

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.

Soybean Insect Pests

Armyworm

Pest status: Sporadic pest

Description: Larvae (caterpillars) variable in color, from black to brown to greenish. Narrow light stripe across back and broad stripes running down sides of body.

Life cycle: Likely migrate to Michigan each spring. 2-3 generations per year.

Type of damage: Defoliation by larvae.

Conditions favoring damage: Grassy or weedy fields; double-cropping with small grains such as wheat

Threshold: 25% defoliation

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

Bacillus thuringiensis (check product labels for rates)

[Agree WG, Biobit HP, Dipel ES / DF, Javelin WG, Xentari DF]

Baythroid 2* (1.6 to 2.8 oz)

Capture 2EC* (2.1 to 6.4 oz)

Carbaryl 4L (2 to 3 pt)

Chlorpyrifos 4E* (1 to 1.5 pt)

Larvin 3.2* (10 to 30 fl oz)

Lorsban 4E* (1 to 1.5 pt – see insecticide table for generics)

Mustang* (3 to 4.3 oz) or Max* (3.2 to 4 oz)

Nufos 4E* (1 to 1.5 pt)

Orthene 75S (1 to 1.33 lbs) or 90S (0.83 to 1.1 lbs)

Orthene 97 (0.75 to 1 lb)

Pounce 3.2EC* (4 to 8 oz)

Proaxis* (3.2 to 3.84 oz)

Sevin 4F and XLR Plus (1 to 1.5 qt)

Sevin 80S and 80WSP (1.25 to 1.875 lb)

Tracer (1.5 to 2 oz)

Warrior* (3.2 to 3.84 oz)

Bean Leaf Beetle (BLB)

Pest status: Occasional.

Description: Small beetle (1/4 inch long) with variable coloration; wings greenish-yellow or red, 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: Adults overwinter in leaf litter and wooded field margins, become active in spring. Move into alfalfa, then migrate into soybeans 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 and reduces yield and seed quality.

Management: Young soybeans can tolerate considerable injury without loss of yield; Cultural – late planting helps avoid BLB.

Threshold: 25% or more defoliation throughout field; 50% defoliation of seedlings or 25% defoliation during pod setting/filling, or if pod damage more than 10%.

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

Ambush* 25W (3.2 to 6.4 oz)

Arctic 3.2 EC* (2 to 4 oz)

Asana XL* (5.8 to 9.6 fl oz)

Baythroid 2* (1.6 to 2.8 oz)

Capture 2EC* (2.1 to 6.4 oz)

Carbaryl 4L (1 to 2 pt)

Chlorpyrifos 4E* (1 to 2 pt)

Cruiser 5FS seed treatment (1.28 oz / 100 lbs of seed)

Dimethoate / DiGon 400 and 4EC (1 pt)

Dimethoate 267 (1.5 pts)

Furadan 4F* (0.25 to 0.5 pts)

Gaicho SB Flowable (2 to 4 oz/100 wt seed)

Lannate LV* (0.75 to 1.5 pt) and SP* (0.25 to 0.5 lb)

Larvin 3.2* (18 to 30 fl oz)

Lorsban 4E* (1 to 2 pt – see insecticide table for generics)

Mustang* (3 to 4.3 oz) and Max* (2.8 to 4 oz)

Nufos 4E* (1 to 2 pt)

Orthene 75S (1 to 1.33 lbs) or 90S (0.83 to 1.1 lbs)

Orthene 97 (0.75 to 1 lb)

Penncap-M* (2 to 3 pt)

Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)

Pounce 3.2EC* (2 to 4 fl oz)

Pounce 25WP* (3.2 to 6.4 fl oz) or WSB* (0.2 to 0.4 lbs)

Proaxis* (1.92 to 3.2 oz)

Sevin 4F and XLR Plus (0.5 to 1 qt)

Sevin 80S and 80WSP (0.63 to 1.25 lb)

Warrior* (1.92 to 3.20 fl oz)

Cutworms

Pest status: Sporadic, early season.

Description: Larvae (caterpillar) up to 2 inches in length. Variable color (black-gray).

Life cycle: Adults migrate into Michigan in early spring and lay eggs on weeds or crop debris. Several generations per season.

Type of damage: Larvae cut seedlings, reducing stand development; older plants not as affected.

Sampling/scouting: Look for wilted or cut plants and dig around base of cut seedlings to confirm identity of larvae.

Conditions favoring damage: Weedy fields and borders (especially areas with low, prostrate weed growth); high crop residue; planting into plowed sod or pasture; cover crops; wet areas; no-till.

Management: Soybean tolerates considerable stand reduction without loss of yield; Chemical-rescue (post-plant) option preferred.

Threshold: 5% or more of small plants show cutworm damage, and larvae are less than 1.5 inches

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

Ambush 25W* (3.2 to 6.4 oz)

Arctic 3.2 EC (2 to 4 oz)

Asana XL* (5.8 to 9.6 fl oz)

Baythroid 2* (0.8 to 1.6 oz)

Capture 2EC* (2.1 to 6.4 oz)

Carbaryl 4L (2 to 3 pt)

Chlorpyrifos 4E* (1 to 2 pt)

Empower 2* (3.5 to 8.7 lbs/ acre)

Larvin 3.2* (20 to 30 fl oz)

Lorsban 4E* (1 to 2 pt)

Mustang* (1.4 to 4.3 oz) or Max* (1.28 to 4 oz)

Nufos 4E* (1 to 2 pt)

Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)

Pounce 3.2EC* (2 to 4 fl oz) or 25W* (3.2 to 6.4 oz)

Pounce WSB* (0.2 to 0.4 lbs)

Proaxis* (1.92 to 3.2 oz)

Sevin 4F and XLR Plus (1 to 1.5 qt)

Sevin 80S and 80WSP (1.25 to 1.875 lb)

Warrior* (1.92 to 3.20 fl oz)

Grasshoppers

Pest status: Common insect, occasional outbreaks.

Life cycle: Eggs overwinter in the soil, and nymphs hatch in June. Nymphs molt as they grow, and feeding increases with size.

Females lay eggs in the soil in late summer.

Type of damage: Defoliation (chewing) by nymphs and adults.

Conditions favoring damage: Growing season preceded by 2 or more years of dry weather; Undisturbed grassy sites next to fields (preferred for egg laying); dry, warm weather can enhance survival of nymphs.

Management: Biological – A fungal pathogen can kill many eggs and nymphs under wet spring conditions. Many animals (birds, rodents, amphibians) eat grasshoppers.

Threshold: 25% or more defoliation throughout field.

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

Asana XL* (5.8 to 9.6 fl oz)

Baythroid 2* (2.1 to 2.8 oz)

Capture 2EC* (1.6 to 6.4 oz)

Carbaryl 4L (1 to 3 pt)

Chlorpyrifos 4E* (0.5 to 1 pt)

Dimethoate / DiGon 400 and 4EC (1 pt)

Dimethoate 267 (1.5 pts)

Dimilin* 25W and 2L (2 oz)

Furadan 4F* (0.25 to 0.5 pt)

Lorsban 4E* (0.5 to 1 pt – see insecticide table for generics)

Mustang* (3.4 to 4.3 to 4.3 oz) or Max* (3.2 to 4 oz)

Nufos 4E* (0.5 to 1 pt)

Orthene 75S (0.33 to 0.67 lbs) or 90S (0.28 to 0.56 lbs)

Orthene 97 (0.25 to 0.5 lb)

PennCap-M* (2 to 3 pt)

Proaxis* (3.2 to 3.84 oz)

Sevin 4F and XLR Plus (0.5 to 1.5 qt)

Sevin 80S (0.63 to 1.875 lb)

Warrior* (3.20 to 3.84 fl oz)

Green Cloverworm and Loopers

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: Rough guideline is 25% or more defoliation throughout entire field.

For more information: <http://www.entm.purdue.edu/Entomology/ext/targets/e-series/EseriesPDF/E-78.pdf>

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

Ambush 25W* (3.2 to 6.4 fl oz)

Arctic 3.2 EC (2 to 4 oz)

Asana XL* (2.9 to 5.8 fl oz)

Bt = *Bacillus thuringiensis* (check product labels for rates)

[Agree WG, Biobit HP, Crymax, Dipel ES/ DF, Javelin WG,
Lepinox WDG, Xentari DF]

Baythroid 2* (0.8 to 2.8 oz)

Capture 2EC* (2.1 to 6.4 oz)

Carbaryl 4L (1 to 2 pt)

Chlorpyrifos 4E* (0.5 to 1 pt)

Dimilin 25W* and 2L* (2 to 4 oz)

Lannate LV* (0.4 to 1.5 pt) or SP* (0.125 to 0.5 lb)

Larvin 3.2* (10 to 30 fl oz)

Lorsban 4E* (0.5 to 1 pt – see insecticide table for generics)

Mustang* (3 to 4.3 oz) and Max* (2.8 to 4 oz)

Nufos 4E* (0.5 to 1 pt)

Orthene 75S (1 to 1.33 lbs) or 90S (0.83 to 1.1 lbs)

Orthene 97 (0.75 to 1 lb)

PennCap-M* (2 to 3 pt)

Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)

Pounce 3.2EC* (2 to 4 oz)

Pounce 25WP* (3.2 to 6.4 oz) or WSB* (0.2 to 0.4 lbs)

Proaxis* (1.92 to 3.2 oz)

Sevin 4F and XLR Plus (0.5 to 1 qt)

Sevin 80S and 80WSP (0.63 to 1.25 lb)

Tracer (1 to 2 oz)

Warrior* (1.92 to 3.20 fl oz)

Japanese Beetle

Pest status: Common insect, occasional pest

Description: Adult is metallic green or bronze with reddish wing-covers and tufts of white hair down the side; approx. ¼ inch long

Life cycle: Wide host range; one generation per year.

Type of damage: Adults feed on leaf tissue between veins, giving ‘skeletonized’ appearance

Sampling/scouting: Look at several areas of field to assess defoliation, rather than a single area, as feeding is not uniform throughout field; consider upper and lower leaves in your assessment

Threshold: Feeding by Japanese beetle alone usually not sufficient to warrant treatment; a general threshold is 25% defoliation due to combined feeding from Japanese beetles and other insects such as bean leaf beetles, grasshoppers, etc.

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

Ambush 25W* (6.4 to 12.8 fl oz)

Arctic 3.2 EC (2 to 4 oz)

Asana XL* (5.8 to 9.6 fl oz)

Baythroid 2* (1.6 to 2.8 oz)

Capture 2EC* (2.1 to 6.4 oz)

Carbaryl 4L (1 to 2 pt)

Mustang* (3 to 4.3 oz) and Max* (2.8 to 4 oz)

PennCap-M* (3 to 4 pt)

Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)

Pounce 3.2EC* (2 to 4 oz)

Pounce 25WP* (3.2 to 6.4 oz) or WSB* (0.2 to 0.4 lbs)

Proaxis* (3.2 to 3.84 oz)

Sevin 4 F and XLR Plus (0.5 to 1 qt)

Sevin 80S and 80WSP (0.63 to 1.25 lb)

Warrior* (3.20 to 3.84 fl oz)

Mexican Bean Beetle (MBB)

Pest status: Occasional pest.

Description: Adult – oval beetle, ~1/2 inch long, yellow/orange with 16 small black spots on wings; larvae – bright yellow grubs with dark bristly spines.

Life cycle: Adults overwinter in crop debris, woodlots, etc.

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

Management: Greatest potential for yield loss from flowering through pod fill; dry hot summers may reduce populations.

Threshold: 25% or more defoliation throughout field, or 1 or more adults per plant in established plants.

MBB Continued:

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

Ambush 25W* (3.2 to 6.4 oz)	Mustang* (3 to 4.3 oz) and Max* (2.8 to 4 oz)
Arctic 3.2 EC (2 to 4 oz)	Nufos 4E* (1 to 1.5 pt)
Asana XL* (2.9 to 5.8 fl oz)	Orthene 75S (1 to 1.33 lbs) or 90S (0.83 to 1.1 lbs)
Baythroid 2* (1.6 to 2.8 oz)	Orthene 97 (0.75 to 1 lb)
Carbaryl 4L (1 to 2 pt)	Pennac-M* (2 to 3 pt)
Chlorpyrifos 4E* (1 to 1.5 pt)	Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)
Dimethoate 267 (1.5 pt) or 4EC, 400 (1 pt)	Pounce 3.2 EC (2 to 4 oz)
Dimilin 25W* or 2L* (2 to 4 oz)	Pounce 25WP* (3.2 to 6.4 oz) or WSB* (0.2 to 0.4 lb)
Lannate LV* (0.4 to 1.5 pt) or SP* (0.125 to 0.5 lb)	Proaxis* (1.92 to 3.2 oz)
Larvin 3.2* (18 to 30 fl oz)	Sevin 4F and XLR Plus (0.5 to 1 qt) or 80WSP (1.25 lb)
Lorsban 4E* (1 to 1.5 pt – see insecticide table for generics)	Warrior* (1.92 to 3.2 fl 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, move to new growth and lay eggs on underside of leaves; may spread by crawling or be blown by wind; all stages feed on plants; populations can expand quickly.

Type of damage: Sucking pest; insert mouthparts into individual plant cells, resulting in small speckled 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 warm, humid conditions.

Threshold: If problem identified early, treatments of hot-spots may suffice; or, if mites have spread across field:

Pre-bloom – 40% damage. Bloom to podfill – 15% damage. Podfill to early maturity – 25% damage.

Notes: Mites are difficult to control, and 2 applications may be needed. Notify your county MSU extension agent if you have a mite problem, so that a pest alert can be issued. If soybean aphid populations are also heavy, dimethoate may not be the best choice to control both pests.

For more information: MSU CAT Alert article from 28 July 2005, ‘You Might Have Mites’
<http://www.ipm.msu.edu/CAT05 fld/FC07-28-05.htm>

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

Capture 2EC* (5.12 to 6.4 oz)	Lorsban 4E* (0.5 to 1 pt – see insecticide table for generics)
Chlorpyrifos 4E* (0.5 to 1 pt)	Nufos 4E* (0.5 to 1 pt)
Dimethoate 267 (1.5 pt) or 4EC, 400 (1 pt)	

Potato Leafhopper (PLH)

Pest status: Common insect, rarely a pest in soybeans.

Description: Small, bright green, torpedo shaped insects. Fast moving - often move 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. May colonize alfalfa and other hosts prior to soybean seedling emergence. Females lay eggs in soybean leaf veins and petioles. Multiple overlapping generations.

Type of damage: Adults and nymphs suck plant sap, causing leaf edges to become yellowish and cupped (curled downward and inward); greatest injury often seen in border rows adjacent to alfalfa.

Management: Cultural – ‘hairy’ soybean cultivars interfere with PLH feeding.

Threshold: 1 or more PLH per trifoliate leaf, and leaves show first signs of cupping.

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

Ambush 25W* (3.2 to 6.4 fl oz)	Orthene 75S (0.67-1.33 lbs), 90S (0.56-1.1 lbs), 97 (0.5-1.0 lb)
Arctic 3.2 EC (2 to 4 oz)	Permethrin/ Perm-Up 3.2EC* (2 to 4 oz)
Asana XL* (2.9 to 5.8 fl oz)	Pounce 3.2EC* (2 to 4 fl oz)
Baythroid 2* (0.8 to 1.6 oz)	Pounce 25WP* (3.2 to 6.4 oz) or WSB* (0.2 to 0.4 lbs)
Capture 2EC (1.6 to 6.4 oz)	Proaxis* (1.92 to 3.2 oz)
Carbaryl 4L (2 pt)	Sevin 4F and XLR Plus (1 qt)
Dimethoate 4EC and DiGon 400 (1 pt) or 267 (1.5 pt)	Sevin 80S and 80WSP (1.25 lb)
Mustang* (3 to 4.3 oz) or Max* (2.8 to 4 oz)	Warrior* (1.92 to 3.2 fl 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, or plants with two main stems (Y-plants).

Conditions favoring damage: Cool wet soil (delays germination), soils high in organic matter from cover crop or manure.

Management: Cultural - decreased potential for injury in reduced tillage fields; Chemical- seed treatment before planting is the easiest control method and can be used in air blast planters. Planter box treatments are also effective in conventional planters, but can't be used with air blast planters. Seed and planter box treatments often come mixed with fungicides. Be sure that the insecticide is applied at the amount recommended when a prepared mixture is used. Soil insecticide is more expensive, but offers an alternative if seed or planter box treatments cannot be used.

Threshold: Treat soybeans planted in soils high in organic matter.

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

Cruiser 5FS seed treatment (1.28 oz / 100 lbs of seed)

Phorate 20G* (6.75 oz per 1,000 feet of row)

Empower 2* (3.5 to 8.7 lbs/ acre)

Thimet 20G* (6.75 oz per 1,000 feet of row)

Gaicho SB Flowable (2 to 4 oz/ 100 wt of seed)

Slugs

Pest status: Common animal, occasional economic pest

Type of damage: May damage seedlings by feeding on stems, cotyledons, and leaves; up to 40% defoliation can be tolerated in pre-bloom plants, but if growing point is killed, stands can be significantly reduced.

Conditions favoring damage: Planting into wheat stubble or other heavy crop residue, or into a field with recent history of slug damage; cool, wet conditions

Threshold: No established threshold; consider treating if slug damage threatens to reduce stand density below an acceptable level.

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

Deadline MP's 4% Bait (10 to 40 lb)

Snail and Slug Pellets 3.5% Bait (various products and rates)

(Soybean aphid – see next page)

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: Adults move into Michigan on airstreams in the spring. Females insert eggs into plant tissue.

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 – natural enemies (minute pirate bugs, predacious thrips and mites).

Threshold: Rough guideline – treat when 30% of plants have thrips and some drying of leaves is seen.

Notes: Young plants can generally outgrow feeding injury; damage may be confused with some types of herbicide injury.

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

Baythroid 2* (0.8 to 1.6 oz)

Orthene 97 (0.25 to 0.5 lb)

Capture 2EC* (2.1 to 6.4 oz)

PennCap-M* (2 to 3 pt)

Carbaryl 4L (2 pt)

Proaxis* (1.92 to 3.2 oz)

Lannate LV* (0.75 to 1.5 pt) or SP* (0.25 to 0.5 lbs)

Sevin 4 F and XLR Plus (1 qt)

Mustang Max* (3.2 to 4.0 oz)

Sevin 80S and 80WSP (1.25 lb)

Orthene 75S (0.33 to 0.67 lbs) or 90S (0.28 to 0.56 lbs)

Warrior* (1.92 to 3.20 fl oz)

Soybean Aphid

Pest status: The soybean aphid, a pest native to Asia, was first found in 2000. It caused yield loss in 2001, 2003, and 2005.

Type of damage: Aphids are sucking pests that remove plant sap. Soybean aphids can reproduce rapidly, resulting in hundreds of aphids per leaf; this population level appears to reduce pod number, beans per pod, and bean size. Heavily infested plants are coated with sticky honeydew and black sooty mold, and may also exhibit top-down symptoms of potassium deficiency (yellow leaf margins, leaf cupping, stunting).

Conditions favoring damage: Dry conditions increase the impact of aphid feeding. Earlier-infested (early July), late-planted (June) and potassium deficient fields are at greater risk for yield loss if aphid-infested.

Management: In some years, aphid populations are held in check by a combination of natural enemies and fungal pathogens.

Sampling: Fields should be sampled multiple times to determine if populations are increasing. Count the number of SBA per plant, or use the 'Speed Scouting' technique at http://www.soybeans.umn.edu/crop/insects/aphid/aphid_sampling.htm

Threshold: 250 aphids per plant on vegetative – R5 beans, with INCREASING POPULATIONS. In practical terms, aphids should be common (on most or all plants) and abundant (several hundred aphids per plant). Threshold provides a ~7 day treatment window.

Timing: Timing is critical. Spraying too early (below the 250 threshold) potentially disrupts natural enemies, leading to higher aphid populations and re-application later in the season. If fields are sprayed too late (honeydew, sooty mold), yield has already been lost. Sprays in late August often do not result in yield increases compared to unsprayed trials.

Product Efficacy: It is important to get excellent coverage when treating for aphids - use the highest pressure and gal/ acre practical when spraying, and choose a nozzle type recommended for insecticide coverage. When tank-mixing insecticides with other products, be sure to maximize the application for insecticide coverage.

For more information: MSU CAT Alert article from 23 June 2005: http://www.ipm.msu.edu/CAT05_fld/FC06-23-05.htm

List of recommended insecticides, *RUP (rate per acre): PHIs are given in [square parentheses]

Asana XL* (5.8 fl. oz) [21]

Baythroid 2* (2 to 2.8 oz) [45]

Capture 2EC (2.1 to 6.4 oz) [3]

Chlorpyrifos 4E* (1 pt) [28]

Cruiser 5FS seed treatment (1.28 oz / 100 lbs of seed)

Furadan 4F* (0.25 to 0.5 pts) [21]

Gauche SB Flowable (2 to 4 oz/ 100 wt of seed)

Lorsban 4E* (1 pt) [28]

Mustang Max* (2.8 to 4 oz) [21]

Nufos 4E* (1 pt) [28]

Orthene 75S (1-1.33 lbs), 90S (0.83-1.1 lbs), 97 (0.75-1.0 lb)

PennCap-M* (1 to 3 pts) [20]

Proaxis* (1.92 to 3.2 oz) [45]

Warrior* (3.2 oz) [45]

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: One or more wireworms per bait trap.

List of registered insecticides: Cruiser 5FS seed treatment (1.28 oz/ 100 lbs of seed)

Insecticides Registered on Soybean

Trade Name	Common Name	Class	Registered for:	PHI days	REI hrs	Precautions and Remarks
Ambush (RUP)	permethrin	Pyr	BLB, cloverworm, cutworm, Japanese beetle, MBB, PLH	60	12	Maximum 24 oz per acre per season. Do not graze or feed forage.
Arctic 3.2 EC	permethrin	Pyr	BLB, cloverworm, cutworm, Japanese beetle, MBB, PLH	60	12	Maximum 0.4 lb a.i. per acre per season.
Asana XL (RUP)	esfenvalerate	Pyr	BLB, cloverworm, cutworm, grasshoppers, Japanese beetle, MBB, PLH, SBA	21	12	Do not exceed 38 oz per acre per season. Do not graze or feed forage to livestock.
Bt [Agree, Biobit, Dipel, Javelin, Xentari]	<i>Bacillus thuringiensis</i>	Bio	armyworm, cloverworm	0	4	Use only to control small armyworms when populations are light. Full coverage is important.
Baythroid 2 (RUP)	cyfluthrin	Pyr	armyworm, BLB, cutworm, grasshopper, cloverworm, JB, MBB, PLH, SBA, thrips	45	12	Maximum 11.2 oz per acre per season. Max 4 applications per season.
Capture 2EC (RUP)	bifenthrin	Pyr	armyworm, BLB, cutworm, grasshopper, cloverworm, JB, MBB, PLH, thrips	3	12	Maximum 0.2 lbs a.i. per acre per season.
Carbaryl 4L	carbaryl	Carb	armyworm, BLB, cloverworm, cutworm, grasshopper, MBB, PLH, thrips	21	12	Similar to Sevin (below)
Chlorpyrifos 4E (RUP)	chlorpyrifos	OP	armyworm, BLB, cloverworm, cutworm, grasshoppers, MBB, mites, SBA	28	24	Similar to Lorsban 4E (below)
Cruiser 5FS	thiamethoxam	Nic	BLB, MBB, PLH, seedcorn maggot, soybean aphid, wireworm			Seed treatment. Provides early season control – lasts 35-40 days after planting.
Deadline MPs	metaldehyde	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. Keep children, pets, and poultry away from treated areas.
DiGon, Dimate, Dimethoate	dimethoate	OP	BLB, grasshoppers, MBB, mites, PLH	21	48	Full coverage is not required when using dimethoate.
Dimilin (RUP) 25W & 2L	diflufenzuron	IGR	cloverworm, grasshoppers, MBB	21	12	Do not graze or feed forage to livestock. Maximum 2 applications per season. Dimilin inhibits molting of larvae. 3-7 days may be required before populations are reduced.
Empower 2 (RUP)	bifenthrin	Pyr	Cutworm, seedcorn maggot, wireworm	3	24	Maximum 0.2 lbs a.i. per acre per season.
Furadan 4F (RUP)	carbofuran	Carb	BLB, grasshoppers, SBA	21	48	Maximum 2 applications per season. Do not feed treated vines to livestock.
Gaucha SB Flowable	imidacloprid	Neo	BLB, Seedcorn maggot, SBA	--	--	Seed treatment. Provides early season control – lasts 35-40 days after planting. See label for plant back restrictions.
Lannate (RUP) LV & SP	methomyl	Carb	BLB, cloverworm, MBB, thrips	14	48	Maximum 3 applications per crop.

Trade Name	Common Name	Class	Registered for:	PHI days	REI hrs	Precautions and Remarks
Larvin 3.2 (RUP)	thiodicarb	Carb	armyworm, BLB, MBB, cloverworm, cutworm,	28	12	Do not exceed 120 pints per acre per season. Do not feed treated forage to livestock.
Lorsban 4E (RUP) (also Govern 4E and Nufos 4E)	chlorpyrifos	OP	armyworm, BLB, cloverworm, cutworm, grasshoppers, MBB, mites, SBA	28	24	Maximum 6 pt per acre per season. Do not graze or feed forage to livestock.
Mustang and Mustang Max (RUP)	zeta cypermethrin	Pyr	armyworm, BLB, cloverworm, cutworm, grasshoppers, MBB, PLH, SBA	21	12	Maximum 25.8 oz. per acre per season. Do not graze treated areas or feed forage. Addition of crop oil to spray may improve coverage and control.
Nufos 4E (RUP)	chlorpyrifos	OP	armyworm, BLB, cutworm, cloverworm, grasshopper, MBB, mites, SBA	28	24	Maximum 6 pints per acre per season.
Orthene 75S, 90S, 97	acephate	OP	Armyworm, BLB, grasshopper, MBB, PLH, SBA	14	24	Do not graze or cut vines for hay or forage. Maximum 4 lbs a.i. per acre per season.
PennCap-M (RUP)	methyl parathion	OP	BLB, cloverworm, grasshoppers, Japanese beetle, MBB, SBA, thrips	20	96	Maximum 2 applications per season.
Permethrin 3.2AG Perm-up 3.2EC (RUP)	permethrin	Pyr	BLB, cloverworm, cutworm, Japanese beetle, MBB, PLH	60	12	Maximum 16 oz. per acre per season. Do not graze treated areas or feed forage.
Phorate 20G (RUP)	phorate	OP	seedcorn maggot	--	48	Apply at planting as a band centered over the row and cover with soil. Same restrictions as Thimet 20G (below)
Pounce (RUP)	permethrin	Pyr	armyworm, BLB, cloverworm, cutworm, Japanese beetle, MBB, PLH	60	12	Maximum 24 oz per acre per season. Do not graze or feed forage.
Proaxis (RUP)	gamma cyhalothrin	Pyr	armyworm, BLB, cloverworm, cutworm, grasshoppers, Japanese beetle, MBB, PLH, SBA, thrips	45	24	Maximum 0.03 lb a.i. per acre per season. Do not graze or feed forage.
Sevin	carbaryl	Carb	armyworm, BLB, cloverworm, cutworm, grasshoppers, Japanese beetle, MBB, PLH, thrips	21	12	Do not mix with 2,4-DB herbicides.
Snail and Slug Pellets	metaldehyde	other	slugs	--	12	May apply every 2 weeks or as needed. Do not allow pellets to contact edible portion of plant. Keep children, pets, and poultry away from treated areas.
Thimet 20G (RUP)	phorate	OP	seedcorn maggot	--	48	Apply at planting as a band centered over row & cover with soil. Do not allow Thimet to contact seed. Do not feed foliage. Do not apply if metribuzin herbicides (Lexone, Sencor) have been applied.
Tracer	spinosad	other	armyworm, cloverworm	28	4	Maximum 6 oz per acre per season. Do not feed treated forage.
Warrior (RUP)	lambda-cyhalothrin	Pyr	armyworm, BLB, cloverworm, cutworm, grasshopper, Japanese beetle, MBB, PLH, SBA, thrips	45	24	Do not apply more than 7.7 oz per acre per season. Do not graze or feed forage.