

## SUGARBEET INSECTS

Other resources available through NDSU Extension Service:

Internet Document: Insects Affecting Sugarbeets in North Dakota (<http://www.sbreb.org/brochures/ndinsects/ndinsects.htm>)  
 Publications: Sugarbeet Production Guide  
 Sugarbeet Research and Extension Reports  
 Sugarbeet Insects (color I.D. plates)

| Calendar of Sugarbeet Insect Activity in the Red River Valley |              |  |  |      |  |  |      |  |  |                                       |  |
|---|--------------|--|--|------|--|--|------|--|--|---------------------------------------|--|
| April   | May          |  |  | June |  |  | July |  |  | August                                |  |
|   | Flea Beetles |  |  |      |  |  |      |  |  |                                       |  |
|   | Springtails  |  |  |      |  |  |      |  |  |                                       |  |
|   | White Grubs  |  |  |      |  |  |      |  |  |                                       |  |
|   | Wireworms    |  |  |      |  |  |      |  |  |                                       |  |
|   |              |  | Cutworms - Dingy, Dark-sided,<br>and Redbacked |      |  |  |      |  |  |                                       |  |
|   |              |  | Beet Webworm - adults                          |      |  |  |      |  |  |                                       |  |
|   |              |  | Beet Webworm - larvae                          |      |  |  |      |  |  |                                       |  |
|   |              |  | Sugarbeet Root Maggot - adults                 |      |  |  |      |  |  |                                       |  |
|   |              |  | Sugarbeet Root Maggot - larvae                 |      |  |  |      |  |  |                                       |  |
|   |              |  |  |      |  |  |      |  |  | Tarnished Plant ( <i>Lygus</i> ) Bugs |  |
|   |              |  |  |      |  |  |      |  |  | Cutworms - Black and Variegated       |  |

### BEET WEBWORM

Beet webworms rarely occur in significant numbers in Red River Valley sugarbeet fields. Larvae are slender caterpillars and are very active when disturbed. Early-stage larvae are dark green. Older larvae are olive green and have a dark band flanked on each side by two light-colored stripes running down the center of their back. Full-grown larvae can be up to 1½ inches long. Adults are mottled tan and brown moths with smoky grayish wing margins. The moths first appear in late May and early June. Larvae usually cause problems during the first 3 weeks of June. A second brood is also possible during late August and September.

**Threshold:**

Treatment is recommended if 1 to 2 webworms are present on 50% to 75% of sampled leaves.

| INSECTICIDE   | DOSAGE IN LB<br>AI/ACRE | PRODUCT<br>PER ACRE | RESTRICTIONS ON USE   |
|---|-------------------------|---------------------|---|
| <b>esfenvalerate</b><br>Adjourn<br>Asana XL<br><br><i>RUP</i>                                   | 0.03 - 0.05             | 5.8 - 9.6 fl oz     | Do not exceed 0.15 lb ai/acre per season. Apply with a minimum of 2 gal per acre. PHI = 21 days.  |
| <b>carbaryl</b><br>Sevin<br><br><i>RUP</i>  | 1 - 1.5                 | variable            | PHI = 28 days. Repeat application as necessary up to 2 times, but not more often than every 14 days. Do not apply more than 3 lb of active ingredient per acre per crop.  |
| <b>chlorpyrifos</b><br>Chlorpyrifos 4E AG<br>Lorsban 4E<br>Warhawk<br>Yuma 4E<br><br><i>RUP</i> | 0.5 - 1                 | 1 - 2 pt            | Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications per season. Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment. PHI = 30 days. |
| <b>methomyl</b><br>Lannate LV<br><br><i>RUP</i>   | 0.22 - 0.9              | 0.75 - 3 pint       | PHI = 7 days. Do not feed tops to livestock within 30 days of last application. Field re-entry interval is 48 hours. Do not apply more than 4.5 lb active ingredient per acre per crop. Do not make more than 10 applications per crop.                                     |
| <b>methyl parathion</b><br><br><i>RUP</i>   | 0.25 - 0.38             | 0.5 - 0.75 pt       | PHI = 20 days; or 60 days of feeding tops to animals. Do not enter fields for 48 hours after application.   |

*RUP* - Restricted use pesticide

## CUTWORMS

Major cutworm pests of sugarbeets in the Red River Valley include the **Darksided and Redbacked cutworms**. Eggs of both species hatch into larvae during late May and early June. Early detection of larval feeding activity is essential to a good control program. Fields should be checked for wilting or dead plants at frequent intervals during periods of cutworm activity. Cutworms will generally be found within 1 to 2 inches of the soil surface near the base of wilting plants. Most feeding activity occurs at night. Young sugarbeet plants are often cut off near ground level. During periods of dry weather, larvae prefer feeding just below the soil surface as they move along the row. They will feed above the surface on leaves and petioles during periods of excessive soil moisture.

Variiegated and black cutworm infestations also caused problems in late July and August. These insects migrate into our region as moths during the spring and are capable of multiple generations within a single growing season. Variiegated cutworm larvae have a distinctive row of pale yellow spots down the middle of their backs. They are a climbing cutworm species that primarily feeds in the plant canopy during evening hours. Because they feed above ground, insecticide treatment can be effective in controlling economic populations of variiegated cutworms. Black cutworms can feed more than 2 inches below ground in later growth stages when soils are too warm near the surface. Therefore, late-season control of these cutworms can be difficult to achieve.

Insecticides generally require some moisture after application for optimal performance. Very light rain showers or heavy dew is generally sufficient. It is desirable to apply insecticides during late afternoon. This maximizes the amount of insecticide material present during the first nighttime hours following application when larvae are often most active. Applications may be repeated as necessary during peak cutworm feeding. Liquid formulations generally provide better control of cutworms, especially during very dry periods. If severe crusting is evident in the field, the crust should be broken up prior to or during the insecticide application.

### Threshold:

Cutworm control in young beets is suggested when 4 to 5% cutting of seedlings observed in fields. Control is recommended when a population of 3 to 5 larvae per square foot is observed in late summer when the plant canopy is developed.

| INSECTICIDE  | DOSAGE IN LB<br>AI/ACRE                     | PRODUCT<br>PER ACRE   | RESTRICTIONS ON USE   |
|--|---|---|---|
| carbaryl<br>Sevin  | 1.5   | variable  | This treatment is most effective against cutworms feeding on upper portions of plants. Repeat application as necessary up to 2 times but not more often than every 14 days. PHI = 28 days. Do not apply more than 3 lb of active ingredient per acre per crop.  |
| chlorpyrifos<br>Lorsban 15G<br><i>RUP</i>  | 1.5 - 2.0                                   | 10.0 - 13.3 lb<br>(6.6 - 9 oz/1,000<br>row ft)              | Granules must be applied behind furrow openers and ahead of press wheels as a 4- to 5-inch band at planting. <b>Do not apply in-furrow or modified in-furrow.</b> Lightly incorporate with chains or tines behind press wheels for best results. <b>Do not apply granules in direct contact with the seed.</b> Do not make more than 1 application per year.            |
| chlorpyrifos<br>Chlorpyrifos 4E AG<br>Govern 4E<br>Lorsban 4E<br>Lorsban Advanced<br>Nufos 4E<br>Warhawk 4E<br>Whirlwind 4E<br>Yuma 4E<br><i>RUP</i> | Foliar broadcast:<br>1<br><br>Band:<br>0.67 | Foliar broadcast:<br>2 pts<br><br>Band:<br>1½ pts           | PHI = 30 days. Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications of chlorpyrifos-containing products per season. Maximum single application rate is 0.94 lg ai per acre. Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment. |
| clothianidin + beta-<br>Cyfluthrin<br>Poncho Beta<br>(seed treatment)  | refer to<br>recommended label<br>rate       | 5.07 fl oz per unit of<br>seed (a unit is<br>100,000 seeds) | Follow all applicable directions, restrictions and precautions on the EPA registered label.   |
| esfenvalerate<br>Adjourn<br>Asana XL<br><i>RUP</i>   | 0.03 - 0.05                                 | 5.8 - 9.6 fl oz   | PHI = 21 days. Do not exceed 0.15 lb ai/acre per season as an at-plant treatment or 0.25 lb ai/acre per season. Apply with a minimum of 2 gal per acre.   |
| esfenvalerate<br>Asana XL<br><i>RUP</i>  | 0.0023 lbs a.i. per<br>1000 feet of row     | 0.45 fl oz per 1,000<br>feet of row                         | Use for sugarbeets at plant. PHI = 21. Apply as in in-furrow, T-band, or band treatment using a minimum 4" band. See label for specific rate information. Do not exceed 0.05 lbs a.i. per season as an at-plant application. Do not apply more than 0.25 lbs a.i. per acre per season including at-plant plus foliar applications of Asana XL.                          |
| <b>FOR SUGAR BEETS<br/>AT-PLANT ONLY</b>   |   |   |   |

| INSECTICIDE  | DOSAGE IN LB AI/ACRE                               | PRODUCT PER ACRE                                | RESTRICTIONS ON USE   |
|--|--|---|---|
| <b>methomyl</b><br>Lannate LV<br><i>RUP</i>              | 0.45   | 1.5 pt  | Apply for variegated cutworm control. PHI = 7 days. Do not feed tops to livestock within 30 days of last application. Field re-entry interval is 48 hours. Do not apply more than 4.5 lb active ingredient per acre per crop. Do not make more than 10 applications per crop.   |
| <b>methyl parathion</b><br><i>RUP</i>                    | 0.25 - 0.38  | 0.5 - 0.75 pt                                   | PHI = 20 days; or 60 days of feeding tops to animals. Do not enter fields for 48 hours after application.   |
| <b>zeta-cypermethrin</b><br>Mustang Max EC<br><i>RUP</i> | Foliar:<br>0.014 - 0.025<br><br>At plant:<br>0.025 | Foliar:<br>2.24 - 4 oz<br><br>At plant:<br>4 oz | PHI = 50 days for tops and roots. Apply as foliar application or in-furrow using a 3- to 4-inch T-band (band over the open furrow) at planting in a minimum of 3 to 5 gals of finished spray per acre. Do not apply more than 0.075 lb active ingredient per acre per season. Registered for 24 (c) special local need sale and use in sugarbeet in ND (SLN no. ND-030003) and expires December 31, 2013. |

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## FLEA BEETLES

The flea beetles most frequently found feeding on beets are shiny black in color and about 1/8 inch in length. All flea beetles are oval-shaped and have enlarged hind legs. When approached or disturbed, they readily jump to escape. Flea beetles overwinter as adults and emerge in late April and May. They feed first on suitable weeds such as winter annuals, and move to field crops as weed hosts are depleted and crop plants begin emerging. Foliar feeding injury from flea beetles consists of small, rounded holes, and gives leaves a shot-hole appearance. Severe shot-holing damage can result in stunting, wilting, and even death of seedling plants. Plant responses will be most dramatic during periods of hot and dry weather.

### Threshold:

Treatment is usually justified if flea beetles threaten to reduce sugarbeet plant stands to below 35,000 plants/acre.

| INSECTICIDE   | DOSAGE IN LB AI/ACRE                        | PRODUCT PER ACRE                                      | RESTRICTIONS ON USE   |
|---|---|---|---|
| <b>carbaryl</b><br>Sevin  | 1 - 1.5                                     | variable  | Repeat application as necessary up to 2 times but not more often than every 14 days. PHI = 28 days. Do not apply more than 3 lb of active ingredient per acre per crop.   |
| <b>chlorpyrifos</b><br>Lorsban 4E<br>Lorsban Advanced<br>Warhawk<br>Yuma 4E<br><i>RUP</i> | Foliar broadcast:<br>1<br><br>Band:<br>0.67 | Foliar broadcast:<br>2 pts<br><br>Band:<br>1 1/3 pts  | PHI = 30 days. Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications per season. Maximum single application rate is 0.94 lg ai per acre. Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment. |
| <b>clothianidin + beta-Cyfluthrin</b><br>Poncho Beta<br>(seed treatment)                  | refer to recommended label rate             | 5.07 fl oz per unit of seed (a unit is 100,000 seeds) | Follow all applicable directions, restrictions and precautions on the EPA registered label.   |
| <b>esfenvalerate</b><br>Adjourn<br>Asana XL<br><i>RUP</i>                                 | 0.03 - 0.05                                 | 5.8 - 9.6 fl oz                                       | Do not exceed 0.15 lb ai/acre per season. Apply with a minimum of 2 gal per acre. PHI = 21 days.  |
| <b>methomyl</b><br>Lannate LV<br><i>RUP</i>   | 0.22 - 0.9                                  | 0.75 - 3 pint   | PHI = 7 days. Do not feed tops to livestock within 30 days of last application. Field re-entry interval is 48 hours. Do not apply more than 4.5 pounds active ingredient per acre per crop. Do not make more than 10 applications per crop.   |
| <b>methyl parathion</b><br><i>RUP</i>   | 0.25 - 0.38                                 | 0.5 - 0.75 pt   | PHI = 20 days; or 60 days of feeding tops to animals. Do not enter fields for 48 hours after application.   |

| INSECTICIDE                                       | DOSAGE IN LB AI/ACRE | PRODUCT PER ACRE | RESTRICTIONS ON USE   |
|---|----------------------|------------------|---|
| zeta-cypermethrin<br>Mustang Max EC<br><i>RUP</i> | 0.014 - 0.025        | 2.24 - 4 oz      | PHI = 50 days of harvesting tops or roots. Apply using a minimum of 2 gals of water per acre by air or 10 gals per acre by ground. Do not apply more than 0.75 lb active ingredient per acre per season. Registered for 24 (c) special local need sale and use in sugarbeet in ND (SLN no. ND-030003) and expires December 31, 2013 |

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## GRASSHOPPERS

In the Northern Plains, grasshopper eggs hatch normally begins in late April to early May. Most grasshoppers emerge from eggs deposited in uncultivated ground. Sugarbeet growers should expect to find grasshopper feeding first along field margins adjacent to these sites. Beets in fields that follow late-season crops may have hatching throughout the field and should be monitored carefully if adults deposited eggs in the field during the previous fall. Later infestations may develop when grasshopper adults migrate from harvested small grain fields.

### Threshold:

Grasshopper control is advised whenever 20 or more adults per square yard are found in field margins or 8 to 14 adults per square yard are occurring in the crop. (For more information on infestation ratings, see the discussion under Grasshoppers in Small Grain Insects)

| INSECTICIDE  | DOSAGE IN LB AI/ACRE           | PRODUCT PER ACRE  | RESTRICTIONS ON USE  |
|--|--------------------------------|---|--|
| esfenvalerate<br>Asana XL<br><i>RUP</i>  | 0.02 - 0.03<br><br>0.03 - 0.05 | Low Rate:<br>3.9 - 5.8 fl oz<br><br>High Rate:<br>5.8-9.6 fl oz | PHI = 21 days. A <b>reduced rate</b> has been issued as a state 2 (ee) label. These lower rates are for control of first- and second-stage grasshoppers, <b>ONLY</b> . The reduced-rate application has a range of 3.9 - 5.8 fl oz. The higher rates are for control of grasshopper nymphs larger than 2 <sup>nd</sup> instar. Do not exceed 0.15 lb ai/acre per season. Apply with a minimum of 2 gal per acre. |
| chlorpyrifos<br>Chlorpyrifos 4E AG<br>Lorsban 4E<br>Lorsban Advanced<br>Nufos 4E<br>Warhawk<br>Yuma 4E<br><i>RUP</i> | 0.25 - 0.5                     | 0.5 - 1 pt  | PHI = 30 days. Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications per season. Maximum single application rate is 0.94 lg ai per acre. Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment.  |
| methyl parathion<br><i>RUP</i>   | 0.25 - 0.38                    | 0.5 - 0.75 pt   | PHI = 20 days; or 60 days of feeding tops to animals. Do not enter fields for 48 hours after application.  |
| zeta-cypermethrin<br>Mustang Max EC<br><i>RUP</i>  | 0.014 - 0.025                  | 2.24 - 4 fl oz  | PHI = 50 days of harvesting tops or roots. Apply using a minimum of 2 gals of water per acre by air or 10 gals per acre by ground. Do not apply more than 0.75 lb active ingredient per acre per season. Registered for 24 (c) special local need sale and use in sugarbeet in ND (SLN no. ND-030003) and expires December 31, 2013.   |

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## LYGUS BUG (TARNISHED PLANT BUG)

Tarnished plant bugs, commonly referred to as "Lygus bugs", have caused late-season injury to Red River Valley sugarbeets since 1998. Most feeding injury appears on new leaves and stems emerging from the sugarbeet plant crown. Feeding symptoms include curling and wilting of leaves, feeding scars on leaf petioles, seepage of a black exudate from petioles of young leaves, and blackening of the new growth near the center of the crown. Multiple generations of Lygus bugs can develop during the growing season, especially if extended periods of unseasonably warm weather prevail during spring and early summer. Populations usually build up in other host plant habitats (e.g., alfalfa, canola, small-seeded broadleaf weeds), then adults migrate to beets in late-July

through August. Lygus bugs are sporadic pests in this region and their biological profile is not understood well enough to anticipate when or where future problems could arise.

**Threshold:**

Treatment with an insecticide may be justified if an infestation **exceeds** 1 Lygus bug per plant (adults and nymphs combined) after checking 30 to 50 plants in a field. Significant economic loss is likely to occur if an infestation reaches 4 Lygus bugs per plant. Lygus bugs usually infested beets during August. Therefore consideration of pre-harvest interval may be a critical factor in choosing an insecticide. A number of insecticides that are approved for use on sugarbeets have Tarnished plant bug or *Lygus* as a target pest in their labels for other crops; however, Tarnished plant bug is not listed as a target pest in the *sugarbeet* portion of those labels.

**These insecticides include Asana, carbaryl (Sevin), Lannate, Lorsban, and malathion. It is legal to apply an insecticide if it is labeled for use in the crop;** however, if the target pest is not listed for that crop, efficacy is not implied by the manufacturer and growers who choose to use the product assume their own liability for any unsatisfactory performance.

| INSECTICIDE   | DOSAGE IN LB AI/ACRE | PRODUCT PER ACRE | RESTRICTIONS ON USE   |
|---|----------------------|------------------|---|
| <b>naled</b><br>Dibrom 8 Emulsive   | 0.94                 | 1 pt             | PHI = 2 days. Apply by air in 1 to 5 gals of water per acre. Do not apply more than 5 pt per acre per season. Allow 7 days between successive applications. Do not make more than 5 applications per season. <b>Issued by manufacturer as a FIFRA Section 2 (ee) recommendation for use within the following states: ND, MN, MT, WY, NE, SD, CO, ID, WA, and OR</b> |
| <b>chlorpyrifos</b><br>Govern 4E<br>Lorsban 4E<br>Lorsban Advanced<br>Warhawk 4E<br>Whirlwind 4E<br>Yuma 4E<br><br><i>RUP</i> | 0.5                  | 1 pt             | PHI = 30 days. Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications per season. Maximum single application rate is 0.94 lg ai per acre. Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment.                                 |

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**SPRINGTAILS**

Springtails that damage RRV sugarbeet fields are tiny (1/32 to 3/32 inch long), wingless, white- to cream-colored insects with fleshy, forward-pointed antennae. They spend their entire life below the soil surface, and are most harmful to seedlings. Plant injury ranges from a few brown feeding punctures to extensive root scarring. Field symptoms include wilted plants and plant stand losses. *Fine-textured* (i.e., clay or silty clay) soils with *high organic matter content* are conducive to springtail problems. *Early-planted fields, especially where soils remain cool and wet* during early spring, can be especially vulnerable to attack. Field history is a good indicator of risk because springtails do not migrate from one field to another. Insecticides registered for use in sugarbeet against other soil-dwelling pests may be used for springtail control; however, manufacturers are not legally bound to guarantee acceptable control if springtail control is not listed on the product label.

NDSU research on springtail management suggests the following:

Counter 15G provides good control if applied at 1.5 lb AI (10 lb product) per acre.

Counter should not be applied at less than 0.0 lb AI (6 lb product) per acre for springtail control.

MustangMax has provided unsatisfactory control in some cases. It performs best when applied:

1. directly in-furrow at planting using conventional nozzles (not microtubes)
2. at full rate of 4 oz of product per acre, and
3. tank-mixed with strained 10-34-0 starter fertilizer at a ratio of 60:1 (fertilizer to insecticide)

Lorsban 15G and other chlorpyrifos-based products will not provide adequate protection from springtail injury.

| INSECTICIDE  | DOSAGE IN LB AI/ACRE                                 | PRODUCT PER ACRE                                     | RESTRICTIONS ON USE  |
|--|--|--|--|
| <b>clothianidin</b><br>NipsIT INSIDE<br>(seed treatment) | 60 g a.i. per unit of seed (a unit is 100,000 seeds) | 3.4 fl oz per unit of seed (a unit is 100,000 seeds) | NipsIT cannot be applied to GMO (e.g., glyphosate-resistant transgenic) sugarbeet seed until January 1, 2011. Application to seed by commercial seed treatment equipment utilizing standard liquid or slurry treaters is necessary. Tank mixtures with other seed treatment products should be pretested to evaluate compatibility and assure proper physical compatibility. |

| INSECTICIDE  | DOSAGE IN LB<br>AI/ACRE  | PRODUCT<br>PER ACRE  | RESTRICTIONS ON USE   |
|--|--|--|---|
| <b>clothianidin + beta-cyfluthrin</b><br>Poncho Beta<br>(seed treatment) | 68 g a.i. per unit of seed (a unit is 100,000 seeds) refer to recommended label rate | 5.07 fl oz per unit of seed (a unit is 100,000 seeds)        | For application to seed by commercial treaters only. Not for application to seed via hopper-box, slurry-box, or similar on-farm seed treatment applicators. Treated areas may be replanted with any crop listed on both clothianidin and beta-cyfluthrin labels. Areas planted with treated seed may be replanted immediately with corn or after 30 days with cereal grains, soybeans, dried beans and dried peas.            |
| <b>imidacloprid</b><br>Gaucho 600<br>(seed treatment)                    | refer to recommended label rate  |  | Apply as a commercial seed treatment only. Follow all applicable directions, restrictions and precautions on the EPA registered label.  |
| <b>terbufos</b><br>Counter 15G <sup>a</sup><br>RUP                       | 1 - 1.8  | 5.9 - 11.9 lbs<br>or<br>4 - 8 oz/1,000 row ft                | Counter performs best against wireworms if applied using spoon or modified in-furrow (2-3 inches behind seed drop zone) placement at planting time. Banded applications may not provide acceptable control. Do not place in direct contact with seed. Do not harvest sugarbeets or feed tops to livestock within 110 days after application. Treated fields must be posted. <b>Only one application may be made per year.</b> |
| <b>terbufos</b><br>Counter 20G <sup>a</sup>                              | 0.9 - 1.8  | 5.9 - 11.9<br>or<br>3 - 6 oz/1,000 row ft                    |   |
| <b>thiamethoxam</b><br>Criuser 5FS<br>(seed treatment)                   | 60 - 70 g a.i. per unit of seed (a unit is 100,000 seeds)                            | 3.39 - 3.95 fl oz per unit of seed (a unit is 100,000 seeds) | Apply at 3.39-3.95 fl oz per seed unit. Cruiser can be combined with seed coating materials and seed treatment fungicides. Such combinations should be tested for seed safety prior to large-scale planting to ensure that there will be no detrimental effects on seed germination or plant stand establishment.   |

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<sup>a</sup> Counter 15G and Counter 20G may only be applied once per year.

## SUGARBEET ROOT MAGGOT

This insect overwinters in soil at 6 to 12 inches below the surface as a mature larva in fields that had been planted to sugarbeets during the previous growing season. In late April and early May, overwintered larvae move up to within 3 inches of the soil surface to pupate. In the Red River Valley, fly emergence generally begins in late May and continues for a period of 4 to 6 weeks. Following emergence, flies move to current-year sugarbeet fields and deposit eggs below the soil surface near the base of beet plants. Egg depth is dependent on soil moisture (i.e., eggs are deposited deeper in dry soil conditions). Earlier-seeded (April - early May) plants are usually more vigorous and able to tolerate more injury than smaller, later-planted beets. Fields planted in areas with established maggot populations should be protected with a planting-time insecticide. These treatments will usually be effective with adequate rainfall during June. If dry conditions prevail, a postemergence insecticide application may be needed. This management approach has been shown to be cost-effective during dry growing seasons and under severe maggot infestation levels. Producers should consider the following when deciding if a postemergence treatment is warranted: **soil moisture** - good soil moisture with spring rains should enhance planting-time insecticide performance – extreme rainfall amounts (3 inches within first 24 hours or at least 6 inches if received in 1 or 2 rainfall events within 1 week after planting) may cause movement of the insecticide from the treated target zone; **sugarbeet size** - plants that have 10 to 14 true leaves at peak activity (early- to mid-June) can tolerate moderate levels of feeding injury; **population level** - use sticky-stake traps to monitor for development of damaging population levels.

| INSECTICIDE  | DOSAGE IN LB<br>AI/ACRE   | PRODUCT<br>PER ACRE  | RESTRICTIONS ON USE   |
|--|---|--|---|
| <b>aldicarb</b><br>Temik 15G <sup>b</sup><br><i>RUP</i>                  | 1.0 - 2.1   | 6.7 - 14 lb<br>(4.5 - 9.5 oz/1,000<br>row ft)  | PHI = 90 days for root harvest or within 120 days of top harvest for livestock feeding. Apply at planting in a 2- to 6-inch band or by modified in-furrow. Lightly incorporate banded applications. Do not use in consecutive years or in suspected aggressive soils. For postemergence treatment, apply granules to both sides of row and incorporate immediately. Do not use tops as food for humans. Do not apply more than 33 pounds per acre per year. Treated areas must be posted with warning signs.  |
| <b>chlorpyrifos</b><br>Lorsban 15G <sup>a</sup><br><i>RUP</i>            | 1.0 - 2.0   | 6.75 - 13.3 lb<br>(4.5 - 9 oz/1,000<br>row ft)   | Granules must be applied behind furrow openers and ahead of press wheels as a 5-inch band at planting. <b>Do not apply in-furrow or modified in-furrow.</b> Lightly incorporate with chains or tines behind press wheels for best results. <b>Do not apply granules in direct contact with the seed.</b> The low application rate should be considered if low infestation levels are expected. If low rate is applied, monitor for higher than anticipated adult fly numbers. May be applied postemergence in accordance with label directions. <b>Do not make more than 1 application per year.</b>  |
| <b>chlorpyrifos</b><br>Nufos 15G <sup>a</sup><br><i>RUP</i>              | 1.0 - 2.0   | 6.75 - 13.4 lb<br>(4.5 - 9 oz/1,000<br>row ft)   |   |
| <b>chlorpyrifos</b><br>Lorsban 4E<br>Lorsban Advanced<br><i>RUP</i>      | Foliar broadcast for<br>adults:<br>0.25 - 1<br><br>Foliar broadcast for<br>larvae:<br>1<br><br>Band for larvae:<br>0.67 - 1 | Foliar broadcast for<br>adults:<br>0.5 - 2 pt<br><br>Foliar broadcast for<br>larvae:<br>2 pt<br><br>Band for larvae:<br>1½ - 2 | PHI = 30 days for beet roots and tops. Apply in 5- to 7-inch bands or as a broadcast treatment. When banding, apply using a minimum of 6.5 gals of finished spray per acre and <b>do not reduce the dosage for banded applications (i.e., apply the specified broadcast dosage within the band).</b> Time treatments from 7 days before to 3 days after peak adult fly activity. For best results, band-applied treatment should be lightly incorporated, either mechanically or with irrigation. If an organophosphate insecticide was used at planting, make no more than 1 application any chlorpyrifos product per season when adults are active. <b>Do not apply more than 6 pt/acre (broadcast basis) or make more than 3 applications per season.</b> Do not allow meat or dairy animals to graze in treated area or harvest treated beet tops as feed for meat or dairy animals within 30 days of last treatment. |
| <b>chlorpyrifos</b><br>Govern 4E<br><i>RUP</i>                           | 0.25 - 1.0  | 0.5 - 2 pts  |   |
| <b>chlorpyrifos</b><br>Nufos 4E<br><i>RUP</i>                            | 0.5   | 1 pt   |   |
| <b>chlorpyrifos</b><br>Warhawk 4E<br><i>RUP</i>                          | -   | 1 1/3 - 2 pts  |   |
| <b>chlorpyrifos</b><br>Whirlwind 4E<br><i>RUP</i>                        | 0.25 - 1.0  | 0.5 - 2 pts  |   |
| <b>chlorpyrifos</b><br>Yuma 4E<br><i>RUP</i>                             | -   | 1 1/3 - 2 pts  |   |
| <b>clothianidin + beta-Cyfluthrin</b><br>Poncho Beta<br>(seed treatment) | refer to<br>recommended label<br>rate   | 5.07 fl oz per unit of<br>seed (a unit is<br>1000,000 seeds)   | Follow all applicable directions, restrictions and precautions on the EPA registered label.   |

| INSECTICIDE   | DOSAGE IN LB<br>AI/ACRE | PRODUCT<br>PER ACRE                          | RESTRICTIONS ON USE  |
|---|-------------------------|--|--|
| <b>esfenvalerate</b><br>Asana XL<br><i>RUP</i><br><b>ADULT FLIES ONLY</b> | 0.03 - 0.05             | 5.8 - 9.6 fl oz                              | <b>Use as foliar spray for control of adult flies only.</b> Do not exceed 0.15 lb ai/acre per season. Apply with a minimum of 2 gal per acre. PHI = 21 days.   |
| <b>phorate</b><br>Thimet 20G <sup>a</sup><br><i>RUP</i>                   | 1.0 - 1.5               | 4.9 - 7.5 lb<br>(3.2 – 5 oz/1,000<br>row ft) | Apply in a 5- to 7-inch band over the row as a postemergence treatment and incorporate lightly into soil. Do not apply in a broadcast. <b>Do not make more than 1 application per year.</b> PHI = 30 days. Treated areas must be posted with warning signs.  |
| <b>terbufos</b><br>Counter 15G <sup>a</sup><br><i>RUP</i>                 | 0.9 - 1.8               | 5.9 - 11.9 lb<br>(4 - 8 oz/1,000 row<br>ft)  | Apply in a 5-inch band or by modified in-furrow at planting time. <b>Do not place in direct contact with seed.</b> Counter may also be banded over the row as a postemergence treatment. Planting-time and postemergence treatments should be incorporated lightly into soil. <b>Only 1 application may be made per year.</b> Do not harvest sugarbeets or feed tops to livestock within 110 days after application. Treated areas must be posted with warning signs.    |
| <b>terbufos</b><br>Counter 20G <sup>a</sup><br><i>RUP</i>                 | 0.9 - 1.8               | 5.9 - 11.9 lb<br>(4 - 8 oz/1,000 row<br>ft)  |  |
| <b>terbufos</b><br>Counter CR <sup>a</sup><br><i>RUP</i>                  | 0.9 - 1.8               | 4.5 - 8.9 lb<br>(3 - 6 oz/1,000 row<br>ft)   | Apply in a 5-inch band or by modified in-furrow at planting time. <b>Do not place in direct contact with seed.</b> Counter CR may also be banded over row as a postemergence treatment. Planting-time and postemergence treatments should be incorporated lightly into the soil. <b>Only 1 application may be made per year.</b> Do not harvest sugarbeets or feed tops to livestock within 110 days after application. Treated areas must be posted with warning signs. |

*RUP* - Restricted use pesticide

<sup>a</sup> Counter 15G, Counter 20G, Counter CR, Lorsban 15G, Nufos 15G and Thimet 20G may only be applied once per year.

<sup>b</sup> Temik 15G can be applied once at planting and up to two postemergence treatments can be applied per season; however, total product applied per acre per season cannot exceed 33 pounds.

## WIREWORMS

Wireworm larvae are smooth, somewhat hard-bodied worms varying in length from ½ to 1 ½ inches long. Their color can range from yellowish-white to a light copper color. Wireworms feed on a wide variety of crops and weeds, and are generally difficult to detect and control. They tend to be more prevalent in light-textured soils or in soil that has not been in crop production for several years. Fields that had grassy weed escapes during the preceding season are also at risk. Frequent cropping and working the soil helps reduce wireworm problems.

### Threshold:

Currently, there is no established threshold for wireworms in sugarbeet. The following insecticides labeled for sugarbeet root maggot control will usually provide adequate protection from wireworm injury. Check with your company field representatives before treating sugarbeet seed with an insecticide. Refer to product labels for more information. Please the seed treatment section in the introduction for more information.

| INSECTICIDE  | DOSAGE IN LB<br>AI/ACRE | PRODUCT<br>PER ACRE                            | RESTRICTIONS ON USE   |
|--|-------------------------|--|---|
| <b>chlorpyrifos</b><br>Lorsban 15G<br>(suppression only) | 1.5 - 2                 | 10 - 13.3 lbs<br>or<br>6.5 - 9 oz/1,000 row ft | Lorsban 15G can provide suppression of low to moderate infestations at these rates. <b>Do not apply in-furrow or modified in-furrow.</b> Lightly incorporate with chains or tines behind press wheels for best results. <b>Do not apply granules in direct contact with the seed. Do not make more than 1 application per year.</b> |

| INSECTICIDE   | DOSAGE IN LB<br>AI/ACRE  | PRODUCT<br>PER ACRE  | RESTRICTIONS ON USE  |
|---|--|--|--|
| <b>clothianidin</b><br>NipsIT INSIDE<br>(seed treatment)                                | 60 g a.i. per unit of<br>seed (a unit is<br>100,000 seeds)                                       | 3.4 fl oz per unit of<br>seed (a unit is<br>100,000 seeds)         | NipsIT cannot be applied to GMO (e.g., glyphosate-resistant transgenic) sugarbeet seed until January 1, 2011. Application to seed by commercial seed treatment equipment utilizing standard liquid or slurry treaters is necessary. Tank mixtures with other seed treatment products should be pretested to evaluate compatibility and assure proper physical compatibility.   |
| <b>clothianidin + beta-cyfluthrin</b><br>Poncho Beta<br>(seed treatment)                | 68 g a.i. per unit of<br>seed (a unit is<br>100,000 seeds) refer<br>to recommended<br>label rate | 5.07 fl oz per unit of<br>seed (a unit is<br>100,000 seeds)        | For application to seed by commercial treaters only. Not for application to seed via hopper-box, slurry-box, or similar on-farm seed treatment applicators. Treated areas may be replanted with any crop listed on both clothianidin and beta-cyfluthrin labels. Areas planted with treated seed may be replanted immediately with corn or after 30 days with cereal grains, soybeans, dried beans and dried peas.   |
| <b>imidacloprid</b><br>Dyna-Shield<br>Imidacloprid 5<br>Senator 600<br>(seed treatment) | refer to<br>recommended label<br>rate  |  | Apply as a commercial seed treatment only. Follow all applicable directions, restrictions and precautions on the EPA registered label.   |
| <b>imidacloprid</b><br>Gaucho 600<br>(seed treatment)                                   | refer to<br>recommended label<br>rate  |  | Apply as a commercial seed treatment only. Follow all applicable directions, restrictions and precautions on the EPA registered label.   |
| <b>terbufos</b><br>Counter 15G <sup>a</sup><br><i>RUP</i>                               | 1 - 1.8  | 5.9 - 11.9 lbs<br>or<br>4 - 8 oz/1,000 row ft                      | Counter performs best against wireworms if applied using spoon or modified in-furrow (2-3 inches behind seed drop zone) placement at planting time. Banded applications may not provide acceptable control. Do not place in direct contact with seed. Do not harvest sugarbeets or feed tops to livestock within 110 days after application. Treated fields must be posted. <b>Only one application may be made per year.</b>  |
| <b>terbufos</b><br>Counter 20G <sup>a</sup>   | 0.9 - 1.8  | 5.9 - 11.9<br>or<br>3 - 6 pz/1,000 row ft                          |  |
| <b>zeta-cypermethrin</b><br>Mustang Max EC<br><i>RUP</i>                                | 0.025  | 4 oz   | Research suggests that Mustang Max performs best against wireworms if applied directly in-furrow at planting. Apply in a minimum of 3–5 gallons of finished spray per acre. Do not apply within 50 days of harvesting tops or roots. Do not apply more than 0.075 pound active ingredient per acre per season. Registered for 24 (c) Special Local Need sale and use in sugarbeet in ND (SLN no. ND-030003), MN (SLN no. MN-030001), MT (SLN no. MT-030001), and other western states. SLN expires before 2013 growing season. |
| <b>thiamethoxam</b><br>Criuser 5FS<br>(seed treatment)                                  | 60 - 70 g a.i. per unit<br>of seed (a unit is<br>100,000 seeds)                                  | 3.39 - 3.95 fl oz per<br>unit of seed (a unit is<br>100,000 seeds) | Apply at 3.39-3.95 fl oz per seed unit. Cruiser can be combined with seed coating materials and seed treatment fungicides. Such combinations should be tested for seed safety prior to large-scale planting to ensure that there will be no detrimental effects on seed germination or plant stand establishment.  |

*RUP* - Restricted use pesticide

<sup>a</sup> Counter 15G and Counter 20G may only be applied once per year.