Updated Dec 2025

MICHIGAN STATE UNIVERSITY

THE OHIO STATE UNIVERSITY

PEST MANAGEMENT GUIDE for FIELD CROPS INSECTS:

Sugarbeet Section

Dr. Chris DiFonzo, MSU & Dr. Kelley Tilmon, OSU

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

College of Agriculture and Natural Resources
MICHIGAN STATE UNIVERSITY

Introduction Figure 1: How to read the insecticide tables in this bulletin – a made-up example!

Active ingredients (AI) are listed alphabetically. Insecticides are listed by Trade Name under each AI to allow for comparison or substitution of products.

See Table 1 to cross reference active ingredients x insecticide.

A letter under an insect indicates it is on the label
• The specific letter corresponds to use rates in column 2.

Compare PHIs between products

A few of the important statements on the label

Active ingredient Trade names	Labeled rate per acre	caterpillars	cutworm	grasshoppe	spider mite	stink bugs	Pre - harvest Interval (PHI) in days	Precautions and Remarks
abamectin Big-Ten SC	(a) 1.7 - 3.5 oz				a		28	• Apply when spider mites are first observed
bifenthrin Brutus Buckeye	(a) 3.5 - 5.0 oz (a) 7.0 - 10 oz	a	a	a		a	18	• Do not make applications less than 30 days apart
chlorantraniliprole O-Hi Advanced	(a) 14 oz (b) 20 oz	a		b			1	• Must be applied before insects reach damaging levels
cyhalothrin (lambda) Izzo AG Green-UP WDG Lansing LV Scarlet 4F Spartan Izzo Extra Spartan Maxx	(a) 3 oz (b) 6 oz (a) 1 oz (b) 2 oz	a	a	b		b	30	• Do not graze or harvest vines as forage or hay

An AI with one trade name with a single rate (a) for one pest, spider mite

An AI with two trade names, each with its own single rate (a) for multiple insects
- For example, for cutworm the rate per acre is 3.5-5.0 oz of Brutus and 7.0-10 oz of Buckeye

An AI with one trade name but different use rates, (a) and (b), for different pests
- For example, the rate per acre is (a) 14 oz for caterpillars and (b) 20 oz for grasshoppers

An AI with many trade names, grouped by use rates; products in a group are similar and interchangeable
- For example, for cutworm use (a) 3 oz of Izzo Ag or 1 oz of Izzo Extra. Use the higher rate (b) for hoppers
- If you can't find Izzo Extra, Spartan Maxx is a similar product

Management of Insect Pests of Sugarbeet in Michigan
Updated December 2025

Prepared by:
Chris DiFonzo
Field Crops Entomologist
Department of Entomology
288 Farm Lane
East Lansing, MI
difonzo@msu.edu

How to Use this Guide

This publication is set up as a series of stand-alone tables with information on insect biology, damage, management recommendations, and insecticides registered in Michigan on **sugarbeets.** Pesticide names and rates are current as of the date at the top of the page.

- ✓ **Table 1** shows the timing of common insect pests in beets, from early to late season.

- ✓ **Table 2** is a checklist of damage symptoms from these insects to aid in field scouting.

- ✓ **Table 3** has information on the life cycle of each insect, plus a detailed description of its damage and the conditions that may lead to or favor infestations. A rating of pest status (and thus damage potential) is given based on experience in the state. Most insect pests are uncommon or do not increase to damaging levels in a typical year.

- ✓ **Table 4** has information on management of each pest. Most insects are kept in check by natural enemies (biological control) or by adverse environmental conditions. Some pest problems can be reduced by simply changing or avoiding certain agronomic practices. Table 4 also gives scouting and threshold recommendations. Note that these recommendations vary in quality. Key pests tend to have research-based scouting methods and thresholds. But many insects are not at damaging levels often enough to generate good information; sampling recommendations and thresholds for these species are based on observations, experience, or a best guess. This is noted in the table.

- ✓ Insecticides registered in Michigan on the crop are listed in **Table 5** (at planting) and **Table 6** (foliar sprays)**.** Active ingredients (AI) are listed alphabetically in column 1. All products with the same active ingredient are grouped together under each AI for easy comparison or substitution of one product for another. Label rates and pests are listed in columns 2 and 3. A letter under a pest indicates that a particular insect is on the label (i.e., the label claims control of that insect). The letter corresponds to an application rate in column 2. Some insecticides are applied at a single rate for all insects (‘a’), while others vary (‘a’, ‘b’, ‘c’). The final columns in the table list the preharvest interval (PHI) in days and notes on application - for example bee toxicity warnings, minimum recommended spray volumes, or other restrictions.

Table 1. Timing of damage from insect pests of sugarbeet in Michigan

- Pests are listed from early to late-season. Key species are highlighted in bold text.

Common name	Overwintering stage, location	April-May	June	July	August into September
springtails	in soil and residue	damage to seedlings			
cutworm (several species)	Winter cutworm: larvae in residue Black cutworm: migrates north	feeding on seedlings			
white grubs	larvae (grubs), underground	root damage to seedlings		larval damage to tap root by June beetle species	
wireworm	larvae in soil	root damage to seedlings		larval damage to tap root	
spinach leafminer	pupae in soil	leaf mining by larvae			
flea beetle	adults, in residue & protected areas	feeding by adults on leaves (shot holing)			
sugarbeet root aphid	on roots of lambsquarters		multiple generations puncture root cells to feed on plant sap		
armyworm	Southern USA, migrate north		caterpillars feed on foliage		
grasshoppers (multiple species)	egg clusters, underground		nymphs, then adults, feed on foliage		
webworms (beet, garden, alfalfa)	larvae or pupae in soil		caterpillars feed on foliage (timing depends on species)		
aphids on leaves (several species)	depends on species			multiple generations pierce leaves to feed on plant sap	
Japanese beetle	grubs in soil			adults feed on leaves	
leafhoppers (several species)	depends on species			nymphs and adults pierce leaves to feed on plant sap	
spider mite	adult females, at the base of hosts			multiple generations pierce plant cells to feed	
lygus bug (tarnished plant bug)	adults, in residue & protected areas			nymphs and adults pierce leaves to feed on plant sap	
thrips	depends on species			adults and nymphs 'punch' and suck plant cells	
woolly bears & zebra caterpillars	depends on species			caterpillars feed on foliage	

Table 2: Damage checklist to aid in scouting for insect pests of sugarbeet in Michigan

Plant part or timing Type of damage or injury	aphids (on leaves)	armyworm	cutworms	flea beetle	grasshoppers	Japanese beetle	leafhoppers	lygus bug	spider mite	spinach leafminer	springtails	sugarbeet root aphid	thrips	webworm	white grub	wireworm	woolly/ zebra caterpillar
Stand (emergence)																	
stand loss / gaps in row											x				x	x	
wilted or cut plants			x												x	x	
Stand (later in season)																	
wilting or dead plants												x					
Leaves																	
scraping of leaf surface											x						
leaf mining										x							
shot- or pin holes				x							x						
irregular leaf feeding		x	x		x									x			
skeletonizing between veins						x								x			x
defoliation		x			x	x								x			x
leaf curling	x						x	x									
sticky honeydew	x																
yellowing of leaf tips, margins								x									
tiny yellow spots (stippling)							x		x				x				
generalized leaf yellowing							x		x								
wilted plants			x									x			x	x	
webbing									x					x			
Roots																	
roots pruned or cut															x	x	
chewing into tap root															x	x	
white, waxy coating												x					

Table 3: Life cycle, damage, and pest status of insect pests of sugarbeet in Michigan

Terms to describe the pest status of each insect. Ratings apply to Michigan

- **Rare**: Unusual, typically goes unnoticed. May not even be present
- **Uncommon**: Usually present but well-below damaging levels. An outbreak once a generation.
- **Occasional**: Present in most fields, sometimes in high numbers. An outbreak once a decade.
- **Important**: Present in most fields, potentially increasing to damaging levels every season. A common target of scouting, management programs, or insecticide use.
- **Sporadic:** Damaging levels occur after favorable weather patterns (such as drought) or mass movement from south to north during the season
- **Localized**: Damaging levels occur in specific locations under specific agronomic conditions, for example in no-till production or in older stands.

Pest (abbreviation)	Life cycle and Number of generations	Description of Damage	Conditions which favor infestation or damage	Pest Status in Michigan & commentary
aphids *on leaves* *On roots, see sugarbeet root aphid*	Summer population is all female. Females do not mate to reproduce and give birth to live young. Multiple overlapping generations	• All stages suck plant sap from leaves • Heavy infestation may lead to stunting, curling of leaves, weakening of plants	• Drought stress may be made worse by aphids removing plant sap	Uncommon Often present, but numbers rarely high enough to cause damage
armyworm	Adult moths migrate into Michigan in early spring. Eggs are laid on low-growing weeds, in grassy field margins, or in pasture or wheat.	• Caterpillars defoliate beets • Feeding often occurs at night • Larvae may march from one field to another (hence the name 'army')	• Weedy fields • Beets adjacent to infested pasture, corn, or wheat (tho beets are not a preferred host)	Uncommon Infestations of wheat and corn occur after a heavy spring flight from the south
cutworm - black	Adult moths migrate into Michigan in early spring. Eggs are laid on low-growing weeds or crop residue. Larvae often hide during the day & feed at night. Pupation in soil.	• Young larvae feed on leaves • Extensive damage occurs when older larvae cut at or below soil surface, leading to wilting and death of plants	• Fields with a weed problem or planted to a cover crop (egg-laying site for moths) • No-till fields	Uncommon Outbreaks occur after a heavy spring flight from the south
cutworm - winter	Cold-tolerant larvae overwinter in residue and thatch. They may be active very early in the season. Pupates in the soil in spring. New moths emerge and lay eggs in June.	• Larvae feed on seedlings and leaves • During rare outbreaks, large numbers of larvae sometimes move in a wave across a road or field	• Unknown	Uncommon
flea beetle *several species*	Adults overwinter in crop residue. They emerge in spring and feed on weeds and crops, including beets.	• Adult beetles chew small round holes in leaves	• Weedy fields or borders	Uncommon Shot holing is noticeable, but rarely enough to cause concern
grasshoppers *several species*	Eggs overwinter in soil. Nymphs emerge in June. Their feeding increases as they grow. Females lay groups of eggs in undisturbed soil in late summer. 1 generation per year	• All stages eat leaves. Feeding has a ragged appearance	• Adjacent fallow areas or pasture, where eggs are laid • A hot dry summer & fall can lead to a high population the following year	Uncommon Often present, but outbreaks are rare in Michigan
Japanese beetle	Larvae (grubs) overwinter. Adults typically begin to emerge in July, feed, mate, and lay eggs in soil. Adults may be active into early fall.	• Adult beetles feed on numerous host plants, including beets. Feeding has a skeletonized appearance	• Nothing specific	Uncommon Present, but not at damaging levels

Pest (abbreviation)	Life cycle and Number of generations	Description of Damage	Conditions which favor infestation or damage	Pest Status in Michigan & commentary
leafhoppers	Several species feed on beets. Adults lay eggs in plant stems.	• Both adults and nymphs suck plant sap. Symptoms under high populations include leaf curling and yellowing	• Nothing specific	Uncommon Present, but not at damaging levels
lygus bug *including tarnished plant bug*	Adults overwinter in residue and on field edges. Weeds and early crops like alfalfa are fed on and colonized first. There are multiple generations during the summer.	• Adults and nymphs inject toxic saliva during feeding and suck plant sap • Fed-on leaves turn yellow or brown at tips and edges. Damaged plants may wilt • Damage to beets is difficult to recreate or quantify. When symptoms appear, the feeding happened days earlier.	• Movement into beets may coincide with cutting of adjacent alfalfa fields or with dry down of weeds on field edge	Localized Numbers may be higher in fields adjacent to alfalfa
spider mites	Adult females overwinter in field borders and sheltered areas. In spring, they move to new growth, and lay eggs. Mites spread from field to field by crawling or blowing in the wind. Multiple overlapping generations	• Adults & nymphs pierce individual plant cells, resulting in tiny yellow spots called stippling • Webbing is a sign of a significant infestation • Severe damage results in leaf yellowing or death, water loss	• Prolonged hot, dry weather favors an outbreak & enhances the impact of feeding • Infestations often start on dusty edges of fields	Sporadic Outbreaks occur in hot, dry seasons
spinach leafminer	Pupae overwinter and flies emerge in spring. Females lay eggs on beet leaves. Larvae (maggots) feed, then drop to the soil surface to pupate. Multiple generations, but only the first is important on sugarbeet.	• Larvae create distinctive, winding mines as they feed internally in the leaf	• Nothing specific	Occasional Mining is noticeable, but rarely enough to cause concern
springtails	Springtails are common arthropods related to insects. They break down crop residue or feed on fungi. They are considered an indicator of good soil health, but when populations are high their feeding may damage beet seedlings.	• Nymphs and adults scrape or scar cotyledons just as they emerge from the soil • Heavy feeding is reported to destroy seedlings and reduce stand	• Planting into heavy residue, particularly corn stalks, where numbers are high • Moist conditions & slow emergence after planting	Occasional Damage is rare unless numbers are very high
sugarbeet root aphid (SBRA)	Females overwinter locally in soil or on roots of weeds (especially lambsquarter), moving onto beets planted in the same field. Winged forms can also move to new fields. Summer population is all female. Females reproduce without mating and give birth to live young. Multiple overlapping generations	• All stages suck plant sap from roots. Aboveground symptoms include wilting, yellowing, and stunting. The pattern of damaged plants in the field is often elliptical • Root aphids cover themselves in a protective layer of wax, which can reduce water and nutrient uptake by beet roots • Moderate infestations can reduce yield, sugar content, and recoverable sugar even if above-ground symptoms are lacking	• Aphids overwinter on roots of certain weeds, especially lambsquarters, pigweed, & kochia • Dry conditions help root aphids spread, as soil cracks allow them to access roots • Drought also enhances the impact of SBRA root feeding	Occasional and Localized SBRA persists on alternate weed hosts. Infested areas show up in beet fields in dry seasons. Recent issues with SBRA appear to relate to certain beet varieties.
thrips	Adults and nymphs overwinter in residue. Populations initially build up on grasses and in wheat. Thrips are an important food source for beneficial insects (such as pirate bugs) that control other pests.	• Nymphs and adults feed with a single mandible, using it to puncture plant cells and slurp up the liquid inside • Punctured cells dry up, resulting in dead spots. Under heavy infestation, leaves dry up, curl, or die	• Dry conditions in early summer • Adults may move into beets from adjacent wheat fields or grassy borders as they dry down	Uncommon Usually present, but numbers are rarely high enough to cause damage

Pest (abbreviation)	Life cycle and Number of generations	Description of Damage	Conditions which favor infestation or damage	Pest Status in Michigan & commentary
webworms *several species*	Larvae overwinter. Adult moths emerge in spring and lay eggs on many hosts. Beet webworm caterpillars occur in June and again in August.	• Caterpillars spin webs and feed on beet leaves, usually near the leaf base	• Weedy fields, as moths may lay eggs on some of the weed species present	Uncommon
white grubs - *several species*	Mature grubs overwinter under-ground. Adults emerge May to July, depending on species. Eggs laid in soil in the summer. Grubs feed on roots, then move down the soil profile in late fall to overwinter. In spring, grubs feed for a period, then pupate. 1 generation per year except for June Beetle with a multiyear life cycle	• Larvae (grubs) prune root hairs or whole roots of small plants • On larger plants, grubs chew into or sever the tap root, causing wilting, water and nutrient deficiency, and even plant death	• Planting after a grass sod or fallow • Sandy fields or parts of fields	Uncommon and Localized Often related to fields or parts of fields with sandy soil
wireworm *several species*	Wireworms are the larval stage of click beetles. Adults are harmless Depending on species, wireworms spend several years in the larval stage feeding on seeds, roots, and tubers.	• Larvae feed on germinating seeds, seedlings, and on the growing tap root • A heavy infestation may reduce stand	• Planting after fallow or pasture or into a field with grass control issues last season • Cool, wet weather that delays crop development • Sandy fields or parts of fields	Uncommon I've never seen a severe infestation in Michigan.
woolly bear and zebra caterpillars	Depends on species, but larvae are present in July and August	• Larvae feed on leaves	• Nothing specific	Uncommon High numbers may be noticed in some years, but are not damaging

Table 4: Management notes, scouting recommendations, and thresholds for insect pests of sugarbeet in Michigan

Pest	Notes on non-chemical and chemical management	Scouting recommendation	Threshold
aphids *on leaves* *On roots, see sugarbeet root aphid*	• Biological: Predators (such as ladybugs, lacewings, and parasitoids keep populations in check. Under humid conditions, entomopathogenic fungi infect and kill aphids • Environmental: Heavy rainfall and irrigation may wash off aphids. Adequate moisture reduces feeding stress and increases humidity for infection by pathogens	Check 100 plants (20 plants x 5 sets)	Rough guideline: one colony (group of ~30 aphids) per plant Rarely justified in Michigan
armyworm	• Biological: Predators and parasitoids can reduce numbers. Under humid conditions, entomopathogenic fungi infect larvae • Agronomic: Good weed control reduces egg laying in a field • Insecticides: A border treatment may be possible if armyworms are moving into beets from an adjacent field	No specific recommendation Edges of fields are at greater risk	Rough guideline: 25% or more defoliation by leaf-feeding insects Beets aren't a preferred host
cutworm - black	• Biological: Ground-dwelling predators (beetles) likely provide some control • Agronomic: Good weed control reduces egg laying	Check 100 plants (20 plants x 5 sets), for cutting and wilting. Dig around base of cut plants to confirm larvae	5% of plants cut
cutworm - winter	• Biological: Ground-dwelling predators (such as beetles) and birds likely to provide some control	Same as black cutworm	5% of plants cut A rare, odd outbreak occurred in 2007
flea beetle	• Agronomic: Good weed control reduces alternate hosts	Check 100 seedlings (20 plants x 5 sets) for feeding damage. Newly-emerged plants are most vulnerable	Rough guideline: 25% of seedlings with feeding damage
grasshoppers	• Biological: Blister beetle larvae prey on eggs, while insects, birds, and mammals eat nymphs & adults. Natural fungal pathogens kill eggs and nymphs under wet spring conditions • Agronomic: Tillage reduces survival of eggs and newly hatched nymphs • Insecticide: May be able to limit sprayed area if hoppers invade from a neighboring field or grassy border	No specific recommendation	Rough guideline: 25% or more defoliation by leaf-feeding insects I have never seen populations high enough to treat in Michigan
Japanese beetle	• Agronomic: Tillage reduces survival of overwintering grubs	No specific recommendation	Rough guideline: 25% or more defoliation by leaf-feeding insects
leafhoppers	• No specific guidelines	No specific recommendation	None I have never seen populations high enough to treat in Michigan
lygus bug	• Insecticides: Spraying is not very effective at managing Lygus. By the time damage (yellowing) is seen on older leaves, the feeding occurred potentially many days before, and the insects may not even be present	Check 100 plants (20 plants x 5 sets) for bugs or for the distinctive yellowing Note: Lygus are fast and hard to scout	Rough guideline: 1 bug per plant or when significant yellowing occurs on new growth

Pest	Notes on non-chemical and chemical management	Scouting recommendation	Threshold
spider mite	• Biological: Under humid conditions, a natural fungal pathogen can infect and wipe out mite populations in a matter of days. Some natural enemies eat mites • Agronomic: Irrigation mitigates the impact of spider mite feeding and increases humidity for fungal biocontrol, but during a drought, even irrigation isn't enough • Environmental: Rainfall has a similar effect as irrigation • Insecticide: Insecticide resistance is common in mites. Some insecticides (including most pyrethroids) will flare mite populations by killing off natural enemies. Likewise, fungicide applications may disrupt fungal pathogens of mites. Insurance applications of both are discouraged. Be cautious about pesticide applications in dry years	Infestations often start on field edges Look for mites on undersides of leaves using hand lens or tap leaves over a black piece of paper Webbing is present when populations are high	A guess: Treat when mites appear on >25% of the plants and first yellowing is seen Mites are difficult to control. Spraying is often a losing proposition
spinach leafminer	• Insecticide: Sprays are most effective when applied just before or during egg hatch	Check 100 small plants (20 plants x 5 sets) for leaf mines	Treat if 50% or more of plants have egg masses and small mines are present
springtails (foliar)	• Agronomic: Tillage to incorporate and destroy crop residue in the fall prior to planting beets • Insecticide: No sugarbeet insecticides specifically list foliar-feeding springtails on the label, although some probably provide control. Note that the manufacturer is not responsible for poor performance	No specific recommendation	None established If the stand is severely damaged, follow guidelines for making a replant decision
sugarbeet root aphid (SBRA)	• Agronomic: Control of alternate weed hosts, especially lambsquarters, helps to reduce the local population in a field • Varieties: The majority, if not all, beet varieties grown in Michigan are rated as SBRA resistant. The accuracy of the rating is uncertain. In 2024, significant infestations were reported in some fields on resistant beets. • Cultural: Clean equipment when moving between fields. • Insecticides: Soil insecticides are not very effective at managing this pest	No specific recommendation Look for aphids and wax on roots in areas with wilted beets	None established Use resistant varieties if SBRA is known to be present in a field
thrips	• Biological: Generally kept in check by predators • Environmental: Rainfall or irrigation reduces populations • Insecticides: Thrips can be viewed as semi-beneficial, because they are predators of spider mite eggs. Spraying for thrips may contribute to a spider mite outbreak in the future, especially under dry conditions	Infestations often start on field edges Look for thrips on leaf undersides using a hand lens or tap leaves over a piece of paper	None established
webworm	• Biological: Many parasites and predators attack caterpillars	No specific recommendation. Check leaves in several locations in the field	Rough guideline: small larvae present on 50-75% of leaves
white grubs	• Biological: Some species are attacked by pathogens. • Agronomic: If practical, fall plowing of long-standing fallow fields & pasture prior to planting is recommended. Tillage also exposes grubs to mammals and birds Note: It is important to identify grubs found in the field to distinguish annual species from multiyear June beetle species	No specific recommendation Grubs tend to be in sandy parts of fields. They may be detected when plowing in the fall or spring, or if birds follow tillage equipment	None established
wireworm	• Agronomic: Tillage and longer rotations can reduce wireworm infestations	No specific recommendation	None established
woolly bears & zebra caterpillar	• Nothing specific	No specific recommendation	Rough guideline: 25% or more defoliation by leaf-feeding insects

Table 5: Soil/at-plant insecticides to manage insect pests of sugarbeet in Michigan

- Insecticides are grouped by active ingredient(s), which are listed alphabetically, allowing for easy comparison of products with the same chemistry
- Application rates are listed for pests which appear on the manufacturer label; if a column is blank, the pest is not on the label. The letters in the pest columns refer to the label use rate from column two
- Note that insecticide rates per 1000 feet of row are based on a **30-inch row spacing**. See label for specific per-acre rate and gauge-setting charts for narrower row spacing

Active ingredient Trade Names	**Labelled rate(s)** per 1000 feet of row or per acre	**cutworms**	**root aphid**	**slugs**	**white grub**	**wireworm**	**Precautions and Remarks**
cypermethrin (zeta) Mustang Maxx	(a) 4.0 oz per acre	a			a	a	• For cutworm, apply on soil surface or broadcast in 3-5 gal water • For grubs and wireworm, apply in-furrow or in a 3-4 inch T-band over the open furrow
esfenvalerate Asana XL S-FenvaloStar Zyrate	(a) 0.45 oz per 1000 ft	a					• Apply in-furrow, T-band or banded
iron phosphate Ferroxx AQ Sluggo	(a) 20-44 lbs per acre			a			• Broadcast pellets; use higher rate for heavy infestations. For best results, apply bait in the evening and on moist soil
sodium ferric EDTA Ferroxx	(a) 5-20 lbs per acre			a			• Broadcast pellets; use higher rate for heavy infestations • Slugs stop feeding, slowly die
terbufos Counter 20G (Lock'N Load, Smartbox, or SmartCartidge)	(a) 3 - 6 oz per 1000 ft		*		a	a	• Apply banded or 'modified' in-furrow (2-3 inches behind the seed after some soil has covered the seed); do not let granules directly contact seed, as injury may occur • Higher rate may also suppress cutworms and sugar beet cyst nematode * See label for banded postemergence use against sugarbeet root aphid. Note the 90-day pre-harvest interval for this application.

Table 6: Foliar insecticides to manage insect pests of sugarbeet in Michigan

- Insecticides are grouped by active ingredient(s), which are listed alphabetically, allowing for easy comparison of products with the same chemistry
- Application rates are listed for pests which appear on the manufacturer label. If a column is blank, the pest is not on the label. The letters in the pest columns refer to the label use rate from column two
- 'Caterpillar' column includes woolly bear, saltmarsh, thistle, & zebra caterpillars

Active ingredient Trade Names	**Labelled rate per acre**	**aphids (foliar)**	**armyworm**	**caterpillars**	**cutworms**	**flea beetle**	**grasshopper**	**leafhopper**	**lygus bug**	**spider mite**	**spinach leafminer**	**springtails**	**thrips**	**webworm**	**Pre harvest interval (PHI) in days**	**Precautions and Remarks**
Bacillus thuringiensis (Bt) Agree WG* Javelin WG Xentari DF	(a) 0.5 - 2.0 lb (a) 0.25 - 1.5 lb (a) 0.5 - 1.5 lb		a	a	a									a	0	• Bt is a selective biological insecticide to control caterpillars. Larvae must eat treated foliage to be controlled so good coverage is important. Must be targeted on small (1st - 2nd stage) larvae. • All are certified for organic production * The Agree WG label only lists armyworm
carbaryl Carbaryl 4L Sevin 4F Sevin XLR Plus	(a) 1.0 - 1.5 quarts		a		a	a								a	28	• Max 3 quarts per acre • For cutworm, effective on species feeding on top of plant • Toxic to bees - do not apply if weeds in field are in bloom
cyantraniliprole Dupont Exirel Exirel	(a) 13.5 - 20.5 oz (b) 10.0 - 20.5 oz	a	b		b	a							*		1	• Thorough coverage is essential; application for aphid control requires an effective adjuvant (see label) *Application may suppress thrips
chlorantraniliprole Vantacor	(a) 1.2 - 2.5 oz		a								a				1	• Use higher rate in dense canopy or under rainy / high temp conditions • 2ee label for leafminer, but suppression only
cypermethrin (alpha) Fastac CS Fastac EC*	(a) 2.2 - 3.8 oz	a	a		a	a	a								50	• Minimum spray volume 2 gal by air and 10 gal by ground • Do not graze or harvest treated tops for feed • Fastac CS is a microencapsulated formulation * Fastac EC does not list aphids & armyworm on the label
cypermethrin (zeta) Mustang Maxx	(a) 2.24 - 4.0 oz	a	a	a	a	a	a	a	a		a			a	50	• Aphid control depends on species
esfenvalerate Asana XL S-FenvaloStar Zyrate	(a) 5.8 - 9.6 oz		a	a	a	a	a	a							21	

Active ingredient Trade Names	**Labelled rate per acre**	**aphids (foliar)**	**armyworm**	**caterpillars**	**cutworms**	**flea beetle**	**grasshopper**	**leafhopper**	**lygus bug**	**spider mite**	**spinach leafminer**	**springtails**	**thrips**	**webworm**	**Pre harvest interval (PHI) in days**	**Precautions and Remarks**
methomyl Annihilate LV Lanveer LV Lannate LV Nudrin LV Annihilate SP Corrida 90WSP Lannate SP Nudrin SP	(a) 0.75 - 3.0 pints (b) 1.5 pints (a) 0.25 - 1 lbs (b) 0.5 lb			a	b	a								a	21 beets 30 tops	• Highly toxic to bees; be careful about drifting onto nearby crops or application on blooming weeds • See label for set-back requirements from surface water
methoxyfenozide Intrepid 2F	(a) 8 - 16 oz		a	a	a									a	7	• Minimum spray volume 10 gal by air and ground • Cutworms, suppression only • Narrow spectrum, targets caterpillars. Novel mode of action disrupts molting. Spray timing is critical; applications need to be made at egg hatch or just as feeding starts • Endangered species warning for use in Montcalm Co. Michigan. Access EPA's 'Bulletins Live! Two' web site
naled Dibrom 8E	(a) 1 pint	a	a				a	a	a	a					2	• See label for setback requirements from surface water
pyrethrins Evergreen EC 60-6 PyGanic EC 1.4 II PyGanic 5.0	(a) 2.0 - 12.6 oz (a) 16 - 64 oz (a) 4.5 - 15.6 oz	a	a	a	a	a	a	a	a			a	a	a	0 when sprays dry	• Plant-derived insecticides that knock down insects quickly but have short residual control. Coverage is critical • Highly toxic to bees exposed to direct treatment; do not apply on or drift onto blooming crops or weeds
spinosyns **(spinetoram & spinosad)** Radiant SS	(a) 6 - 8 oz		a			a							a		7	• Must target egg hatch or small larvae • Flea beetles - suppression only. Thrips control is improved by adding an adjuvant as detailed on the label. Be careful using oil-based adjuvants in sugarbeet tank mixes.
spirotetramat Movento Movento HL	(a) 5 - 9 oz (a) 2.25-4.5 oz	a													28	• Systemic - moves through plant into leaves and roots; systemic activity may be limited in cold or dry weather when plant isn't actively growing • Minimum spray volume 5 gal by air and 15 gal for ground; see label for recommendation to add an adjuvant • Also controls root aphid and suppresses cyst nematode