

## INSECT MANAGEMENT

### Sugarbeet Root Maggot

#### 2015 Population Forecast

The 2015 sugarbeet root maggot (SBRM) forecast map for the Red River Valley is shown in Figure 1. Areas at **high risk** include rural Auburn, Cavalier, Minto, Grand Forks, Reynolds, St. Thomas, and Thompson, ND, as well as Ada, MN. **Moderate risk** is expected near Crystal, Forest River, Johnstown, Oakwood, and Reynolds, ND, and Borup and Euclid, MN. The remainder of the area is at low risk. Although many sites had high fly activity during 2014, root injury ratings indicated that some of those fields incurred low levels of SBRM feeding injury. This could indicate that control efforts in those fields were successful; however, other fields in the vicinity of those fields could still be at risk of damaging infestations this year. SBRM populations can increase rapidly from year to year. Proximity to previous-year beet fields where SBRM populations were high and/or control was unsatisfactory during the previous year increases risk. ***Sugarbeet fields near those where high fly activity occurred in 2014 should be closely monitored in 2015.*** Growers in high-risk areas should use an aggressive form of at-plant insecticide treatment (i.e., granular insecticide) and a postemergence rescue insecticide (i.e., banded granules or peak-fly spray). Those in moderate-risk areas using insecticidal seed treatments for at-plant protection should closely monitor fly activity levels in their area, and be ready to apply additive postemergence protection if needed. All growers in known SBRM areas should pay close attention to fly activity levels in late-May through June to decide if postemergence treatment is needed. NDSU Entomology will continue to inform growers regarding SBRM activity levels and hot spots each year through radio reports, the NDSU "Crop & Pest Report", and notification of sugar cooperative agricultural staff when appropriate. Root maggot fly count information for the current season and from previous years can be viewed at: <http://www.ndsu.edu/entomology/people/faculty/boetel/flycounts/>.

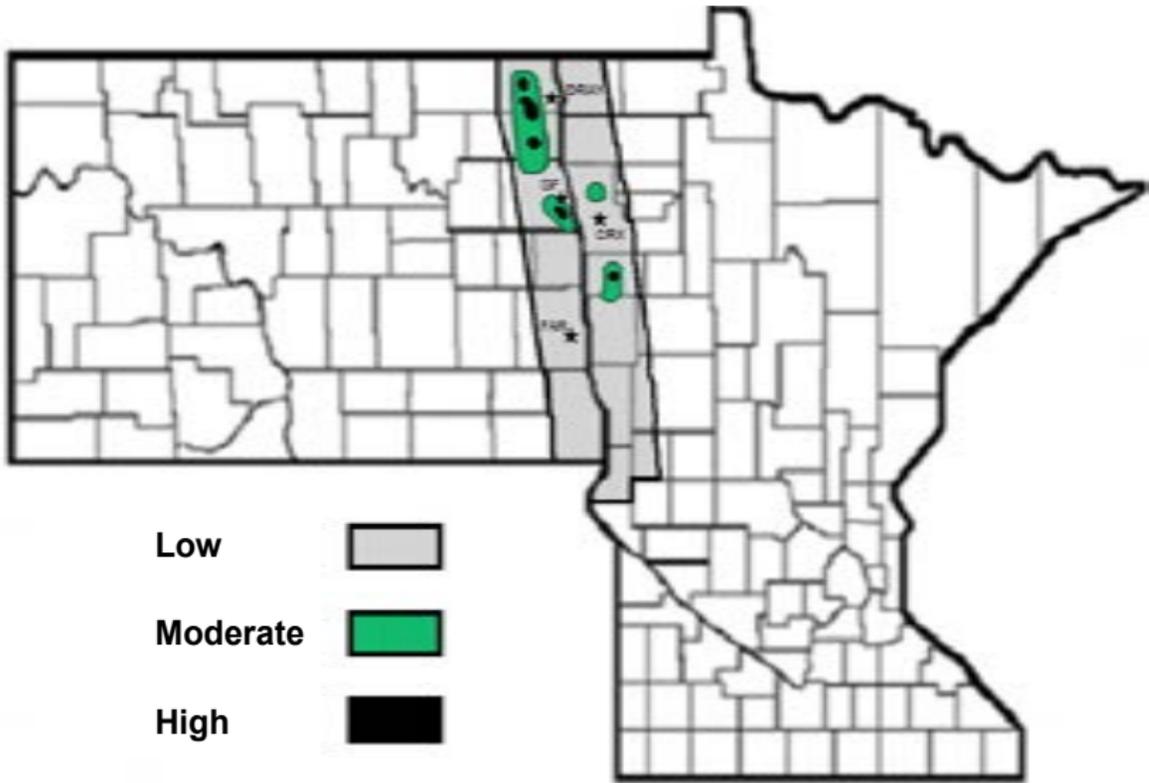


Fig. 1. Anticipated risk of SBRM fly activity and damaging larval infestations in the Red River Valley.

Please note the following important terminology used in this guide: 1) **fly emergence** pertains to the initial appearance of flies emerging from soil in previous-year beet fields where they had overwintered as larvae; and 2) **fly activity** refers to fly numbers in current-year beet fields. The time period between *emergence* from old beets and *activity* in current beet fields is weather-dependent and varies among years. Forecasts and updates on these important events will be provided to growers, county extension personnel, sugar cooperative agricultural staff, and other agricultural professionals by using various media outlets. However, there is no substitute for careful evaluation of insect activity on an individual-field basis.

## Cultural Control

**Early planting** allows for larger beet roots during the period of peak SBRM feeding activity (mid-June to mid-July). Larger roots are more able to withstand feeding injury and can avoid potential yield impacts if adequate rainfall is received. Roots of smaller, late-planted beets are more vulnerable to feeding injury. Severe injury can either kill seedlings and cause major stand reductions or result in smaller, sprangled, bulb-shaped roots at harvest.

Using a **rotary hoe or field harrow** across beet rows in June following egg deposition can help reduce maggot numbers. These tillage practices can move eggs away from beet seedlings and onto the soil surface, which exposes them to predators and the elements. As a result of exposure to heat and dry air, the developing maggots sometimes die before hatch. This cultural strategy works best if hot and dry weather coincides with egg deposition.

Sowing oat **cover crops** immediately before beet planting can reduce SBRM injury to sugarbeet roots. Cover crops provide a dense plant canopy and the shading helps keep soils moist. This condition is believed to keep larvae feeding higher in the soil profile (away from tap roots and nearer to insecticide-treated soil). Also, the dense network

of oat roots may impair the ability of larvae to locate and feed on beet roots. Added benefits of cover crops include soil stabilization, protection of beet seedlings from mechanical wind injury, and reduced abrasion from wind-blown soil. Cover crops should be killed by applying a grass-killing herbicide during the last week of May or 1<sup>st</sup> two weeks of June to avoid sugarbeet yield losses due to competition from cover crops for water, sunlight, and soil nutrients.

### **Chemical Control**

Suggestions in this guide are based on the assumption that insecticides listed herein will have registration for the suggested use in the current production season. Remember to always READ, UNDERSTAND, and FOLLOW all label directions and precautions for the insecticide product you use. Using an insecticide in a manner inconsistent with its label is illegal, and violators may be subject to fines. Non-registered use may also result in condemnation of the crop.

**Planting-time granular insecticides** are important tools for managing sugarbeet root maggots in the Red River Valley. A few basic steps in preparation for insecticide applications can increase the probability of accuracy, effectiveness, and economical use of these products. Preparation for planting should include serious attention to the following: **1)** accurate calibration; **2)** unrestricted, consistent flow of granules; **3)** even distribution of granules over the row; **4)** adequate incorporation into soil; and **5)** protection from wind.

Calibrate all of the planter's granular applicators for the insecticide that will be used and for the exact registered rate needed. This is fairly simple since application rates on granular insecticide labels and in extension materials are listed in ounces of product per 1,000 row feet. It is also advisable to reconfirm calibration settings for the desired output at least once after planting about 50% of your anticipated acreage. Ensure that granules will flow smoothly down the drop tubes. Incorporate insecticide granules well into the upper 1/4 inch of soil. Wind is a perennial challenge to making effective insecticide applications in the Red River Valley. Commonly, as much as 30% of the

granules can be blown far off the row. As a result, insecticide concentrations applied directly over the rows are greatly diminished. If winds are too high (15-20 mph), discontinue planting until winds subside. Calm conditions are more likely to occur during evening and early morning hours, and these times can be more conducive to accurate granule placement when daytime winds are a problem. The addition of wind shields to planter row units is a practical solution that greatly diminishes the impact of wind on granule placement. **It is strongly recommended that wind shields be installed on any sugarbeet planter used to apply planting-time soil insecticides.**

**Growers anticipating SBRM problems should consider the following management recommendations:**

1. Apply a planting-time granular insecticide application.
2. Place granules in a 5-inch band over the row, or deliver via “spoon” applicator, and incorporate with soil.

**RECOMMENDED APPLICATION RATES FOR PLANTING-TIME SOIL INSECTICIDES  
BASED ON EXPECTED SBRM POPULATION LEVEL**

Insecticide	Rate (lb product/ac) within population level			Timing Options
	Low	Moderate	High	
Counter 20G*	4.5 lb	7.5 lb	8.9 lb	Planting-time or Postemergence**
Lorsban 15G	6.7 lb	10.0 lb	13.4 lb	Planting-time or Postemergence

\*Restricted use pesticide

\*\*Supplemental labeling for Counter 20G now includes a shortened (90-day) preharvest interval which, in some years, will allow sufficient time to apply it as a postemergence treatment for sugarbeet root maggot control.

IMPORTANT: Counter can only be applied once per year per field, regardless of which formulation is used.

Moderate application rates of labeled soil insecticides are recommended in areas where correspondingly moderate SBRM infestation levels are expected. These treatments should be sufficient if adequate soil moisture prevails after planting. High labeled application rates should be used in areas where SBRM populations are expected to be high (see forecast map), especially in areas where SBRM problems were evident during the preceding year.

### **Replanting Sugarbeet:**

NDSU research has shown that major yield losses due to SBRM feeding injury are likely if replanting is done without applying a second insecticide treatment in high-risk fields. Beets in replanted fields are usually smaller and more vulnerable to attack during the root maggot larval feeding period than older, more established plants. Therefore, growers in areas where high maggot populations are anticipated are advised to consider two options: 1) apply another granular material at replanting; or 2) apply a postemergence liquid or granular insecticide. Treatment with Counter 20G or Lorsban 15G (and most generic chlorpyrifos-containing granular materials) is limited to one application per year. Therefore, if one of these products was applied at initial planting, another labeled material must be used for re-planting or at postemergence. To avoid future development of insecticide-resistant root maggot strains, rotation to a different active ingredient or even a different chemical class is advised.

### **Postemergence Insecticides:**

In areas where moderate to high root maggot infestations are common, additive plant protection may be needed for adequate SBRM control, especially if an insecticidal seed treatment or a low rate of a planting-time insecticide was used for at-plant protection. Consideration of a few factors can help decide whether a postemergence insecticide is needed. Soil moisture - good soil moisture enhances the effectiveness of planting-time granular insecticides. Postemergence granules work best under moist soil conditions, and liquids work better than granules in dry soils.

Sugarbeet size at peak fly activity - early planted beets may have sufficient root development and size to withstand some maggot feeding without major yield loss. Therefore, a planting-time granular application may be sufficient. Sugarbeet fields in 10- to 14-leaf stages of development or those with an established canopy are generally large enough to withstand moderate levels of feeding. Tolerance to feeding injury can be enhanced with rainfall in early June and through July. SBRM population level - growers and crop advisors are encouraged to check individual fields for threatening fly activity levels and to monitor radio, DTN, the NDSU “Crop & Pest Report”, and other media sources for reports on fly activity levels from late May through June.

### **Postemergence Granules**

Any of the following conditions can warrant consideration of a postemergence granular insecticide application:

1. Replanted beet crop (especially if no insecticide was applied during replanting)
2. Heavy rainfall events after planting (1 to 3 inches or more within first 24 hours or at least 6 inches if received in 1 or 2 rainfall events within a week after planting)
3. Current-year beets are planted adjacent to previous-year beet fields (especially where high fly populations were present during the preceding growing season)

When a postemergence application of a granular insecticide is made, a few important factors should be considered. First, granules should be applied around late May or early June, and if possible, ahead of an anticipated rainfall. If optimal timing is in question, it is advisable to err toward applying the granule early. Second, the granules should be incorporated into the soil. If the soil surface is crusted, drag chains will not effectively incorporate the insecticide. Third, moisture is required after the application to move the chemical off its granular carrier and into the soil. Without rain to activate the insecticide, control provided by a postemergence granule will likely be marginal.

## Postemergence Liquids

Postemergence liquid insecticides are most beneficial and cost-effective under dry conditions, especially when SBRM fly activity is high. Timing of the liquid spray application is critical. Applications made too early or too late will not produce the desired result and may not be cost-effective.

Liquids work best when applied within 3 days of (preferably before) peak fly activity. Rain following the application can enhance the performance of foliar insecticides that also have activity against larvae in the soil (e.g., chlorpyrifos-containing liquid products such as Lorsban Advanced and Lorsban 4E). If rain is likely 5 to 7 days before peak fly activity, the application should be made before the expected rain. These applications will be more effective if applied at least 24 hours before rain occurs.

The decision to apply liquid chlorpyrifos for fly control and larval suppression following a planting-time granular insecticide should not be made before SBRM fly numbers are estimated. Observation of posted sticky stake capture data can aid in this determination; however, it is no substitute for actual monitoring of individual fields.

If conditions warrant application of a postemergence liquid insecticide, the following recommendations are suggested:

1. Apply the insecticide in a 7- to 11-inch band or as a broadcast. If broadcasting, do not use a low rate.
2. Treat slightly (2 to 4 days) before peak fly activity occurs in the current-year beet field.
3. If practical, make only one application per season to minimize the likelihood of developing insecticide-resistant root maggot strains.

## Insecticides Labeled for Controlling Insect Pests in Sugarbeet

### SUGARBEET ROOT MAGGOT

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<b>Seed Treatments</b>			
CruiserMaxx Sugarbeets \$ /A = 28.00 - 36.00	60-70 g a.i./ 100,000-seed unit		<i>CruiserMaxx Sugarbeets</i> is a combination of Cruiser 5FS, Apron XL fungicide, and Maxim 4FS fungicide. Apply Cruiser 5FS at 3.39 to 3.95 fl oz per seed unit. See product label for fungicide rates.
NipsIt Suite Sugar Beets \$ /A = 31.00 - 39.00	60 g a.i./ 100,000-seed unit		<i>NipsIt Suite Sugarbeets</i> is a combination of NipsIt Inside, Metlock (metconazole) fungicide, and metalaxyl fungicide. Apply NipsIt Inside at 3.4 fl oz per seed unit. See product label for fungicide rates.
Poncho Beta \$ /A = 29.00 - 38.00	68 g a.i./ 100,000-seed unit		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.

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<b>Granular Insecticides</b>			
<i>Chlorpyrifos</i> Lorsban 15G \$/A = 11.00 - 26.00 Lorsban 15G Smartbox \$/A = 14.50 - 30.50 generic products \$/A = 7.50 - 18.00	1.0 - 2.0	6.7 - 13.4 lb (4.5 - 9 oz / 1,000 row ft	Apply at planting behind planter furrow openers and ahead of press wheels using band (5-inch) or by using "spoon" applicators. Do not apply in-furrow or modified in-furrow, and do not apply in direct contact with seed. May also be applied postemergence. Lightly incorporate bands with chains or tines for best results. Do not apply within 7 days before sugarbeet harvest. Do not apply a liquid form of chlorpyrifos within <u>10 days</u> of an at-plant application of a granular chlorpyrifos formulation. <b>Only one application of granular chlorpyrifos may be made per year. Do not make more than 3 applications of chlorpyrifos products per season.</b>
<i>Terbufos</i> Counter 20G Lock 'N Load \$/A = 14.50 - 31.50 <i>RUP</i> Counter 20G Smartbox \$/A = 15.00 - 33.00 <i>RUP</i>	0.9 - 1.8	4.5 - 8.9 lb (3 - 6 oz / 1,000 row ft)	Apply at planting using 5-inch band, modified in-furrow, or "spoon" placement. Avoid direct contact with seed. May also be banded (5- to 7-inch) over rows at postemergence. Product should be incorporated lightly into soil. Do not harvest sugarbeets or feed tops to livestock within 90 days after application. <b>Only one application may be made per year.</b> Treated areas must be posted with warning signs.
Thimet 20G \$/A = 13.00 - 21.00 <i>RUP</i>	1.0 - 1.5	4.9 - 7.5 lb (3.2 - 5 oz / 1,000 row ft)	Apply in 5- to 7-inch bands over the row and incorporate lightly into soil. Do not apply more than once per year. Do not apply within 30 days of harvest. Treated areas must be posted with warning signs.

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<b>Liquid Insecticides</b>			
Asana XL \$/A = 3.25 - 7.25 <i>RUP</i>	0.03 - 0.05	5.8 - 9.6 fl oz	Apply postemergence as a band or broadcast treatment when adults are active. Apply with ground or air equipment using sufficient water to provide uniform coverage (minimum of 2 gal of finished spray per acre). Do not apply within 21 days of harvest. Do <b>not</b> tank mix Asana with fungicides containing fenitrothion (triphenyltin hydroxide) such as "Super Tin" as crop injury may result.
<i>Chlorpyrifos</i>			
Lorsban Advanced \$/A = 2.20 - 11.00 <i>RUP</i>	0.23 - 0.94	0.5 - 2.0 pt	Broadcast or apply in 5- to 7-inch bands. If banding, apply in a minimum spray volume of 7 GPA and do not reduce dose (i.e., apply broadcast dose). Do not apply directly in furrow. Apply between 7 days before to 3 days after peak fly activity. Avoid making over 2 applications per year when adults are active. If an organophosphate (e.g., Counter, Lorsban) was used at planting, make no more than 1 application/year. Do not apply more than 6 pt/acre or more than 3 applications of any chlorpyrifos products per season. <b>Do not apply this or any chlorpyrifos-containing product within 10 days of 1<sup>st</sup> application or of an at-plant application of granular chlorpyrifos.</b>
Lorsban 4E \$/A = 2.25 - 11.00 <i>RUP</i>	0.25 - 1.00	0.5 - 2.0 pt	
generic products (Govern 4E, Whirlwind 4E, Nufos 4E, Warhawk 4E, etc.) \$/A = 2.00 - 9.00 <i>RUP</i>	0.25 - 1.00	0.5 - 2.0 pt	
Mustang Maxx \$/A = 5.25 - 7.25 <i>RUP</i>	0.014 - 0.025	2.24 - 4.0 fl oz	Do not apply within 50 days of root or top harvest. Do not apply more than 0.075 lb active ingredient (or 12 fl oz product) per acre per season.

*RUP* - restricted use pesticide

## Wireworms

Wireworms are smooth, somewhat hard-bodied larvae that vary in length from 1/2 to 1½ inch long; however, they are most damaging when they are between 1/2 to 3/4 inch in length. They range in color from yellowish-white to bright or deep copper hues. Wireworms feed on a wide variety of crops and weeds, and are difficult to detect and control. They tend to be more prevalent in light-textured soils, and in fields that had a grassy crop the previous season or had not been in crop production for several years. Fields that had grassy weed escapes during the preceding season are also at risk. Frequent tillage helps reduce wireworm problems. **Threshold:** there is no established economic threshold for wireworms in sugarbeet; however, field history can be a good indicator of risk. The following insecticides should protect sugarbeet from wireworm injury. Refer to product labels for more information.

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<i>Chlorpyrifos</i>			
(suppression only)			
Lorsban 15G \$ / A = 11.00 - 26.00	1.0 - 2.0	6.7 - 13.4 lb (4.5 - 9 oz / 1,000 row ft	Granular chlorpyrifos products may provide suppression of low to moderate wireworm infestations if banded or applied using "spoon" applicators. Do not apply in-furrow or modified in-furrow, and do not apply in direct contact with seed. Lightly incorporate for best results. Do not apply a liquid form of chlorpyrifos within <u>10 days</u> of an at-plant application of a granular chlorpyrifos formulation. <b>Only one application of granular chlorpyrifos may be made per year. Do not make more than 3 applications of chlorpyrifos products per season.</b>
Lorsban 15G Smartbox \$ / A = 14.50 - 30.50			
generic products \$ / A = 7.50 - 18.00			

<b>INSECTICIDE and COST</b>	<b>RATE (lb AI/acre)</b>	<b>PRODUCT per acre</b>	<b>REMARKS / RESTRICTIONS</b>
Mustang Maxx \$ /A = 5.25 - 7.25 <i>RUP</i>	0.025	4.0 fl oz	Do not apply within 50 days of root or top harvest. Do not apply more than 0.075 lb active ingredient (or 12 fl oz product) per acre per season.
Counter 20G Lock 'N Load \$ /A = 14.50 - 31.50 <i>RUP</i>	0.9 - 1.8	4.5 - 8.9 lb (3 - 6 oz / 1,000 row ft)	Controls wireworms best if applied at planting using spoon or modified in-furrow (2-3 inches behind seed-drop) placement. Banding may not provide acceptable control. Avoid direct contact with seed. Incorporate lightly into soil. Only one application may be made per year. Do not harvest beets or feed tops to livestock within 90 days after application. Treated areas must be posted with warning signs.
Counter 20G Smartbox \$ /A = 15.00 - 33.00 <i>RUP</i>			
CruiserMaxx Sugarbeets (seed treatment) \$ /A = 28.00 - 36.00	60-70 g a.i./ 100,000-seed unit		<i>CruiserMaxx Sugarbeets</i> is a combination of Cruiser 5FS, Apron XL fungicide, and Maxim 4FS fungicide. Apply Cruiser 5FS at 3.39 to 3.95 fl oz per seed unit. See product label for fungicide rates.
NipsIt Suite Sugar Beets (seed treatment) \$ /A = 31.00 - 39.00	60 g a.i./ 100,000-seed unit		<i>NipsIt Suite Sugarbeets</i> is a combination of NipsIt Inside, Metlock (metconazole) fungicide, and metalaxyl fungicide. Apply NipsIt Inside at 3.4 fl oz per seed unit. See product label for fungicide rates.
Poncho Beta (seed treatment) \$ /A = 29.00 - 38.00	68 g a.i./ 100,000-seed unit		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.

***RUP* - restricted use pesticide**

## Cutworms

Darksided and Redbacked cutworms are the most common cutworm pests of sugarbeet in the Red River Valley. Eggs of both species hatch into larvae during late May and early June. Fields should frequently be checked during early spring for wilting or dead plants because early detection of injury is essential to good control. Cutworms can be found within 2 inches of the soil surface near bases of wilting plants. Most feeding occurs at night. Young plants are often cut off near ground level. During periods of dry weather, larvae feed just below the soil surface as they move along the row. They will feed above the soil surface if soil is excessively moist.

It is desirable to apply insecticides during late afternoon. This maximizes the amount of insecticide material present during the first nighttime hours following application, which is 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 in dry soils. If severe crusting is evident in the field, the crust should be broken up before or during the insecticide application. In 2001, variegated and black cutworm infestations 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. Variegated 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 variegated cutworms feed above ground, they can be effectively managed by using foliar rescue insecticide applications. Late-season infestations of black cutworms often feed more than 2 inches below ground. Therefore, late-season control of this species can be difficult and is improbable to achieve.

**Threshold:** Control in young beets is suggested when 4 to 5% cutting of seedlings is observed. Control may be justified for late-season infestations of 3 to 5 larvae per square foot if they are feeding near or above the soil surface.

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
Asana XL \$ /A = 3.25 - 7.25	0.03 - 0.05	5.8 - 9.6 fl oz	Apply as an at-plant T-band over open seed furrow or conventional band behind planter rear press wheels. Bands should be 4 - 7 inches wide. May also be applied postemergence as a band or broadcast treatment. Apply with ground or air equipment using sufficient water to provide uniform coverage (minimum of 2 gal of finished spray per acre). Do not apply within 21 days of harvest. Do <b>not</b> tank mix Asana with fungicides containing fenitrothion (triphenyltin hydroxide) such as "Super Tin" as crop injury may result.
<i>RUP</i>			
<i>carbaryl</i> (Sevin XLR Plus and several generic products) \$ /A = varies	1.5	varies	This treatment is most effective against cutworms feeding on upper portions of the plant. Apply up to 2 times per crop season, but not more often than every 14 days. Do not apply within 28 days of harvest. Do not apply more than 3 pounds of active ingredient per acre per crop per year.
<i>Chlorpyrifos - granular</i> Lorsban 15G \$ /A = 17.00 - 26.00 Lorsban 15G Smartbox \$ /A = 22.00 - 30.50 generic products \$ /A = 11.00 - 18.00	1.5 - 2.0	10.0 - 13.4 lb (6.6 - 9 oz / 1,000 row ft	Apply in 4- to 5-inch bands (behind planter furrow openers and ahead of press wheels) or by using "spoon" applicators. Do not apply in-furrow or modified in-furrow, and do not apply in direct contact with seed. May also be applied postemergence. Lightly incorporate bands with chains or tines for best results. Do not apply within 7 days before sugarbeet harvest. Do not apply a liquid form of chlorpyrifos within <u>10 days</u> of an at-plant application of a granular chlorpyrifos formulation. <b>Only one application of granular chlorpyrifos may be made per year. Do not make more than 3 applications of chlorpyrifos products per season.</b>

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<i>Chlorpyrifos - liquid</i>			
Lorsban Advanced \$ /A = 2.20 - 11.00	0.94	2 pt broadcast or 1½ pt banded	Broadcast or apply in 5- to 7-inch bands. If banding, apply in a minimum spray volume of 7 GPA and do not reduce dose (i.e., apply broadcast dose in bands). Do not apply directly in furrow. Do not apply more than 6 pt/acre or more than 3 applications per season. Do not apply within 30 days of harvest. <b>Do not apply this or any other chlorpyrifos-containing product within 10 days of 1<sup>st</sup> application or within 10 days after an at-plant application of granular chlorpyrifos.</b>
Lorsban 4E \$ /A = 2.25 - 11.00	1.0		
generic products (Govern 4E, Whirlwind 4E, Nufos 4E, Warhawk 4E, etc.) \$ /A = 2.00 - 9.00	1.0		
	<i>RUP</i>		
<i>Methomyl</i>			
Lannate LV \$ /A = 10.00 - 14.00		1.5 pt	Apply for <i>variegated cutworm</i> control. Do not feed tops to live stock within 30 days of last application. Field re-entry interval is 48 hours. Do not make over 10 applications per crop. Do not apply within 21 days of root harvest or 30 days of harvest for tops. Do not apply more than 15 pts of <u>Lannate LV</u> per acre per crop. Do not apply more than 5 lb of <u>Lannate SP</u> per acre per crop.
Lannate SP \$ /A = 13.00 - 14.50		0.5 lb	
	<i>RUP</i>		
Mustang Maxx \$ /A = 5.25 - 7.25	0.014 - 0.025	2.24 - 4.0 fl oz	Do not apply within 50 days of root or top harvest. Do not apply more than 0.075 lb active ingredient (or 12 fl oz product) per acre per season.
	<i>RUP</i>		

***RUP* - restricted use pesticide**

## 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. Above-ground, or “terrestrial” springtails have damaged sugarbeet in other states, but those affecting beets in the Red River Valley have only been subterranean, spending their entire life below the soil surface. They are most harmful to seedlings. Plant injury ranges from a few brown feeding punctures to extensive root scarring, severed tap roots, and seedling death. Field symptoms include wilted plants and plant stand losses, usually in irregular-shaped patches ranging in size from 0.3 to 5 acres. Fine-textured 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 can 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 20G provides good springtail control at rates between 0.9 and 1.5 lb AI (4.5-7.5 lb product) per acre.

CruiserMaxx, NipsIt Inside, and Poncho Beta seed treatments also provide good springtail control.

Some formulations of Mustang have reportedly provided unsatisfactory control in some cases. To maximize the likelihood of Mustang providing adequate springtail control, apply it using the following methodology:

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 chlorpyrifos-based generics do not provide adequate protection from springtail injury.

<b>INSECTICIDE and COST</b>	<b>RATE (lb AI/acre)</b>	<b>PRODUCT per acre</b>	<b>REMARKS / RESTRICTIONS</b>
Counter 20G Lock 'N Load \$ /A = 14.50 - 26.50 <i>RUP</i>	0.9 - 1.5	4.5 - 7.5 lb (3 - 5 oz / 1,000 row ft)	Apply at planting time using band (5-inch), modified in-furrow, or "spoon" placement. All applications should be incorporated lightly into soil. Avoid direct contact with seed. <b>Only one application may be made per year.</b> Do not harvest beets or feed tops to livestock within 90 days after application. Treated areas must be posted with warning signs.
Counter 20G Smartbox \$ /A = 15.00 - 28.00 <i>RUP</i>			
CruiserMaxx Sugarbeets (seed treatment) \$ /A = 28.00 - 36.00	60-70 g a.i./ 100,000-seed unit		<i>CruiserMaxx Sugarbeets</i> is a combination of Cruiser 5FS, Apron XL fungicide, and Maxim 4FS fungicide. Apply Cruiser 5FS at 3.39 to 3.95 fl oz per seed unit. See product label for fungicide rates.
NipsIt Suite Sugar Beets (seed treatment) \$ /A = 31.00 - 39.00	60 g a.i./ 100,000-seed unit		<i>NipsIt Suite Sugarbeets</i> is a combination of NipsIt Inside, Metlock (metconazole) fungicide, and metalaxyl fungicide. Apply NipsIt Inside at 3.4 fl oz per seed unit. See product label for fungicide rates.
Poncho Beta (seed treatment) \$ /A = 29.00 - 38.00	68 g a.i./ 100,000-seed unit		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.

***RUP* - restricted use pesticide**

## Lygus Bugs

Tarnished plant bugs, commonly referred to as “Lygus bugs”, have occasionally caused late-season injury to Red River Valley sugarbeet fields since the late-1990s. Most feeding injury appears on new leaves and stems emerging from the sugarbeet plant crown. Feeding symptoms include leaf curling and wilting, leaf-tip burn, feeding scars on leaf petioles, and seepage of a black exudate from petioles of young leaves.

Lygus bugs are sporadic pests in this region. Two to three generations can develop during a single growing season in the Red River Valley. Mild winters or those in which frequent snowfalls provide adequate insulation for overwintering adults, followed by early spring warm ups or generally warm growing seasons, increase the likelihood of a third generation being produced. Populations usually build up in other host plant habitats (e.g., alfalfa, canola, small-seeded broadleaf weeds), and then adults migrate to beets in late-July through August.

**Threshold:** Insecticide treatment may be justified if an infestation exceeds one Lygus bug per plant (nymphs and adults combined). NDSU research suggests that insecticide treatment is not likely to be economically beneficial if the application is made within three weeks of harvest. Insecticide *pre-harvest interval* is a critical factor in choosing a product for Lygus bug control because these pests usually infest beets late in the growing season.

A number of insecticides approved for use on sugarbeets have activity against Lygus bugs; however, the species that attacks Red River Valley sugarbeet fields (*Lygus lineolaris*, the tarnished plant bug) is not listed as a target pest in the sugarbeet portion of those labels. Examples include Asana XL, carbaryl (Sevin XLR Plus and several generic products), Lannate LV, and Lannate SP. It is legal to apply an insecticide to sugarbeet when it is labeled for use in the crop; however, if the specific target pest is not listed for sugarbeet, effective control is not implied by the manufacturer and growers who choose to use the product assume all liability for any unsatisfactory performance.

INSECTICIDE and COST	RATE (lb AI/acre)	PRODUCT per acre	REMARKS / RESTRICTIONS
<i>Chlorpyrifos - liquid</i> Lorsban Advanced \$/A = 2.20 - 11.00	0.94	2 pt broadcast or 1½ pt banded	Apply as a broadcast treatment. Do not apply more than 6 pt/acre or more than 3 applications of any chlorpyrifos-containing products per season. Do not apply within 30 days of harvest. <b>Do not apply this or any other chlorpyrifos-containing product within 10 days of 1<sup>st</sup> application or within 10 days after an at-plant application of granular chlorpyrifos.</b>
Lorsban 4E \$/A = 2.25 - 11.00	1.00		
generic products (Govern 4E, Whirlwind 4E, Nufos 4E, Warhawk 4E, etc.) \$/A = 2.00 - 9.00	1.00		
Dibrom 8 Emulsive \$/A = 11.00 - 11.75	0.94	1 pt	Apply by air in 1-5 gallons or by ground in a minimum of 30 gal of finished spray per acre. Do not apply more than 5 pt per acre per season. Do not apply within 2 days of harvest. Allow a minimum of 7 days between applications. Do not make more than 5 applications per season.

**RUP - restricted use pesticide**

**Calendar of Potential Insect Pest Activity in Red River Valley Sugarbeet Fields**

April	May			June			July			August		
	Flea Beetles											
	Springtails											
	White Grubs											
	Wireworms											
				Cutworms - Dingy, Dark-sided and Redbacked								
				Beet Webworm - adults								
				Beet Webworm - larvae								
				Leaf-feeding Weevil								
				Leafminers								
				Sugarbeet Root Maggot - adults								
				Sugarbeet Root Maggot - larvae								
											Lygus Bugs (incl. Tarnished Plant Bug)	
											Cutworms - Black and Variegated	