Insect, Nematode, and Disease Control in Michigan Field Crops

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**This bulletin contains information on the management of field crops insects, nematodes, and diseases, including recommendations for pesticide use. Every attempt is made to verify product names, formulations, use rates, and other important information, but products and labels may change before the field season begins. Always read the label of a product to reconfirm rates, precautions, PPE, and other important information before use.

Dry Bean Insect Pests

Annual Grub Adults (including Japanese beetle, rose chafer)

Pest status: Common insects, rarely economic pests
Description: Color & size depend on species. Japanese beetle is metallic green/ bronze with copper wing-covers, tufts of white hair down side.
Life cycle: Japanese beetle and rose chafer have many host plants. Larvae (grubs) feed underground on roots. Adults emerge mid-summer, and feed on leaves, flowers, and pollen. One generation per year.
Type of damage: Defoliation by adult beetles
Management: Typically do not cause enough damage to warrant treatment.
Threshold: Treat areas where one-quarter of the foliage or more has been damaged by annual grub adults.

List of registered insecticides (rate per acre):

Baythroid 2* (2.4 to 3.2 oz)
Mustang Max* (2.72 to 4 oz)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F & XLR Plus (0.5 to 1 qt)
Sevin 80S & 80WSP (0.62 to 1.25 lb)
Warrior* (2.56 to 3.84 oz)

Aphids

Pest status: Common insect, occasionally an economic pest
Description: Small oval to pear shaped soft-bodied insects. Color varies from green to pink to brown. Have long "tail pipes".
Life cycle: Aphids present during the field season are all female, and do not need to mate to reproduce; females produce live young. Multiple overlapping generations.
Type of damage: Sucks plant sap from leaves; heavy infestation may lead to stunting, curling of leaves, and general weakening of plants. Aphids also transmit plant viruses.
Conditions favoring damage: hot, dry weather often enhances aphid damage
Management: Biological - natural enemies (ladybugs, lacewings, and wasps) and fungi generally keep populations in check
Threshold: Treat where there is one aphid colony (a group of about 30) or more per plant.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Admire 2F (16 to 24 oz)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (3.2 oz)
Dibrom 8E (1 pt)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pt)
Endosulfan 3EC (2.66 pts)
Lannate LV* (1.5 to 3 pt) or SP* (0.5 to 1 lb)
Malathion 57EC (2 to 2.5 pt)
Malathion 8F (1.5 pts) or 8 aquamul (1.25 to 1.75 pts)
Mustang Max* (3.2 to 4 oz)
Orthene 75S & 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Penncap M* (1 qt.)
Proaxis* (2.56 to 3.84 oz)
Provado 1.6F (3.5 oz/ acre)
Pyganic EC1.4 (16 to 64 oz) or EC5.0 (4.5 to 18)
Thimet 20G* (4.5 to 7.0 oz/ 1,000 feet of row)
Thionex 3EC (0.67 to 1.33 qts) or 50WSB (1-2 lbs)
Warrior* (2.56 to 3.84 oz)

Armyworm

Pest status: Rarely an economic pest
Description: Caterpillars variable in color (black/brown/green). Narrow light stripe across back and broad stripes running down sides of body.
Life cycle: Migrate to Michigan each spring. 2-3 generations per year.
Type of damage: Defoliation by larvae.
Threshold: Treat when there are four armyworms or more per row foot, or when one-quarter of the foliage or more has been damaged by leaf-feeding insects, predominantly armyworms.

List of registered insecticides:

Acephate 75SP (1.0 to 1.33 lbs)
Baythroid 2* (2.4 to 3.2 oz)
Biobit HP (0.5 to 2 lb)
Dipel DF (1 to 2 lbs) or ES (2 to 4 pts)
Endosulfan 3EC (2.66 pts)
Javelin WG (0.25 to 1.5 lb)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (1.0 to 1.33 lb) or 97 (12 to 16 oz)
Proaxis* (2.56 to 3.84 oz)
Pyganic EC1.4 (16 to 64 oz) or EC5.0 (4.5 to 18)
Sevin 4F or XLR Plus (1 to 1.5 qt)
Sevin 80S or 80WSP (1.25 to 1.875 lb)
Thionex 3EC (1.33 qts) or 50WSB (2 lbs)
Warrior* (2.56 to 3.84 oz)

Bean Leaf Beetle

Pest status: Occasional.

Description: Adult beetle has brown, greenish-yellow, or red wing covers, with 4 black spots and black stripe along edge; wing spots may be absent, but a black triangle is always present on wings behind head.

Life cycle: Adult BLB overwinter in leaf litter and wooded field margins, becoming active in spring; move into alfalfa, then migrate into beans after first alfalfa cutting; 1-2 generations per year.

Type of damage: Chewing pest; larvae feed on root hairs and nodules; adults defoliate younger plants, leaving small round holes between major leaf veins; adult feeding on developing pods causes scarring, reducing yield and seed quality.

Thresholds: 25% or more defoliation throughout field; 50% defoliation of seedlings or 25% defoliation during pod setting/filling; or more than 10% of the pods damaged.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (2.4 to 3.2 oz)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Endosulfan 3EC (1.32 to 2.66 pts)
Lannate LV* (0.75 to 1.5 pt) or SP* (0.25 to 0.51 lb)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Penncap M* (1 qt)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F or XLR Plus (0.5 to 1 qt)
Sevin 80S or 80WSP (0.62 to 1.25 lb)
Thionex 3EC (0.67 to 1.33 qts) or 50WSB (1to 2 lbs)
Warrior* (2.56 to 3.84 oz)

Black Cutworms

Pest status: Rarely an economic pest

Description: Caterpillar is up to 2 inches long. Variable coloration (gray to black), 4 tubercles per body segment, inner tubercles smaller than the outer tubercles.

Life cycle: Adult moths migrate to Michigan in early spring. Females lay eggs on low-growing weeds (for ex., chickweed) or crop debris. Small larvae first feed on weeds, then may move to the crop later after weed-kill. Several generations per season.

Type of damage: Larvae feed on leaves and stems. Plants can be cut off at the base.

Conditions favoring damage: Low, dense weeds in field (egg laying site for females), areas with high crop residue, planting into plowed sod or pasture, cover crops, wet areas, no-till.

Sampling/ scouting: Begin scouting as soon as seedlings emerge. Look for wilted or cut plants; determine percent seedlings damaged. Dig around base of nearby seedlings to verify identity of larvae.

Threshold: Treat when 5 percent of small plants or more show damage.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (1.0 to 1.6 oz)
Mustang* (1.4 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F or XLR Plus (1.0 to 1.5 qt)
Sevin 80S or 80WSP (1.25 to 1.875 lb)
Warrior* (1.92 to 3.2 oz)

Grasshoppers

Pest status: Common insect**,** occasional outbreaks

Life cycle: Eggs overwinter in soil; nymphs hatch in June. As nymphs grow, feeding damage increases. Females lay eggs in soil in late summer.

Type of damage: Defoliation by nymphs and adults.

Conditions favoring damage: Unplowed or fallow areas are preferred egg-laying sites, and may contribute to populations in nearby fields. Dry, warm weather enhances nymph survival.

Management: Biological - A fungal pathogen kills many eggs and nymphs under wet spring conditions. Natural enemies (birds, rodents, amphibians) also feed on grasshoppers, but may not provide adequate control during outbreaks.

Threshold: Treat areas where one-quarter of the foliage or more has been damaged by leaf-feeding insects, predominantly grasshoppers; or where there are more than 20 grasshoppers on plants less than 6 in; over 40 per 10 row ft in taller plants.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.33 to 0.66 lbs)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (2.4 to 3.2 oz)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Mustang* (3 to 4.3 oz) or Max* (3.2 to 4 oz)
Proaxis* (2.56 to 3.84 oz)
Orthene 75S and 75WSP (0.33 to 0.67 lbs) or 97 (4 to 8 oz)
Sevin XLR Plus (0.5 to 1.5 qt) or 80WSP (0.62 to 1.875 lb)
Warrior* (2.56 to 3.84 oz)

Green Cloverworm

Pest status: Occasional outbreaks.

Description: Pale green caterpillar with 2 white stripes running along side of body; ~1 inch long.

Life cycle: In early spring, adults lay eggs singly on underside of leaves; larvae feed on foliage

Type of damage: Newly hatched larvae feed on the underside of leaves. As they grow they chew through the leaves.

Management: Biological- many natural enemies and diseases.

Threshold: Treat where one-quart of the foliage or more has been damaged by leaf-feeding insects, predominantly green cloverworm; or where there are 15 larvae or more per row foot at green pod stage.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (2.4 to 3.2 oz)
Malathion ULV (0.5 pt)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33) or 97 (8 to 16 oz)
Penncap M* (1 qt)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F or XLR Plus (0.5 to 1 qt)
Sevin 80S or 80WSP (0.62 to 1.25 lb)
Warrior* (1.92 to 3.2 oz)

Mexican Bean Beetle

Pest status: Common insect, occasionally an economic pest

Description: Adult – oval beetle, ~1/2 inch long, yellow/orange with 16 small black spots on wings (ladybug-like); bright yellow larvae with dark bristly spines. Eggs bright yellow, laid in clusters of 40-60 on leaf undersides.

Life cycle: Adults overwinter in crop debris, woodlots, etc. Adults move into dry beans in early summer and lay eggs. Larvae mature in 3-4 weeks, pupate on leaf surface. Adults emerge in mid-late summer and lay eggs for second generation. Second generation larvae feed, pupate in late August, and new adults overwinter.

Type of damage: Chewing pest; larvae and adults feed on undersides of leaves and between veins, giving leaves a lacy appearance.

Sampling/scouting: Examine plants in several locations of the field.

Threshold: Treat where one-quarter of the foliage or more has been damaged by leaf-feeding insects, mostly Mexican bean beetles.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Asana XL* (2.9 to 5.8 oz)
Baythroid 2* (2.4 to 3.2 oz)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Endosulfan 3EC (1.32 to 2.66 pts)
Lannate LV* (0.75 to 3 pt) or SP* (0.25 to 1 lb)
Malathion 57EC (1.5 to 2.5 pt)
Malathion 8F (1.5 pts) or 8 aquamul (1.25 to 1.75 pts)
Malathion ULV (0.5 pt)
Malathion 5EC (1.5 to 2.0 pts)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Penncap M* (1 qt)
Proaxis* (2.56 to 3.84 oz)
Pyganic EC1.4 (16 to 64 oz) or EC5.0 (4.5 to 18)
Sevin 4F or XLR Plus (0.5 to 1 qt)
Sevin 80S or 80WSP (0.67 to 1.25 lb)
Thimet 20G* (4.9 to 9.4 oz/1,000 feet of row)
Thionex 3EC (0.67 to 1.33 qts) or 50WSB (1to 2 lbs)
Warrior* (1.92 to 3.2 oz)

Mites

Pest status: Common arthropod**,** occasional economic pest.

Description: Very small, wingless, 8-legged invertebrate; Two-spotted spider mite is greenish yellow to orange with 1 large black spot on each side of body.

Life cycle: Adults overwinter in field borders and sheltered areas. In spring, adults move to new growth and lay eggs on underside of leaves; Mites spread by crawling or blowing on the wind; all stages feed on plants; populations can expand quickly.

Type of damage: Sucking pest. Inserts mouthparts into individual plant cells, removes contents. Resulting in small yellow spots (stippling)**.**

Conditions favoring damage: Prolonged dry, hot weather.

Sampling/scouting: Look for mites on underside of leaves using hand lens, or tap leaves over a piece of paper; webbing may be present on leaves if population is high.

Management: Biological – a fungal pathogen kills mites under high population pressures**.**

Threshold: Treat when mites appear on one-quarter of the plants or more and when the first yellowing is seen. Mites are difficult to control and two applications may be needed.

List of registered insecticides, *RUP (rate per acre):

Dibrom 8E (1 pt)
Dicofol 4E (1 to 3 pts)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Kelthane MF (1 to 3 pts)
Malathion 5EC (1.5 pts) or ULV (0.5 pts)

Plant Bugs

Pest status: Common insects, occasionally economic pests

Description: 1/8th to 1 inch long, oval 'true bugs'. Plant bugs can be greenish or brown. Tarnished PB is dark brown with yellow V-shaped mark on back. Nymphs resemble adults, but lack wings.

Life cycle: Adults overwinter. Eggs laid into plant tissue. Multiple generations.

Type of damage: Sucking pest. Adults and nymphs remove plant sap. Tarnished plant bug injects a toxic saliva during feeding; can cause beans to shrink within the pod.

Threshold: Treat when there is one bug or more per plant at first flower to green pod stage.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Baythroid 2* (2.4 to 3.2 oz)
Dibrom 8E (1 pt)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Lannate* LV (1.5 to 3 pt) and SP* (0.5 to 1 lb)
Malathion 5EC (2 pts) or 8 Aquamul (1.25 - 1.75 pt)
Malathion ULV (0.5 pts)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Penncap M* (1 qt)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F or XLR Plus (1 to 1.5 qt)
Sevin 80S or 80WSP (1.25 to 1.875 lb)
Warrior* (2.56 to 3.84 oz)

Potato Leafhopper

Pest status: Key pest; widespread and abundant

Description: Small, bright green, torpedo shaped insects. Fast moving, in a "crab-like" fashion. Nymphs resemble adults but are lime green/yellow, much smaller, lack wings.

Life cycle: Adults are carried into Michigan from the south on weather fronts in May/early June. Females lay eggs inside stems. Nymphs hatch in 7-10 days, begin feeding immediately, and reach adult stage in 2-3 weeks. Multiple overlapping generations.

Type of damage: Sucking pest. Both adults and nymphs remove plant sap and inject toxic saliva as they feed. Typical symptom is "hopperburn". Other symptoms include stunting and curling of leaves and poor pod fill.

Conditions favoring damage: Dry conditions (drought) enhance PLH damage.

Management: Biological - a naturally occurring fungal pathogen reduces PLH numbers under favorable conditions. Chemical - Most insecticides are effective against PLH.

Sampling/scouting: Begin scouting in early June. Examine 5 sets of 20 trifoliate leaves from different parts of the field. Count both adults and nymphs.

Threshold: On unifoliate stage beans (prior to presence of a fully expanded 1st trifoliate) treat if population exceeds 0.5 leafhoppers per plant. On plants with one or more fully expanded trifoliate, treat if population exceeds 1 leafhopper per trifoliate leaf.

List of registered insecticides - see next page

Potato Leafhopper, continued from previous page

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Admire 2F (16 to 24 oz)
Asana XL* (5.8 to 9.6 oz)
Baythroid 2* (1 to 1.6 oz)
Dibrom 8E (1 pt)
Dimethoate 4EC (0.5 to 1 pt) or 5lb (6.4 oz)
Dimethoate 267 (0.75 to 1.5 pts)
Disyston 15G* (6 oz / 1000 row ft)
Disyston 8* (0.9 to 1.9 oz / 1000 row ft)
Endosulfan 3EC (1.32 to 2.66 pts)
Lannate LV* (0.75 to 3 pt) or SP* (0.25 to 1 lb)
Malathion 57EC (1.5 to 2.5 pt), 5EC (2 pt), ULV (0.5 pt)
Malathion 8F (1.5 pts) or 8 aquamul (1.25 to 1.75 pts)
Mustang* (3 to 4.3 oz) or Max* (2.72 to 4 oz)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Penncap M* (1 qt)
Proaxis * (2.56 to 3.84 oz)
Provado 1.6F (3.5 oz)
Pyganic EC1.4 (16 to 64 oz) or EC5.0 (4.5 to 18)
Sevin 4F or XLR Plus (1 qt)
Sevin 80S or 80WSP (1.25 lb)
Thimet 20G* (4.5 to 7 oz/ 1,000 feet of row at planting)
Warrior* (2.56 to 3.84 oz)

Seedcorn Maggot

Pest status: Occasional pest.
Description: Larva- small (1/4 inch), white maggot; adult – small gray fly.
Life cycle: Overwinter as pupae in soil; adults emerge as flies in early spring, lay eggs in disturbed soil with decaying organic matter. Multiple generations.
Type of damage: Maggots feed on germinating seed; may cause variable emergence, stand loss, delayed development.
Conditions favoring damage: Cool wet soil (delays germination)**,** soils high in organic matter from cover crop or manure.
Threshold: Seed or planter box treatment of all dry bean seed is recommended. Commercial seed treatment of a fungicide mixed with an insecticide is especially recommended because treated seed can be used in any planter. Make sure that proper amount of insecticide is applied when a mixture fungicide is used. Planter box treatments cannot be used in air planters, but are effective with conventional planters.

List of registered insecticides, *RUP (rate per acre):

Lorsban 30F (seed treatment, apply as a slurry, see label)
Lorsban 50SL (seed treatment, apply as a slurry, see label)
Thimet 20G* (4.5 to 7 oz/ 1,000 feet of row at planting)
Temik 15G* (3.5 to 5 lb)

Slugs

Pest Status: Occasionally an economic pest
Type of damage: Slugs may damage seedling dry beans by feeding on the stems, cotyledons and leaves of young plants. While substantial defoliation can be tolerated in pre-blooming dry beans, if the growing point is killed, stands can be significantly reduced.
Conditions favoring damage: Dry beans established into wheat stubble or other heavy crop residue are at greatest risk. Occasionally, fields planted following a legume plow-down have been damaged. Fields with a recent history of slug damage are also at increased risk. Cool, wet conditions favor slug survival and damage.
Threshold: No thresholds have been established for slugs in dry beans. Consider treatment if slug damage threatens to reduce stand density below an acceptable point.

List of registered insecticides:

Deadline MPs 4% Bait (10 to 20 lbs)
Snail and Slug Pellets 3.5% Bait (various products and rates)

Thrips

Pest status: Common insect, occasional pest.
Description: Adult – small, slender, brown and white-banded abdomen, narrow fringed wings; larva – wingless, yellow/orange.
Life cycle: Females insert eggs into plant tissue. Immature thrips feed on crop until mature. Multiple, overlapping generations.
Type of damage: Most obvious early in season; adult & nymph rasping/sucking mouthparts scrape cells on leaf underside, leaving silvery scratches which may turn leaves brown; young leaves may appear crinkled.
Conditions favoring damage: Hot dry weather coupled with large thrips populations.
Management: Biological – many natural enemies (minute pirate bugs, predacious thrips and mites) attack thrips**.**
Threshold: Treat when one-third of small plants or more show damage and when dry leaves first appear.

List of registered insecticides, *RUP (rate per acre):

Acephate 75SP (0.66 to 1.33 lbs)
Admire 2F (16 to 24 oz)
Lannate LV* (0.74 to 1 pt) and SP* (0.5 to 1.0 lb)
Orthene 75S and 75WSP (0.67 to 1.33 lb) or 97 (8 to 16 oz)
Proaxis* (2.56 to 3.84 oz)
Sevin 4F or XLR Plus (1 qt)
Sevin 80S or 80WSP (1.25 lb)
Warrior* (2.56 to 3.84 oz)

White grubs

No insecticides are currently recommended for use against white grubs in dry beans. Spring and fall plowing during a season of clean fallow before a crop is strongly recommended when a field is broken from established sod. Temik or Thimet soil insecticide used at planting against soil pests such as nematodes may reduce grub numbers.

Wireworms

Pest status: Common insect, occasional pest in localized areas.
Description: Slender, shiny, yellow-brown, with wiry segmented body, up to 1.5 inches long.
Life cycle: Immature form of click beetle; found in grasslands, sod, or fallow fields. Wireworms can spend 2 to 6 years in the larval stage, during which they feed on underground parts of plants.
Type of damage: Feeds on seeds, preventing germination. Also feeds on roots.
Sampling/ scouting: Scout for wireworms with a bait station (see web site below) at least one week before planting.
Management: Cultural – spring and fall plowing of established sod is recommended before crop is planted, where practical.
Threshold: Treat when wireworms are seen while fitting established sod, or areas where damage has occurred. Spring and fall plowing during a season of clean fallow is strongly recommended when a field is broken from established soil. If using bait traps, one or more wireworms per trap.

List of registered insecticides, *RUP (rate per acre):

No insecticides are currently recommended for use against wireworms in dry beans. Spring and fall plowing during a season of clean fallow before a crop is strongly recommended when a field is broken from established sod. Temik or Thimet soil insecticide used at planting against soil pests such as nematodes may reduce wireworm numbers.

Insecticides Registered for Dry Beans

Trade name	Common name	Class	Recommended for:	PHI days	REI hrs	Precautions and Remarks
Acephate 75SP	acephate	OP	aphids, armyworms, bean leaf beetles, cutworms, grasshoppers, green cloverworm, leaf rollers, Mexican bean beetle, plant bugs, PLH, thrips	14	24	Max 2 lbs a.i. per acre per season
Admire 2F	imida-cloprid	Neo	aphids, PLH, thrips	21	12	Maximum of 0.375 lbs a.i. per acre per season.
Asana XL **(RUP)**	esfen-valerate	Pyr	aphids, bean leaf beetle, cutworm, grasshoppers, green cloverworm, Mexican bean beetle, potato leafhopper	21	12	Maximum 0.2 lb a.i. per acre per season. Do not graze or feed forage to livestock.
Baythroid 2 **(RUP)**	cyfluthrin	Pyr	Annual grub adults, aphids, armyworm, BLB, cutworm, grasshoppers, green cloverworm, MBB, plant bugs, PLH	7	12	Maximum 6.4 oz per acre per season with 2 applications. Max 4 applications per season.
Bt [Biobit, Dipel, Javelin]	*Bacillus thurin-giensis*	bio	armyworm	--	12	Use only to control small armyworms when populations are low. Full coverage is important.
Deadline M-Ps 4% Bait	metalde-hyde	other	slugs	--	12	Broadcast by ground or air every 3 to 4 weeks during season as needed. For best results apply in the evening, preferably after a rain or irrigation.
Dibrom 8 EC	naled	OP	aphids, mites, plant bugs, PLH	1	48	Do not feed treated vines or hay to livestock.
Dicofol 4-E miticide	dicofol	Ocl	mites	21	12	Max 2 applications per season.
Dimethoate 267,400, 4EC, 5 lb	dimethoate	OP	aphids, bean leaf beetle, grasshoppers, Mexican bean beetle, mites, plant bugs, PLH	7	48	Do not feed treated vines to livestock. Note honeybee precautions.
Di-Syston **(RUP)** 8, 15 % Granular	disulfoton	OP	PLH	60	48	Max 1 application per season.
Endosulfan 3EC	endosulfan	Ocl	aphids, armyworm, Bean leaf beetle Mexican bean beetle, PLH	3	24	Max 3 applications per season.
Kelthane MF	dicofol	Ocl	mites	21	12	Max 2 applications per season.
Lannate **(RUP)** LV and SP	methomyl	Carb	aphids, bean leaf beetle, Mexican bean beetle, plant bugs, PLH, thrips	14	48	Maximum 4.5 lbs a.i. per acre per year.
Lindane	lindane	OCl	seedcorn maggot	--	12	
Lorsban 30F, 50SL	chlor-pyrifos	OP	seedcorn maggot	--	--	
Malathion 5 EC, 8 Aquamul, 8 Flowable, ULV	malathion	OP	annual grub adults, aphids, green cloverworm, Mexican bean beetle, plant bugs, PLH	1	12	Do not feed treated vines to livestock

Trade name	Common name	Class	Recommended for:	PHI days	REI hrs	Precautions and Remarks
Mustang and Mustang Max **(RUP)**	zeta-cypermethrin	Pyr	aphids, armyworm, cutworm, green cloverworm, grasshopper, MBB, plant bugs, PLH	21	12	Apply no more than 0.3 lbs a.i. per acre per season.
Orthene 75S, 97	acephate	OP	aphids, armyworm, bean leaf beetle, cutworm, grasshoppers, green cloverworm, leafrollers, Mexican bean beetle, plant bugs, potato leafhopper, thrips	14	24	Do not feed treated vines to livestock.
Penncap-M **(RUP)**	methyl parathion	OP	aphids, bean leaf beetle, green cloverworm, Mexican bean beetle, plant bugs, potato leafhopper	15	96	Do not apply more than 12 pts per acre per year.
Proaxis **(RUP)**	gamma cyhalothrin	Pyr	annual grub adults, aphids, armyworm, bean leaf beetle, cutworm, grasshoppers, green cloverworm, Mexican bean beetle, plant bugs, PLH, thrips	21	24	Maximum of 0.06 lbs a.i. per acre per season.
Provado 1.6F	imida-cloprid	Neo	aphids, PLH	7	12	See label for plant back restrictions. Maximum 0.13 lbs a.i. per acre per season.
Pyganic EC1.4 and EC 5.0	pyrethrum	Bio	armyworm, MBB, PLH	0	12	Listed by the Organic Materials Review Institute (OMRI) for use in organic production.
Sevin 4 F, XLR Plus, 50 W 80 S or 80 WSP	carbaryl	Carb	annual grub adults, armyworm, BLB, cutworm, grasshoppers, cloverworm, MBB, plant bugs, potato leafhopper, thrips	21	12	Note honeybee precautions. Application to wet plants or during periods of high humidity may cause injury to tender foliage.
Snail and Slug Pellets 3.5% Bait	metalde-hyde	other	slugs	--	--	Broadcast every 2 weeks or as needed. Wet soil before or just after application. Do not allow pellets to contact edible portion of plant. Keep children, pets, and poultry away from treated areas.
Temik 15G **(RUP)**	aldicarb	Carb	seedcorn maggot	90	48	Apply in seed furrow and cover with soil. Do not feed forage to livestock.
Thimet 20G **(RUP)**	phorate	OP	potato leafhopper, seedcorn maggot	60	48	Do not let Thimet contact seed. Do not graze or feed treated hay or forage to livestock.
Thionex 3 EC, 50WSB	endosulfan	OCl	aphids, bean leaf beetle, Mexican bean beetle	3	24	Do not feed treated vines to livestock.
Warrior **(RUP)**	lambda cyhalothrin	Pyr	annual grub adults, aphids, armyworm, BLB, cutworm, grasshoppers, cloverworm, MBB, plant bugs, PLH, thrips	21	24	Maximum of 0.12 lbs a.i. per acre per season.