asana | Other liquid |             |             |            |      |
| -----% of responses----- |                     |                              |              |       |              |             |             |            |      |
| Fargo                    | 40                  | 10                           | 18           | 2     | 5            | 2           | 3           | 60         |      |
| Grafton                  | 62                  | 50                           | 0            | 0     | 2            | 8           | 13          | 26         |      |
| Grand Forks              | 74                  | 35                           | 7            | 0     | 3            | 7           | 0           | 49         |      |
| Wahpeton                 | 9                   | 0                            | 0            | 0     | 0            | 11          | 0           | 89         |      |
| Totals                   | 185                 | 33                           | 6            | 1     | 3            | 6           | 5           | 45         |      |

Overall satisfaction with insecticide applications made for root maggot management was rated as good to excellent by 81% of respondents when averaged across the Fargo, Grafton, Grand Forks, and Wahpeton seminar locations (Table 11). That was a 5% reduction in growers' rating of insecticide performance for root maggot control during 2018. At the Fargo location, 91% of respondents rated their satisfaction with root maggot control tools as being good to excellent. Similarly, 80% of respondents at the Grafton seminar rated their satisfaction with root

maggot management practices as being good to excellent. The majority (81%) of Grand Forks seminar attendees also rated their insecticide performance as good to excellent.

**Table 11. Satisfaction with insecticide treatments for sugarbeet root maggot management in 2019**

| Location    | Number of Responses | -----% of responses----- |      |      |      |        |
|-------------|---------------------|--------------------------|------|------|------|--------|
|             |                     | Excellent                | Good | Fair | Poor | Unsure |
| Fargo       | 22                  | 50                       | 41   | 4    | 0    | 4      |
| Grafton     | 40                  | 22                       | 48   | 25   | 0    | 5      |
| Grand Forks | 46                  | 35                       | 52   | 11   | 0    | 2      |
| Wahpeton    | 0                   | -                        | -    | -    | -    | -      |
| Totals      | 108                 | 33                       | 48   | 15   | 0    | 4      |

Averaged across all locations, 52% of all growers used some form of insecticide to protect their sugarbeet crop from springtails in 2019 (Table 12). Poncho Beta was relied on by 31% of respondents for springtail control, which was a 24% increase in comparison to use of that product in 2018. Counter 20G was used by 15% of all survey respondents, whereas both Mustang Maxx and Lorsban 15G were used by 2% each of the attendees across all four seminar locations. About 48% of all growers surveyed at the four seminar locations reported not using any insecticide for springtail control.

At the Fargo seminar, Counter 20G and Poncho Beta were used by 20% and 28% of respondents, respectively, with only 3% reporting Mustang Maxx as their choice for springtail control in 2019. Insecticide use for springtail management by Grafton seminar attendees was split between Poncho Beta, Lorsban 15G, and Counter 20G (17, 6, and 4%, respectively). Small proportions (i.e., 2% each) of growers at the Grafton seminar reported using Mustang Maxx and Cruiser seed treatment for their springtail control, whereas 69% of respondents at Grafton indicated no insecticide use for this purpose in 2019. The majority (48%) of respondents at Grand Forks reported using Poncho Beta for springtail control, and an additional 22% used Counter 20G for this purpose. Only 2% of Grand Forks attendees reported using Mustang Maxx for springtail management, and 29% of them reported not using an insecticide to control springtails in 2019. The majority (70%) of attendees at the Wahpeton seminar indicated that they did not use an insecticide to control springtails; however, NipsIt Inside seed treatment, Counter 20G, and Lorsban 15G each used by 10% of respondents for this purpose. **NOTE:** Lorsban 15G is not recommended for springtail management in sugarbeet because NDSU performance trial data indicates that it does not provide adequate control of these early-season pests.

**Table 12. Insecticide use for springtail management in 2019**

| Location    | Number of Responses | -----% of responses----- |               |             |              |             |             |       |      |
|-------------|---------------------|--------------------------|---------------|-------------|--------------|-------------|-------------|-------|------|
|             |                     | Cruiser                  | NipsIt Inside | Poncho Beta | Mustang Maxx | Counter 20G | Lorsban 15G | Other | None |
| Fargo       | 35                  | 0                        | 3             | 28          | 3            | 20          | 0           | 0     | 46   |
| Grafton     | 52                  | 2                        | 0             | 17          | 2            | 4           | 6           | 0     | 69   |
| Grand Forks | 65                  | 0                        | 0             | 48          | 2            | 22          | 0           | 0     | 29   |
| Wahpeton    | 10                  | 0                        | 10            | 0           | 0            | 10          | 10          | 0     | 70   |
| Totals      | 162                 | 1                        | 1             | 31          | 2            | 15          | 2           | 0     | 48   |

As presented in Table 13, 70% of grower respondents across all four seminar locations rated their insecticide performance for springtail management as good to excellent, and only 5% rated insecticide performance as poor. Satisfaction among growers with regard to insecticide performance for springtail control was fairly similar across locations, with ratings of good to excellent by 72% of respondents at both Fargo and Grand Forks. Assessments of insecticide performance for springtail control were slightly lower from growers at Grafton and Wahpeton (66 and 50% good to excellent, respectively); however, respondent ratings of poor performance averaged only 5% across seminar locations.

**Table 13. Satisfaction with insecticide treatments for springtail management in 2019**

| Location    | Number of Responses | Excellent | Good | Fair | Poor | Unsure |
|-------------|---------------------|-----------|------|------|------|--------|
|             |                     |           |      |      |      |        |
| Fargo       | 18                  | 44        | 28   | 11   | 6    | 11     |
| Grafton     | 18                  | 33        | 33   | 0    | 6    | 28     |
| Grand Forks | 49                  | 29        | 43   | 12   | 4    | 12     |
| Wahpeton    | 2                   | 0         | 50   | 50   | 0    | 0      |
| Totals      | 87                  | 32        | 38   | 10   | 5    | 15     |

Only 13% of respondents surveyed across all seminar locations reported using an insecticide for Lygus bug management in 2019 (Table 14). The majority (i.e., 6% averaged across locations) of growers applied a liquid formulation of chlorpyrifos (i.e., Lorsban 4E, Lorsban Advanced, or a generic equivalent) for this purpose. Those producers comprised 18, 4, and 20% of surveyed producers at Fargo, Grafton, and Wahpeton, respectively. Mustang Maxx was used for this purpose by 6% of grower respondents that attended the Fargo seminar, and only 2% of respondents at Grand Forks. Interestingly, although variable across locations, between 3 and 10% of respondents reported using an insecticidal option that was not included as a choice in the survey for Lygus bug management.

**Table 14. Insecticide use for Lygus bug management in 2019**

| Location    | Number of Responses | Asana | Lannate | Lorsban (4E, Advanced, or generic) | Movento | Mustang Maxx | Other | None |
|-------------|---------------------|-------|---------|------------------------------------|---------|--------------|-------|------|
|             |                     |       |         |                                    |         |              |       |      |
| Fargo       | 34                  | 0     | 0       | 18                                 | 0       | 6            | 3     | 73   |
| Grafton     | 44                  | 0     | 0       | 4                                  | 0       | 0            | 6     | 90   |
| Grand Forks | 63                  | 0     | 0       | 0                                  | 0       | 2            | 3     | 95   |
| Wahpeton    | 10                  | 0     | 0       | 20                                 | 0       | 0            | 10    | 70   |
| Totals      | 156                 | 0     | 0       | 6                                  | 0       | 2            | 4     | 87   |

Although a relatively small number of growers (i.e., 21 across all locations) responded to the question regarding satisfaction with insecticide performance for Lygus bug control, 52% rated it as good to excellent (Table 15). Satisfaction levels of good to excellent ranged from 50% at the Fargo seminar to 100% at Wahpeton, although it should be noted that only two respondents answered this question at the Wahpeton seminar. No respondents rated their insecticide performance as poor at any of the locations; however, 33 and 83% of respective attendees at Grafton and Grand Forks responded as being unsure of the level of their insecticide performance.

**Table 15. Satisfaction with insecticide treatments for Lygus bug management in 2019**

| Location    | Number of Responses | Excellent | Good | Fair | Poor | Unsure |
|-------------|---------------------|-----------|------|------|------|--------|
|             |                     |           |      |      |      |        |
| Fargo       | 10                  | 50        | 20   | 10   | 0    | 20     |
| Grafton     | 3                   | 33        | 0    | 33   | 0    | 33     |
| Grand Forks | 6                   | 17        | 0    | 0    | 0    | 83     |
| Wahpeton    | 2                   | 0         | 100  | 0    | 0    | 0      |
| Totals      | 21                  | 33        | 19   | 10   | 0    | 38     |

The majority (60%) of respondents, averaged across all grower seminar locations, reported that they applied postemergence liquid insecticides in a total spray output volume of between six and 10 gallons per acre (GPA), and 29% reported using output volumes ranging between 11 and 15GPA. At individual locations, the percentage of producers using the 6- to 10 GPA rate ranged from 56 to 63% at Fargo, Grafton, and Grand Forks up

to 100% of the Wahpeton respondents. Responses to this question at Wahpeton should be considered with discretion, as only three individuals at that seminar location provided input on this question.

**Table 16. Spray volume output used for ground-applied postemergence insecticide applications in 2019**

| Location    | Number of Responses | 1–5 GPA                  | 6–10 GPA | 11–15 GPA | 16–20 GPA | > 20 GPA |
|-------------|---------------------|--------------------------|----------|-----------|-----------|----------|
|             |                     | -----% of responses----- |          |           |           |          |
| Fargo       | 16                  | 13                       | 56       | 31        | 0         | 0        |
| Grafton     | 34                  | 9                        | 56       | 35        | 0         | 0        |
| Grand Forks | 32                  | 9                        | 63       | 25        | 3         | 0        |
| Wahpeton    | 3                   | 0                        | 100      | 0         | 0         | 0        |
| Totals      | 85                  | 9                        | 60       | 29        | 1         | 0        |

At the Fargo seminar, 31% of respondents reported applying postemergence insecticide sprays in a volume of 11 to 15 GPA, and survey results at Grafton and Grand Forks indicated that 35 and 25% of growers used this higher output volume. These responses were significant increases in use of the 11-15 GPA spray volume when compared to those reported for the previous (2018) crop year. Smaller numbers (9 to 13%) of attendees at the Fargo, Grafton, and Grand Forks grower seminars responded as having used an output volume of one to six gallons per acre to deliver their postemergence liquid insecticide. Using such a low output volume for a ground-based foliar application would be quite rare and, most likely, ineffective for insect control. It is possible that some respondents misread this question, and responded with the output volume of treatments made on their fields by aircraft. However, that is only speculated, and cannot be concluded with a reasonable level of certainty. A small number (3%) of respondents at Grand Forks also reported applying postemergence insecticides at an even higher output volume range of 16 to 20 GPA, however, that amounted to just 1% of respondents when averaged across all four seminar locations.

Overall, 76% of all respondents at the 2019 Winter Sugarbeet Grower Seminars (all locations combined) reported that their insecticide use in 2019 was not different from what it had been during the previous five years (Table 17). At the Fargo Growers Seminar, 14% of respondents indicated that their insecticide use in sugarbeet had decreased, and 75% of respondents at that location reported no change in insecticide use in comparison to the past five years. However, 18, 11, and 11% of grower respondents at Grafton, Grand Forks, and Wahpeton, respectively, indicated that their insecticide use had increased when compared to the previous five years. This finding was probably due to sugarbeet root maggot population increases in 2019 in areas that typically experience lower root maggot infestations. At the Wahpeton seminar location, 33% of attendees reported that they did not use an insecticide on their sugarbeet crop in 2019. That was a 15% reduction from 2018, suggesting an overall increase in insecticide use by growers within the MinnDak Farmers Cooperative growing area in 2019.

**Table 17. Insecticide use in sugarbeet during 2019 compared to the previous 5 years**

| Location    | Number of Responses | Increased                | Decreased | No Change | No Insecticide Use |
|-------------|---------------------|--------------------------|-----------|-----------|--------------------|
|             |                     | -----% of responses----- |           |           |                    |
| Fargo       | 36                  | 3                        | 14        | 75        | 8                  |
| Grafton     | 51                  | 18                       | 2         | 74        | 6                  |
| Grand Forks | 65                  | 11                       | 3         | 81        | 5                  |
| Wahpeton    | 9                   | 11                       | 11        | 44        | 33                 |
| Totals      | 161                 | 11                       | 6         | 76        | 7                  |

Averaged across all four grower seminar locations, 62% of respondents indicated that they used some form of online or cellular-enabled information source for information regarding sugarbeet insect management during the 2019 growing season (Table 18). The most commonly used online/electronic decision-making tools used by attendees for pest management in 2019, as averaged across locations, included NDSU’s online posting of sugarbeet root maggot fly counts (18%), the NDSU Crop & Pest report (14%), cellular text alerts (12%), and the NDSU root

maggot model application on the North Dakota Agricultural Weather Network (NDAWN) (12%).

**Table 18. Use of online decision-making tools for sugarbeet insect management in 2019**

| Location                 | Number of Responses | Cellular text alerts | Maggot Mobile app | NDSU Crop&Pest Report | Root Maggot Fly Count Website | Root Maggot Model (NDAWN) | Sugarbeet Production Guide | Other | None |
|--------------------------|---------------------|----------------------|-------------------|-----------------------|-------------------------------|---------------------------|----------------------------|-------|------|
| -----% of responses----- |                     |                      |                   |                       |                               |                           |                            |       |      |
| Fargo                    | 47                  | 15                   | 0                 | 30                    | 6                             | 9                         | 2                          | 34    | 4    |
| Grafton                  | 70                  | 11                   | 1                 | 9                     | 14                            | 21                        | 1                          | 41    | 0    |
| Grand Forks              | 100                 | 12                   | 5                 | 8                     | 28                            | 9                         | 7                          | 30    | 1    |
| Wahpeton                 | 11                  | 0                    | 0                 | 27                    | 0                             | 0                         | 0                          | 45    | 27   |
| Totals                   | 228                 | 12                   | 3                 | 14                    | 18                            | 12                        | 4                          | 35    | 3    |

At the Fargo seminar, about 62% of respondents indicated using some form of online information, with most use involving the NDSU Crop & Pest Report (30%) and the cellular text-alert system (15%). The majority (21%) of respondents at Grafton reported using the NDAWN root maggot model, and 14% of Grafton attendees also reported using NDSU’s online posting of root maggot fly counts for guidance with management decisions. Attendees of the Grand Forks seminar location reported substantially greater use of NDSU’s web-posted root maggot fly counts (28%) than the respondents at any other seminar location. Twelve percent of Grand Forks attendees also reported using the cellular text-alert system for guidance on their pest management decision-making in 2019. The highest proportion (27%) of Wahpeton seminar respondents reported getting most of their insect pest management information from the NDSU Crop & Pest Report in 2019.