

Control of Insect Pests of Field Crops



Authors

Bruce Eisley

Research Associate
Department of Entomology
Extension Entomology Bldg.
OSU
Columbus, OH 43210

Ron Hammond

Research Entomologist
Department of Entomology
Thorne Hall
OARDC
Wooster, OH 44691

Bulletin 545

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Keith L. Smith, Associate Vice President for Agricultural Administration and Director, OSU Extension
Revised 1/07

CONTROL OF INSECT PESTS OF FIELD CROPS

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Using the Pesticide Recommendations

Common names and trade names of pesticides are used in this publication. When possible, information has been provided on such factors as application rates, pre-harvest limitations, application methods and timing. However, the pesticide container label is the authority for all information, restrictions and regulations. This publication should be used as a guide for registered pesticides, but product labels should always be consulted before application.

ALFALFA

The pest complex affecting alfalfa includes a variety of insect populations of which one or more may become abundant enough to warrant insecticide treatment. In general, the alfalfa plant can tolerate a significant amount of feeding by a number of different insects before a rescue treatment is economically justified. However, insect pests such as potato leafhopper can cause significant injury to the alfalfa plant at very low population levels. Vigilance is needed to accurately determine when treatment is needed.

Following is a listing of insecticide products labeled for control of the pests that affect alfalfa. Also listed in this section is information about formulation and rates of chemicals for specific pests. An asterisk (*) indicates that the use is restricted to certified applicators.

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Alfalfa Weevil	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	0 - 14	No action is warranted if no more than one late-instar weevil larvae are found per stem. If more than one larva is found per stem, early cutting or application of a rescue insecticide treatment should be implemented, depending on the value and height of the crop. Higher rates are for southern Ohio, where longer control may be required. When possible, early cutting (alfalfa taller than 22 inches) should be practiced in place of chemical treatment to minimize upsetting populations of beneficial parasites. For additional information about alfalfa weevil see FactSheet FC-ENT-0032.
	Arctic* 3.2 EC (permethrin)	4 - 8 fl. oz.	0 - 14	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	7	
	Carbaryl (carbaryl)	1½ qt. 4L or 1⅞ lb. 80S	7	
	Chlorpyrifos* 4E AG (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Furadan* 4F (carbofuran)	½ - 2 pt.	7 - 28	
	Imidan 70-W (phosmet)	1 - 1½ lb.	7	
	Lannate* (methomyl)	1 lb. SP or 3 pt. LV	7	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Malathion (malathion)	1½ - 2 pt. 5EC 1½ - 2¼ pt. 57 EC 1 - 2 pt. 8	0 0 0 - 7	
	Mustang MAX* (zeta-cypermethrin)	2.24 - 4 fl. oz.	3	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Permethrin* 3.2 EC (permethrin)	4 - 8 oz.	0 - 14	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Pounce* (permethrin)	4 - 8 fl. oz. 3.2 EC 6.4 - 12.8 oz. 25WP	0 - 14 0 - 14	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Sevin (carbaryl)	1½ qt. 4F or XLR Plus 1⅞ lb. 80S	7 7	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Steward EC (indoxacarb) (larvae only)	6.7 - 11.3 fl. oz.	7	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Alfalfa Weevil (cont.)	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz	7	
	Warhawk* (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
Aphids	Ambush* 25W (permethrin)	3.2 - 12.8 fl. oz.	0 - 14	If more than ½ cup of aphids is collected in 10 sweeps, rescue treatment is warranted if early cutting is not feasible.
	Arctic* 3.2 EC (permethrin)	2 - 8 fl. oz.	0 - 14	
	Baythroid* (cyfluthrin)	2.8 fl. oz. (2 or XL)	7	
	Chlorpyrifos* 4E AG (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Dimethoate (dimethoate)	¾ - 1½ pt. 2.67 ½ - 1 pt. 400 or 4EC ½ - 1 pt. Dimate 4EC	10 10 10	
	Furadan* 4F (carbofuran)	½ - 2 pt.	7 - 28	
	Imidan 70-W (phosmet)	1 - 1½ lb.	7	
	Lannate* (methomyl)	½ - 1 lb. SP 1½ - 3 pt. LV	7 7	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Malathion (malathion)	1½ - 2 pt. 5EC 1½ - 2¼ pt. 57 EC 1 - 2 pt. 8	0 0 0-7	
	Mustang MAX* (zeta-cypermethrin)	2.24 - 4 fl. oz.	3	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Permethrin* 3.2 EC (permethrin)	2 - 8 oz.	0 - 14	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Pounce* (permethrin)	2 - 8 fl. oz. 3.2 EC 3.2 - 12.8 oz. 25 WP	0 - 14 0 - 14	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Warhawk* (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Meadow Spittlebug	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	0 - 14	Spittlebug populations on alfalfa are rarely abundant enough to justify chemical treatment. However, if one or more spittle masses are found per stem, rescue treatment may be warranted. For additional information on meadow spittlebug see FactSheet FC-34.
	Arctic* 3.2 EC (permethrin)	4 - 8 fl. oz.	0 - 14	
	Baythroid* (cyfluthrin)	0.8 - 1.6 fl. oz. (2 or XL)	7	
	Chlorpyrifos*4E AG (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Imidan 70-W (phosmet)	1 - 1½ lb.	7	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Malathion (malathion)	1½ - 2 pt. 5EC 1½ - 2¼ pt. 57 EC	0 0	
	Mustang MAX* (zeta-cypermethrin)	2.24 - 4 fl. oz.	3	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Permethrin* 3.2 EC (permethrin)	4 - 8 oz.	0 - 14	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Pounce* (permethrin)	4 - 8 fl. oz. 3.2 EC 6.4 - 12.8 oz. 25 WP	0 - 14 0 - 14	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
	Warhawk* (chlorpyrifos)	1 - 2 pt.	14 - 21	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	7	
Yuma* 4E (chlorpyrifos)	1 - 2 pt.	14 - 21		
Potato Leafhopper	Ambush* 25W (permethrin)	3.2 - 12.8 fl. oz.	0 - 14	Treatment for PLH is justified when the number of leaf-hoppers collected/10 sweeps is greater than the height of the alfalfa in inches. The PLH threshold should be increased 3 times for those varieties rated greater than 50 percent PLH resistant after the stand is established. For additional information see Fact Sheet FC-ENT-0033.
	Arctic* 3.2 EC (permethrin)	4 - 8 fl. oz.	0 - 14	
	Baythroid* (cyfluthrin)	0.8 - 1.6 fl. oz. (2 or XL)	7	
	Carbaryl (carbaryl)	1 qt. 4L or 1¼ lb. 80S	7	
	Chlorpyrifos* (chlorpyrifos)	1 - 2 pt. 4E AG	14 - 21	
	Dimethoate (dimethoate)	¾ - 1½ pt. 2.67 ½ - 1 pt. 400 or 4EC ½ - 1 pt. Dimate 4EC	10 10 10	
	Furadan* 4F (carbofuran)	1 - 2 pt.	14 - 28	
	Imidan 70-W (phosmet)	1 - 1½ lb.	7	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Potato Leafhopper (cont.)	Lorsban* 4E (chlorpyrifos)	½ - 1 pt.	7 - 14	
	Malathion (malathion)	1½ - 2 pt. 5EC 1½ - 2¼ pt. 57 EC 1 - 2 pt. (8)	0 0 0 - 7	
	Mustang MAX* (zeta-cypermethrin)	2.24 - 4 fl. oz.	3	
	Nufos* 4E (chlorpyrifos)	½ - 1 pt.	7 - 14	
	Permethrin* 3.2 EC (permethrin)	4 - 8 oz.	0 - 14	
	Pilot* 4E (chlorpyrifos)	½ - 1 pt.	7 - 14	
	Pounce* (permethrin)	4 - 8 fl. oz. 3.2 EC 6.4 - 12.8 oz. 25 WP	0 - 14 0 - 14	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	7	
	Sevin (carbaryl)	1 qt. 4F or XLR PLUS 1¼ lb. 80S	7 7	
	Silencer* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	7	
	Steward EC (indoxacarb)	9.2 - 11.3 fl. oz.	7	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	7	
	Warhawk* (chlorpyrifos)	½ - 1 pt.	7 - 14	
	Warrior* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	7	
	Yuma* 4E (chlorpyrifos)	½ - 1 pt.	7 - 14	

CORN

Management of invertebrate pests that affect corn requires agronomic practices that minimize the development of pest populations and use of chemical pesticides when pest populations threaten the economic production of the crop. Insecticide formulations applied to corn fall into three major categories: (1) seed treatments to prevent seed-feeding soil-borne insects; (2) soil insecticide treatments that may be before, during, or after planting in granular or liquid formulations; and (3) postemergence treatments applied in granular (early season) or liquid form.

Following is a listing of insecticide products labeled for control of the pests that affect corn. An asterisk (*) indicates that use is restricted to certified applicators.

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Army- worm	Ambush* 25W (permethrin)	6.4 - 12.8 oz.	PRE, F	30	If stand infestation ranges from 5% to 20%, intensify monitoring and re-check field within a few days.
	Arctic* ^a 3.2EC (permethrin)	4 - 8 fl. oz.	PRE, F	30	
	Adjourn* (esfenvalerate)	5.80 - 9.60 fl. oz.	F	21	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Army- worm (cont.)	Asana* XL (esfenvalerate)	5.80 - 9.60 fl. oz.	F	21	If stand infestation is greater than 20% and less than 50%, consider rescue treatment when corn is at early-whorl stage, or larvae are less than 1 inch long, or more than 1 larvae per plant, or defoliation of infested plants exceeds 50%
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	PRE, F	21	
	Bifenthrin* ^a 2 EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Capture* ^a 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Carbaryl (carbaryl)	1 - 2 qt. 4L 1¼ - 2½ lb. 80S	F F	48 48	
	Chlorpyrifos* (chlorpyrifos)	1 - 2 pt. 4E AG	PRE, F	35	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	F	21	
	Discipline* ^a 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Empower* 2 (bifenthrin)	3.5 - 8.7 lb	F	30	
	Entrust (spinosad)	0.5 - 2.0 oz.	F	28	
	Fanfare* ^a 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Intrepid 2F (methoxyfenozide)	4 - 8 fl. oz.	F	21	If stand infestation is greater than 50% and larvae are not mature, rescue treatment is needed immediately. See FactSheet FC-ENT-0012 for additional information. ^a This material is also labeled for At Plant use for army-worm control. Check the label for rates.
	Lannate* (methomyl)	¾ - 1½ pt. LV ¼ - ½ lb. SP	F F	21 21	
	Lorsban 4E* (chlorpyrifos)	1 - 2 pt.	PRE, F	35	
	Malathion 5EC (malathion)	1½-2 pt.	F	5	
	Mustang MAX* (zeta-cypermethrin)	3.2 - 4.0 fl. oz.	PRE, F	30	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	PRE, F	35	
	PennCap-M* (methyl parathion)	2 - 3 pt.	F	12	
	Permethrin* ^a (permethrin)	4 - 8 oz. 3.2 AG or 3.2EC	PRE, F	30	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	PRE, F	35	
	Pounce* ^a (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	PRE, F PRE, F	30 30	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sevin (carbaryl)	1 - 2 qt. 4F or XLR Plus 1¼ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* ^a (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Army-worm (cont.)	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tracer (spinosad)	1 - 3 fl. oz.	F	28	
	Tundra*, ^a EC (bifenthrin)	2.56 fl. oz. 2.6 - 6.4 fl. oz.	PRE F	30 30	
	Warhawk* (chlorpyrifos)	1 – 2 pt.	PRE, F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt.	PRE, F	35	
Billbug	Chlorpyrifos (chlorpyrifos)	8 - 16 oz./1000 row ft. 15G 2 - 3 pt. 4E AG*	AP F	35 35	The term “billbug” applies to a group of snout-nosed beetles; the feeding of the adult forms can damage corn in the spring. A rescue treatment may be warranted if extensive billbug feeding is detected early and potential stand loss is significant.
	Counter* CR (terbufos)	6 oz./1000 row ft.	AP	30	
	Cruiser 5FS (thiamethoxam)	1.25 mg. a.i./kernel	AP-CST	na	
	Force* 3G (tefluthrin)	4 - 5 oz./1000 row ft. (suppression only)	AP	na	
	Lorsban (chlorpyrifos)	8 oz./1000 row ft. 15G 2 pt. 4E*	AP F	35 35	
	Nufos (chlorpyrifos)	8-16 oz./1000 row ft. 15G 2 - 3 pt. 4E*	AP F	35 35	
	Pilot (chlorpyrifos)	8 oz/1000 row ft. 15G 2 pt. 4E*	AP F	35 35	
	Poncho (clothianidin)	1.25 mg. a.i./kernel	AP-CST	na	
	Regent* 4 SC (fipronil)	0.24 fl. oz./1000 row ft.	AP	90	
	Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Warhawk* (chlorpyrifos)	2 pt.	F	35	
	Yuma* 4E (chlorpyrifos)	2 pt.	F	35	
Common Stalk Borer	Ambush* 25W (permethrin)	6.40 - 12.8 fl. oz.	F	30	This problem is common in weedy areas, especially where grass is present and with minimum-tillage operations. Larvae of the common stalk borer are easily identified due to the obvious purplish stripes.
	Arctic* 3.2 EC (permethrin)	4 - 8 fl. oz.	PRE, F	30	
	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	PRE, F	21	
	Bifenthrin* 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method¹	Pre-Harvest Interval (days)	When to Treat
Common Stalk Borer (cont.)	Capture* 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	Prevention of stalk borer damage is best accomplished by maintaining weed-free fields See FactSheet, FC-ENT-0012 for additional information.
	Chlorpyrifos* (chlorpyrifos)	2 - 3 pt. 4E AG	F	35	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	PRE, F	21	
	Discipline* 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Fanfare* 2EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Lorsban-4E* (chlorpyrifos)	2 pt.	F	35	
	Mustang* MAX (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	Nufos* 4E (chlorpyrifos)	2 - 3 pt.	F	35	
	Permethrin* (permethrin)	4 - 8 oz. 3.2 EC or 3.2 AG	PRE, F	30	
	Pilot* 4E (chlorpyrifos)	2 pt.	F	35	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Pounce* (permethrin)	6.4 - 12.8 oz. 25 WP 4 - 8 fl. oz. 3.2 EC	PRE, F PRE, F	30 30	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* EC (bifenthrin)	2.56 fl. oz. 2.1 - 6.4 fl. oz.	PRE F	30 30	
	Warhawk* (chlorpyrifos)	2 pt.	F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Yuma* 4E (chlorpyrifos)	2 pt.	F	35	
	Corn Leaf Aphid	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	F	
Asana* XL (esfenvalerate)		5.8 - 9.6 fl. oz.	F	21	
Bifenthrin* 2 EC (bifenthrin)		2.1 - 6.4 fl. oz.	F	30	
Capture* 2EC (bifenthrin)		2.1 - 6.4 fl. oz.	F	30	
Chlorpyrifos* (chlorpyrifos)		1 - 2 pt. 4E AG	F	35	
Delta Gold* (deltamethrin)		1.5-1.9 fl. oz. (suppression)	F	21	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Corn Leaf Aphid (cont.)	Dimethoate (dimethoate)	⅔ - 1 pt. 4EC 1 - 1.5 pt. 2.67 ⅔ - 1 pt. (Dimate 4EC)	F F F	14 14 14	appear to be a primary cause of plant stress or significant colonies of aphids are building in 50 percent or more of the plants, rescue treatment should be applied during the late-whorl or early-tassel stage.
	Discipline* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Fanfare* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Lannate* (methomyl)	¾ - 1½ pt. LV ¼ - ½ lb. SP	F F	21 21	
	Lorsban-4E* (chlorpyrifos)	1 - 2 pt.	F	35	
	Malathion (malathion)	1 pt. 8 or 8E or 1½ pt. 5EC	F	5	
	Mustang* MAX (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	F	35	
	Penncap-M* (methyl parathion)	2 - 3 pt.	F	12	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	F	35	
	Proaxis* (gamma-cyhalothrin)	2.56-3.84 fl. oz. (suppression only)	F	21	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Taiga Z* (lambda-cyhalothrin)	2.56-3.84 fl. oz. (suppression only)	F	21	
	Tundra* EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz. (suppression only)	F	21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt.	F	21	
Corn Rootworm (Adult Control)	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	F	30	Rescue treatment is warranted if 5 or more beetles are found per silk mass when 75 percent of the plants have silked and silk clipping to ¼ inch or less is
	Arctic* 3.2 EC (permethrin)	4 - 8 fl. oz.	F	30	
	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	F	21	
	Bifenthrin* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Capture* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Corn Rootworm (Adult Control)	Carbaryl (carbaryl)	1 - 2 qt. 4L 1¼ - 2½ lb. 80S	F F	48 48	observed. If silks are wilting and turning brown, pollination is complete and additional silk clipping by the beetles will not affect yield. See FactSheet, FC-ENT-0016 for additional information.
	Chlorpyrifos* (chlorpyrifos)	1 - 2 pt. 4E AG	F	35	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	F	21	
	Dimethoate (dimethoate)	⅔ - 1 pt. 4EC 1 - 1½ pt. 2.67 ⅔ - 1 pt. (Dimate 4EC)	F F F	14 14 14	
	Discipline* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Fanfare* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Lannate* (methomyl)	¾ - 1½ pt. LV ¼ - ½ lb. SP	F F	21 21	
	Lorsban-4E* (chlorpyrifos)	1 - 2 pt.	F	35	
	Malathion (malathion)	1 pt. 8 or 8E or 1½ pt. 5EC	F	5	
	Mustang MAX* (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	F	35	
	PennCap-M* (methyl parathion)	1 - 2 pt.	F	12	
	Permethrin* (permethrin)	4 - 8 oz. 3.2 AG or 3.2 EC	F	30	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt	F	35	
	Pounce* (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	F F	30 30	
	Sevin (carbaryl)	1 - 2 qt. 4F or XLR Plus 1¼ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pts.	F	35	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Corn Rootworm (Larval Control)	Seed Treatments				Where a significant potential for rootworm injury exists in corn following corn or first year corn following soybean, a preventive treatment will reduce injury. See FactSheet, FC-ENT-0016 for additional information.
	Cruiser 5FS (thiamethoxam)	1.25 mg a.i./kernel	AP-CST	na	
	Poncho 1250 (clothianidin)	1.25 mg a.i./kernel	AP-CST	na	
	Granules and Liquids				
	Aztec* (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft. 2.1G 3 oz./1000 row ft. 4.67G	AP AP - SB	na na	
	Bifenthrin* 2EC (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
	Capture* (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
		3EC 0.39-0.49 fl. oz./1000 row ft. LFR	AP	30	
	Chlorpyrifos (chlorpyrifos)	8 oz./1000 row ft. 15G	AP	35	
	Counter* CR (terbufos)	6 oz./1000 row ft.	AP	30	
	Defcon* 2.1G (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft.	AP	na	
	Discipline* 2EC (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
	Empower* 2 (bifenthrin)	6.4 - 8 oz./1000 row ft.	AP	30	
	Fanfare* 2EC (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
	Force* 3G (tefluthrin)	4 - 5 oz./1000 row ft.	AP	na	
	Fortress* (chlorethoxyfos)	7.4 oz./1000 row ft. 2.5G 3.75-4.5 oz./1000 row ft. 5G	AP AP - SB	na na	
	Furadan* 4F (carbofuran)	2.5 fl. oz./1000 row ft.	AP	30	
	Lorsban (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Mocap 15G* (ethoprop)	8 oz./1000 row ft.	AP	30	
	Nufos (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
Phorate 20G* (phorate)	6 oz./1000 row ft.	AP	30		
Pilot 15G (chlorpyrifos)	8 oz./1000 row ft.	AP	35		
Regent* 4 SC (fipronil)	0.24 fl. oz./1000 row ft.	AP	90		
Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35		

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Corn Rootworm (Larval Control) (cont.)	Sniper* (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
	Tundra* EC (bifenthrin)	0.30 fl. oz./1000 row ft.	AP	30	
	Warhawk* (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	35	
Cutworm	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	PRE, F	30	Rescue treatment is justified when (1) 3 percent or more of the plants have been cut or tunneled, (2) corn plants are in the 2- to 6-leaf stage, and (3) larvae are 1 inch or less in length. Preventive control of cutworms can be achieved by at-planting (AP) or pre-emergent (PRE) use of some of the materials listed in this section. For more information about cutworm control see fact sheet: FC-ENT-0012.
	Arctic* 3.2EC (permethrin)	4 - 8 fl. oz. 0.30 fl. oz./1000 row ft.	PRE, F AP	30 30	
	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	PRE, F	21	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	PRE, F	21	
	Aztec* (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft. 2.1G 3 oz./1000 row ft. 4.67G	AP AP - SB	na na	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL) 0.8 - 1.6 fl. oz. (2 or XL)	PRE F	21 21	
	Bifenthrin* 2 EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft. 2.56 fl. oz. 2.1 - 6.4 fl. oz.	AP PRE F	30 30 30	
	Capture* (bifenthrin) (2EC) (2EC) (2EC) (LFR)	0.15-0.3 fl.oz./1000 row ft. 2.1 - 6.4 fl. oz. 2.56 fl. oz. 0.2-0.39 fl. oz./1000 row ft.	AP PRE F AP	30 30 30 30	
	Carbaryl (carbaryl)	2 qt. 4L or 2½ lb. 80S	F	48	
	Chlorpyrifos (chlorpyrifos)	8 oz./1000 row ft. 15G 1 - 2 pt. 4E AG* 2 - 3 pt. 4E AG*	AP PRE F	35 35 35	
	Cruiser 5FS (thiamethoxam)	0.25 - 1.25 mg a.i./kernel	AP - CST	na	
	Defcon* 2.1G (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft.	AP	na	
	Delta Gold* (deltamethrin)	1 - 1.5 fl. oz.	F	21	
	Discipline* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft. 2.56 fl. oz. 2.1 - 6.4 fl. oz.	AP PRE F	30 30 30	
	Empower* 2 (bifenthrin)	6.4 - 8.0 oz./1000 row ft.	AP	30	
	Fanfare* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft. 2.56 fl. oz. 2.1 - 6.4 fl. oz.	AP PRE F	30 30 30	
	Force* 3G (tefluthrin)	3 - 4 oz/1000 row ft. (1 st year corn only) 4 - 5 oz./1000 row ft.	AP AP	na na	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Cutworm (cont.)	Fortress* (chlorethoxyfos)	7.4 oz./1000 row ft. 2.5G 3.0-3.75 oz./1000 row ft.5G	AP AP - SB	na na	
	Lorsban (chlorpyrifos)	8 oz./1000 row ft. 15G 1 - 2 pt. (4E)*	AP PRE, F	35 35	
	Mustang MAX* (zeta-cypermethrin)	0.16 fl. oz./1000 row ft. 1.28 - 2.8 fl. oz.	AP PRE, F	30 30	
	Mocap 15G* (ethoprop)	8 oz./1000 row ft.	AP	na	
	Nufos (chlorpyrifos)	8 oz./1000 row ft. 15G 1 - 2 pt. EC*	AP PRE, F	35 35	
	PennCap-M* (methyl parathion)	4 pt.	PRE, F	12	
	Permethrin* (permethrin)	4 - 8 oz. 3.2 AG or 3.2 EC	PRE, F	30	
	Pilot (chlorpyrifos)	8 oz/1000 row ft. 15G 1 - 2 pt. 4E*	AP PRE, F	35 35	
	Poncho 600 (clothianidin)	0.25 - 1.25 mg a.i./kernel	AP - CST	na	
	Pounce* (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	PRE, F PRE, F	30 30	
	Proaxis* (gamma-cyhalothrin)	0.16 fl. oz./1000 row ft. 1.92 - 3.20 fl. oz.	AP PRE, F	21 21	
	Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Sevin (carbaryl)	2 qt. 4F or XLR PLUS 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft. 1.92 - 3.20 fl. oz.	AP F	21 21	
	Sniper* (bifenthrin)	0.15-0.3 fl.oz./1000 row ft. 2.56 fl. oz. 2.1 - 6.4 fl. oz.	AP PRE F	30 30 30	
	Taiga Z* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft. 2.56 - 3.20 fl. oz. 1.92 - 3.20 fl. oz.	AP PRE F	21 21 21	
	Tundra* (bifenthrin)	0.15-0.3 fl.oz./1000 row ft. 2.56 fl. oz. 2.1 - 6.4 fl. oz.	AP PRE F	30 30 30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	PRE, F	35	
	Warrior* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft 2.56 - 3.20 fl. oz. 1.92 - 3.20 fl. oz.	AP PRE F	21 21 21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt	PRE, F	35	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
European Corn Borer	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	F	30	First-Generation: Rescue treatment for first-generation control is warranted when 50 percent or more of the plants exhibit feeding damage in the whorl and early instar larvae can be readily found either on the foliage or in the whorl.
	Arctic* 3.2EC (permethrin)	4 - 8 fl. oz.	F	30	
	Adjourn* (esfenvalerate)	7.8 - 9.6 fl. oz.	F	21	
	Asana* XL (esfenvalerate)	7.8 - 9.6 fl. oz.	F	21	
	<i>Bacillus thuringiensis</i> (several Bt products)	Check label	F		
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	F	21	
	Bifenthrin* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Capture* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Carbaryl (carbaryl)	1½ - 2 qt 4L 1⅞ - 2½ lb. 80S	F F	48 48	
	Chlorpyrifos (chlorpyrifos)	5 - 6.5 lb. 15G 1 - 2 pt. 4E AG*	F F	35 35	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	F	21	Second-Generation Treatment of second generation corn borer is recommended if egg masses average one or more per plant or if 50 percent or more of the plants have larvae or egg masses.
	Discipline* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Empower* 2 (bifenthrin)	3.5 - 8.7 lb. (1 st gen.)	F	30	
	Entrust (spinosad)	0.5 - 2 oz.	F	28	
	Fanfare* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Furadan* 4F (carbofuran)	1½ - 2 pt.	F	30	
	Intrepid 2F (methoxyfenozide)	4 - 8 fl. oz.	F	21	
	Lorsban (chlorpyrifos)	5.0 - 6.5 lb. 15G (1 st gen.) 6.5 lb. (2 nd gen.) 1½ - 2 pt. 4E*	F F F	35 35 35	
	Mustang MAX* (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	Nufos (chlorpyrifos)	5.0 - 6.5 lb. 15G (1 st gen) 6.5 lb. 15G (2 nd gen) 1½ - 2 pt. 4E*	F F F	35 35 35	
	PennCap-M* (methyl parathion)	2 - 4 pt.	F	12	
	Permethrin* (permethrin)	4 - 8 oz. (3.2 AG or 3.2EC)	F	30	
	Phorate 20G* (phorate)	5 lb. (1 st gen)	F	30	
	Pilot (chlorpyrifos)	5 - 6.5 lb. 15G (1 st gen) 6.5 lb 15G (2 nd gen) 1½ - 2 pt. 4E*	F F F	35 35 35	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
European Corn Borer (cont.)	Pounce* (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	F F	30 30	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Saurus (chlorpyrifos)	5.0 - 6.5 lb. (1 st gen.) 6.5 lb. (2 nd gen.)	F F	35 35	
	Sevin (carbaryl)	1½ - 2 qt. 4F or XLR Plus 1⅞ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Taiga*Z (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Tracer (spinosad)	1 - 3 fl. oz.	F	28	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pts.	F	35	
	Fall Army- worm	Arctic* 3.2EC (permethrin)	4 - 8 fl. oz.	F	
Baythroid* (cyfluthrin)		2.8 fl. oz. (2 or XL)	F	21	
Bifenthrin* 2EC (bifenthrin)		2.1 - 6.4 fl. oz.	F	30	
Capture* (bifenthrin)		2.1 - 6.4 fl. oz. 2EC	F	30	
Carbaryl (carbaryl)		1 - 2 qt. 4L 1¼ - 2½ lb. 80S	F F	48 48	
Delta Gold* (deltamethrin)		1.5 - 1.9 fl. oz	F	21	
Discipline* 2EC (bifenthrin)		2.1 - 6.4 fl. oz.	F	30	
Empower* 2 (bifenthrin)		3.5 - 8.7 oz.	F	21	
Entrust (spinosad)		0.5 - 2.0 fl. oz.	F	28	
Fanfare* 2EC (bifenthrin)		2.1 - 6.4 fl. oz.	F	30	
Lannate* (methomyl)		¾ - 1½ pt. Lv ¼ - ½ lb. SP	F F	21 21	
Mustang MAX* (zeta-cypermethrin)		3.2 - 4.0 fl. oz.	F	30	
Permethrin* (permethrin)		4 - 8 oz. 3.2AG or 3.2 EC	F	30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Fall Army- worm (cont.)	Pounce* (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	F F	30 30	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz. (1 st & 2 nd instars)	F	21	
	Sevin (carbaryl)	1 - 2 qt. 4F or XLR Plus 1¼ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz. (1 st & 2 nd instars)	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* (bifenthrin)	2.56 - 6.4 fl. oz.	F	30	
	Tracer (spinosad)	1 - 3 fl. oz.	F	28	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
Flea Beetles	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	F	30	Several flea beetles may attack corn of which the corn flea beetle is the most important. The corn flea beetle is a vector of Stewart's wilt disease. Most corn varieties are now resistant to or tolerant of Stewart's wilt. Growers can expect significant populations of flea beetles on corn after mild winters. Rescue treatment is warranted if plants begin to wilt and a potential loss in stand appears likely. For additional information about flea beetles, see FactSheet, FC-ENT-0012.
	Arctic* 3.2EC (permethrin)	4 - 8 fl. oz.	F	30	
	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	
	Baythroid* (cyfluthrin)	0.8 - 1.6 fl. oz. (2 or XL)	F	21	
	Bifenthrin* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Capture* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Carbaryl (carbaryl)	1 - 2 qt 4L 1¼ - 2½ lb. 80S	F F	48 48	
	Chlorpyrifos* (chlorpyrifos)	2 - 3 pt. 4E AG	F	35	
	Concur (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Cruiser 5FS (thiamethoxam)	0.25 - 1.25 mg. a.i./kernel	AP - CST	na	
	Delta Gold* (deltamethrin)	1.0 - 1.5 fl. oz.	F	21	
	Discipline* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Fanfare* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Lannate* (methomyl)	¾ - 1½ pt. LV ¼ - ½ lb. SP	F F	21 21	
	Latitude (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	F	35	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Flea Beetles (cont.)	Mustang MAX* (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	F	30	
	Penncap-M* (methyl parathion)	2 - 3 pt	F	12	
	Permethrin* (permethrin)	4 - 8 oz. 3.2 AG or 3.2EC	F	30	
	Pilot* 4E (chlorpyrifos)	2 pt.	F	35	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Poncho 600 (clothianidin)	0.25 - 1.25 mg. a.i./kernel	AP - CST	na	
	Pounce* (permethrin)	6.4 - 12.8 fl. oz. 25 WP 4 - 8 fl. oz. 3.2 EC	F F	30 30	
	Sevin (carbaryl)	1 - 2 qt. 4F or XLR Plus 1¼ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	F	35	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Yuma* 4E (chlorpyrifos)	1 - 2 pt.	F	35	
Grubs	Aztec* (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft. 2.1G 3 oz./1000 row ft. 4.67G	AP AP - SB	na na	If stand emergence is reduced or irregular, a number of plants should be dug to detect presence of C-shaped grubs that may range in size from ½ to 1 inch when extended. No effective rescue treatment is available if a grub problem is identified. However, treatment is recommended if replanting is warranted.
	Baythroid* (cyfluthrin)	0.14-0.16 fl. oz./1000 row ft. (2 or XL)	AP	21	
	Bifenthrin* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Capture* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Chlorpyrifos (chlorpyrifos)	8 - 16 oz./1000 row ft. 15G	AP	35	
	Concur (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Counter* CR (terbufos)	6 oz./1000 row ft.	AP	30	
	Cruiser 5FS (thiamathoxam)	0.25 - 1.25 mg. a.i./kernel	AP - CST	na	
	Defcon* 2.1G (tebupirimphos & cyfluthrin)	6.7 oz.1000 row ft.	AP	na	

Pest	Product Name (Common Name)	Amount per Acre	Application Method¹	Pre-Harvest Interval (days)	When to Treat
Grubs (cont.)	Discipline* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	For additional information about grubs, see FactSheet, FC-ENT-0012.
	Empower* 2 (bifenthrin)	6.4 - 8 oz./1000 row ft.	AP	30	
	Fanfare* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Force* 3G (tefluthrin)	4 - 5 oz./1000 row ft.	AP	na	
	Fortress* (chlorethoxyfos)	7.4 oz./1000 row ft. 2.5G 3.0-3.75 oz./1000 row ft. 5G	AP AP - SB	na na	
	Latitude (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Lorsban (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Mocap 15G* (ethoprop)	8 oz./1000 row ft. (suppression)	AP	na	
	Nufos (chlorpyrifos)	8 - 16 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Poncho 600 (clothianidin)	0.25 - 1.25 mg. a.i./kernel	AP - CST	na	
	Phorate 20G* (phorate)	6 oz./1000 row ft. (reduction)	AP	na	
	Pilot 15G (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Proaxis* (gamma-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Regent* 4SC (fipronil)	0.24 fl. oz./1000 row ft.	AP	90	
	Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Silencer* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Sniper* (bifenthrin)	0.15-0.3 fl. oz./1000 row ft.	AP	30	
	Taiga Z* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Tundra* (bifenthrin)	0.15-0.3 fl. oz./1000 row ft.	AP	30	
	Warhawk* (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	35	
Warrior* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21		
Yuma* 4E (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	35		
Japanese Beetle (Adult)	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	F	21	Damage from Japanese beetle adults is normally confined to possible silk clipping around the
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	F	21	
	Bifenthrin* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Japanese Beetle (Adult) (cont.)	Capture* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	edges of the field. Treatment may be warranted if 2 or more adults are found per silk mass when 75% of the plants have silked and silk clipping - ¼ inch or less is observed.
	Carbaryl (carbaryl)	1 - 2 qt. 4L 1¼ - 2½ lb. 80S	F F	48 48	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	F	21	
	Discipline* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Fanfare* 2EC (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Mustang MAX* (zeta-cypermethrin)	2.72 - 4.0 fl. oz.	F	30	
	PennCap-M* (methyl parathion)	2 - 4 pt.	F	12	
	Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sevin (carbaryl)	1 - 2 qt 4F or XLR Plus 1¼ - 2½ lb. 80S	F F	48 48	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Sniper* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
	Tundra* (bifenthrin)	2.1 - 6.4 fl. oz.	F	30	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	F	21	
Seedcorn Maggot	Arctic* 3.2EC (permethrin)	0.30 fl. oz./1000 row ft.	AP	30	In general, seed-corn maggot problems are most likely to occur in situations where (1) high organic matter or decaying vegetation attracts egg-laying adult flies (i.e., a green cover crop such as rye or alfalfa is plowed or disked under, and (2) cool, damp soil conditions delay seed germination and prolong the period vulnerable to maggot attack. See FactSheet FC-ENT-0012 for additional information.
	Aztec*. ^b (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft. 2.1G 3 oz./1000 row ft. 4.67G	AP AP - SB	na na	
	Baythroid* (cyfluthrin)	0.12-0.16 fl.oz./1000 row ft. (2 or XL)	AP	21	
	Bifenthrin*. ^b 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft	AP	30	
	Capture 2*. ^b EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft	AP	30	
	Chlorpyrifos ^b (chlorpyrifos)	8 oz./1000 ft. 15G	AP	35	
	Concur ^b (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Counter* CR (terbufos)	6 oz./1000 row ft.	AP	na	
	Cruiser 5FS ^b (thiamethoxam)	0.25 - 1.25 mg a.i./kernel	AP - CST	na	
	Defcon*. ^b 2.1G (tebupirimphos & cyfluthrin)	6.7 oz./1000 ft.	AP	na	
	Discipline*. ^b 2EC (bifenthrin)	0.15-0.3 fl. oz./1000 row ft	AP	30	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Seedcorn Maggot (cont.)	Empower* ^b 2 (bifenthrin)	6.4 - 8.0 oz./1000 ft.	AP	30	^b Also labeled for Seedcorn Beetle.
	Fanfare* ^b 2EC (bifenthrin)	0.15-0.3 fl. oz./1000 row ft.	AP	30	
	Force* ^b 3G (tefluthrin)	4 - 5 oz./1000 ft.	AP	na	
	Fortress* (chlorothoxyfos)	7.4 oz./1000 row ft. 2.5G 3.0-3.75 oz./1000 row ft. 5G	AP AP - SB	na na	
	Furadan* 4F (carbofuran)	2.5 fl. oz./1000 row ft.	AP	30	
	Germate Plus ^b (diazinon + lindane)	1.5 oz/42 lb. of seed	AP-HST	na	
	Kernel Gurad ^b (diazinon + lindane)	1.5 oz/42 lb. of seed	AP - HST	na	
	Kernel Guard Supreme ^b (permethrin)	1.5 oz./42 lb. of seed	AP - HST	na	
	Kickstart ^b (diazinon + lindane)	1.5 oz./42 lb. of seed	AP - HST	na	
	Kickstart VP ^b (permethrin)	1.5 oz./42 lb. of seed	AP - HST	na	
	Latitude ^b (imidicloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Lorsban ^b (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Nufos ^b (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Pilot ^b 15G (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Poncho ^b 600 (clothianidin)	0.25 - 1.25 mg a.i./kernel	AP - CST	na	
	Proaxis* (gamma-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Regent* ^b 4 SC (fipronil)	0.24 fl. oz. per 1000 row ft.	AP	na	
	Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Silencer* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Sniper* (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Taiga Z* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Tundra* (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Warhawk* (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	35	
	Warrior* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Yuma* ^b 4E (chlorpyrifos)	2.4 fl. oz./ 1000 row ft.	AP	35	

Pest	Product Name (Common Name)	Amount per Acre	Application Method¹	Pre-Harvest Interval (days)	When to Treat
Slugs	Deadline MPs (4% metaldehyde)	10 lb.	Broadcast	na	Treatment may be necessary if the new growth has greater than 40% defoliation or if more than 3% of the plants are being killed.
	Metarex (4% metaldehyde)	7.5 lb.	Broadcast	na	
	Orcal Slug and Snail Bait (3.5% metaldehyde)	10 lb.	Broadcast	na	
	Sluggo (iron phosphate)	24 - 44 lb.	Broadcast	na	
Wire- worms	Arctic* 3.2EC (permethrin)	0.30 fl. oz./1000 row ft.	AP	30	Preventive treatment is warranted when a field has a history of wireworms or wireworms are detected in the field prior to planting. See FactSheet FC-ENT-0012 for additional information.
	Aztec* (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft. 2.1G 3 oz./1000 row ft. 4.67G	AP AP - SB	na na	
	Baythroid* (cyfluthrin)	0.12-0.16 fl.oz./1000 row ft (2 or XL)	AP	21	
	Bifenthrin* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Capture* (bifenthrin) (2EC) (LFR)	0.15-0.3 fl.oz./1000 row ft. 0.2-0.39 fl. oz./1000 row ft	AP AP	30 30	
	Chlorpyrifos (chlorpyrifos)	8 oz./1000 row ft. 15G	AP	35	
	Concur (imidacloprid)	1.5 oz./42 lb. of seed	AP	na	
	Counter* CR (terbufos)	6 oz./1000 row ft.	AP	30	
	Cruiser 5FS (thiamethoxam)	0.25 - 1.25 mg a.i./kernel	AP	na	
	Defcon* 2.1G (tebupirimphos & cyfluthrin)	6.7 oz./1000 row ft.	AP	na	
	Discipline* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Empower* 2 (bifenthrin)	3.2 - 8.0 oz./1000 row ft.	AP	30	
	Fanfare* 2EC (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	na	
	Force* 3G (tefluthrin)	4 - 5 oz./1000 row ft.	AP	na	
	Fortress* (chlorethoxyfos)	7.4 oz./1000 row ft. 2.5G 3.0-3.75 oz./1000 row ft. 5G	AP AP - SB	na na	
	Furadan* 4F (carbofuran)	2.5 fl. oz./1000 row ft.	AP	30	
	Germate Plus (diazinon + lindane)	1.5 oz/42 lb. of seed	AP - HST	na	
	Kernel Guard (diazinon + lindane)	1.5 oz/42 lb. of seed	AP - HST	na	
	Kernel Guard Supreme (permethrin)	1.5 oz./42 lb. of seed	AP - HST	na	

Pest	Product Name (Common Name)	Amount per Acre	Application Method ¹	Pre-Harvest Interval (days)	When to Treat
Wire- worms (cont.)	Kickstart (diazinon + lindane)	1.5 oz./42 lb. of seed	AP - HST	na	
	Kickstart VP (permethrin)	1.5 oz./42 lb. of seed	AP - HST	na	
	Latitude (imidacloprid)	1.5 oz./42 lb. of seed	AP - HST	na	
	Lorsban (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Mocap 15G* (ethoprop)	8 oz./1000 row ft.	AP	na	
	Nufos (chlorpyrifos)	8 oz./1000 row ft. 15G 2.4 fl. oz./1000 row ft. 4E*	AP AP	35 35	
	Phorate 20G* (phorate)	6 oz./1000 row ft.	AP	30	
	Pilot 15G (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Poncho 600 (clothianidin)	0.25-1.25 mg a.i./kernel	AP - CST	na	
	Proaxis* (gamma-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Regent* 4 SC (fipronil)	0.24 fl. oz./1000 row ft.	AP	90	
	Saurus (chlorpyrifos)	8 oz./1000 row ft.	AP	35	
	Silencer* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Sniper* (bifenthrin)	0.15-0.3 fl.oz./1000 row ft.	AP	30	
	Taiga Z* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Warhawk* (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	30	
	Warrior* (lambda-cyhalothrin)	0.66 fl. oz./1000 row ft.	AP	21	
	Yuma* 4E (chlorpyrifos)	2.4 fl. oz./1000 row ft.	AP	35	

¹ AP = material applied at planting time either in a band or in-furrow, AP-SB = material applied at planting time either as a band or in-furrow through the SmartBox system, AP-CST = material applied at planting time as a commercially applied seed treatment, AP-HST = material applied at planting time as a hopper-box seed treatment, F = material applied broadcast foliar, Brd = material broadcast over the soil, PRE = material applied broadcast either pre-plant or pre-emerge

SMALL GRAINS

Management of insect pests affecting small grains often emphasizes non-chemical control measures. Hessian fly on wheat is controlled primarily by timing of sowing dates and the use of resistant varieties. Cereal leaf beetle on oats usually is controlled by beneficial parasites introduced from the beetle's native land.

However, populations of some pests, especially armyworms, may occur in numbers warranting rescue treatment with an insecticide. Following is a listing of insecticide products labeled for control of the pests that affect small grains. An asterisk (*) indicates use is restricted to certified applicators only.

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Aphids	Baythroid* (cyfluthrin)	1.8 - 2.4 fl. oz. (2 or XL)	30	Of the various aphid species that occur on small grains, only the greenbug causes damage that may warrant rescue treatment. Rescue treatment is warranted if an average of 50 greenbugs is found per linear ft of row on small plants in the fall or 100 per linear ft of row in the spring.
	Dimethoate (dimethoate)	½ - ¾ pt. (Dimate 4E)	35	
		½ - ¾ pt. 400 or 4EC	35	
		0.75 - 1.13 pt. 2.67	35	
	Cruiser 5FS (thiamethoxam)	0.75 - 1.33 mg a.i./kernel	AP - CST	
	Endosulfan* 3EC (endosulfan)	0.66 - 1 qt.	Do not apply after heads begin to form	
	Lannate* (methomyl)	¼ - ½ lb. SP	7	
		¾ - 1½ pt. LV	7	
	Malathion (malathion)	1½ pt. 5EC	7	
		1½ - 2 pt. 57 EC	7	
		1 - 1¼ pt. 8	7	
	Mustang MAX* (zeta-cypermethrin)	3.20 - 4.0 oz	14	
	Mystic Z* (lambda-cyhalothrin)	1.92 fl. oz.	30	
	Pennacap-M* (methyl parathion)	2 - 3 pt.	15	
Proaxis* (gamma-cyhalothrin)	3.84 fl. oz.	30		
Prolex* (gamma-cyhalothrin)	1.02 - 1.54 fl. oz.	30		
Silencer* (lambda-cyhalothrin)	3.84 fl. oz.	30		
Taiga Z* (lambdo-cyhalothrin)	3.84 fl. oz.	30		
Warrior* (lambda-cyhalothrin)	3.84 fl. oz.	30		
Armyworms on Wheat	Baythroid * (cyfluthrin)	1.8 - 2.4 fl. oz. (2 or XL)	30	Rescue treatment is recommended if 6 or more armyworm larvae are found per 1 ft of row or if head cutting occurs. Where larvae are abundant enough - justify action, treatment should be applied when larvae are in their early stage of development.
	Carbaryl (carbaryl)	1 - 1½ qt. 4L	21	
		1¼ - 1⅞ lb. 80S	21	
	Entrust (spinosad)	1 - 2 oz.	21	
	Lannate* (methomyl)	¼ - ½ lb. SP	7	
		¾ - 1½ pt. LV	7	
	Malathion (malathion)	2 pt. 57 EC	7	
		1 - 1¼ pt. 8	7	
	Mustang MAX* (zeta-cypermethrin)	1.76 - 4.0 oz	14	
Mystic Z* (lambda-cyhalothrin)	1.28 - 1.92 fl. oz.	30		
Pennacap-M* (methyl parathion)	2 - 3 pt.	15		
Proaxis* (gamma-cyhalothrin)	2.56 - 3.84 fl. oz.	30		

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Armyworms on Wheat (cont.)	Porlex* (gamma-cyhalothrin)	1.02 - 1.54 fl. oz.	30	
	Sevin (carbaryl)	1 - 1½ qt. 4F or XLR Plus 1¼ - 1⅞ lb. 80S	21 21	
	Silencer* (lambda-cyhalothrin)	2.56-3.84 fl. oz.	30	
	Tracer (spinosad)	1 - 3 fl. oz.	21	
	Taiga Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Warrior* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
Cereal Leaf Beetle	Baythroid* (cyfluthrin) (wheat only)	1.0 - 1.8 fl. oz. (2 or XL)	30	Rescue treatment is warranted when two or more larvae are found per stem.
	Carbaryl (carbaryl) (wheat only)	1 qt. 4L 1¼ lb. 80S	21 21	
	Endosulfan* 3EC (endosulfan) (oats & wheat)	0.33 - 0.66 qt.	Do not apply after heads begin to form	
	Entrust (spinosad) (oats & wheat)	0.5 - 2.0 fl. oz.	21	
	Lannate* (methomyl) (oats & wheat)	¼ - ½ lb. SP ¾ - 1½ pt. LV	7 7	
	Malathion (malathion) (oats & wheat)	1 - 1½ pt. 5EC	7	
	Mustang MAX* (zeta-cypermethrin)(wheat only)	1.76 - 4.0 oz	14	
	Mystic Z* (lambda-cyhalothrin) (wheat only)	1.28 - 1.92 fl. oz.	30	
	Proaxis* (gamma-cyhalothrin) (wheat only)	2.56 - 3.84 fl. oz.	30	
	Prolex* (gamma-cyhalothrin) (wheat only)	1.02 - 1.54 fl. oz.	30	
	Sevin (carbaryl) (wheat only)	1qt. 4F or XLR PLUS 1¼ lb. 80S	21 21	
	Silencer* (lambda-cyhalothrin) (wheat only)	2.56 - 3.84 fl. oz.	21	
	Tracer (spinosad) (oats & wheat)	1 - 3 fl. oz.	21	
	Taiga Z* (lambdo-cyhalothrin) (wheat only)	2.56 - 3.84 fl. oz.	30	
	Warrior* (lambda-cyhalothrin) (wheat only)	2.56 - 3.84 fl. oz.	30	

Hessian Fly

The problem of Hessian fly on wheat has been minimized by the development of resistant varieties and widespread adherence to planting wheat on or after fly-safe sowing date. The accompanying map depicts Ohio fly-free dates by county.

Wheat sown on or after the date indicated for each county will escape most egg deposition by the fall brood of Hessian fly. Egg-laying is completed within the 2- to 3-day female lifespan. Therefore, it is important to time autumn wheat sowing to escape most egg deposition on the plants.

Cruiser 5FS at 0.75 - 1.33 fl. oz./100 lb of seed is also labeled for control of Hessian fly.



SOYBEAN

Insecticide application to manage soybean insect pests may be required at any time throughout the development of the crop. At planting time, seed treatments may be warranted for protection against seed maggots. On early-planted beans, rescue treatment following emergence may be required to control overwintering bean leaf beetles if severe stand loss appears likely. Up to bloom, soybean can tolerate up to 40 percent defoliation by the defoliating pests without an economic loss in yield that would justify a rescue treatment. Soybean becomes more susceptible to defoliation from bloom to pod-fill, and defoliation should not be allowed to exceed 15 percent during that time. Once pods have set, pod injury due to bean leaf beetle may be problem, especially on early-planted beans. If pod injury is detected, rescue treatment is warranted when injury of 10 percent or more of the pods appears imminent.

Following is a listing of insecticide products labeled for control of the pests that affect soybean. An asterisk (*) indicates that use is restricted to certified applicators only.

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Bean Leaf Beetle	Ambush* 25W (permethrin)	3.2 - 6.4 fl. oz.	60	Treatment is warranted when defoliation is greater than 40% pre-bloom, 15% bloom through pod fill or 25% after pod fill but prior to plant yellowing.
	Arctic* 3.2 EC (permethrin)	2 - 4 fl. oz.	60	
	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	21	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	21	Treatment is also warranted when greater than 10% of the pods show feeding damage.
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	45	
	Carbaryl (carbaryl)	½ - 1 qt 4L ⅝ - 1¼ lb 80S	14 14	The disease Bean Pod Mottle Virus is transmitted by bean leaf beetles and may be important some years especially for producers growing seed for seed or food grade soybean.
	Chlorpyrifos* (chlorpyrifos)	1 - 2 pt. 4E AG	28	
	Cruiser 5FS (thiamethoxam)	1.28 fl. oz./cwt seed	na	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	21	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Bean Leaf Beetle (cont.)	Dimethoate (dimethoate)	1 pt. Dimate 4E 1 pt. 400 or 4EC 1.5 pt. 2.67	21 21 21	See Fact Sheet FC-23 for additional information.
	Gaucho 480 (imidacloprid)	2 - 4 fl. oz./cwt seed	na	
	Lannate* (methomyl)	¼ - ⅜ lb. SP ¾ - 1 pt. LV	14 14	
	Larvin 3.2 (thiodicarb)	18 - 30 fl. oz.	28	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Mustang Max* (zeta-cypermethrin)	2.8 - 4.0 fl. oz.	21	
	Mystic Z* (lambda-cyhalothrin)	0.96 - 1.6 fl. oz.	30	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Orthene 97 (acephate)	0.75 - 1.0 lb.	14	
	PennCap-M* (methyl parathion)	2 - 3 pt	20	
	Permethrin* (permethrin)	2 - 4 fl. oz 3.2 EC 2 - 4 fl. oz. 3.2 AG	60 60	
	Pilot* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Pounce* (permethrin)	2 - 4 fl. oz. 3.2EC 3.2 - 6.4 oz. WP	60 60	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	0.77 - 1.28	45	
	Silencer* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Sevin (carbaryl)	½ - 1 qt. XLR Plus or 4F ⅝ - 1¼ lb. 80S	14 14	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	28	
	Warrior* (lambda-cyhalothrin)	1.92 - 3.2 fl. oz.	30	
Yuma* 4E (chlorpyrifos)	1 - 2 pts.	28		
Grasshopper	Adjourn* (esfenvalerate)	5.8-9.6 fl. oz.	21	Grasshopper damage to soybean is generally concentrated along the field edges especially grassy ditch banks and road-ways. Such injury may build up during a growing season, possibly damaging
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	21	
	Baythroid* (cyfluthrin)	2.0 - 2.8 fl. oz. (2 or XL)	45	
	Carbaryl (carbaryl)	½ - 1.5 qt 4L ⅝ - 1¼ lb 80S	14 14	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Grasshopper (cont.)	Chlorpyrifos* (chlorpyrifos)	½ - 1 pt. 4E AG	28	pods in the late summer or early fall. Rescue treatment of grasshoppers may be warranted when such damage is combined with one or more other defoliating insects feeding on soybean.
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	21	
	Dimethoate (dimethoate)	1 pt. (Dimate 4E)	21	
		1 pt. 400 or 4EC	21	
		1.5 pt. 2.67	21	
	Dimilin 2L (diflubenzuron)	2 fl. oz.	21	
	Furadan* 4F (carbofuran)	¼ - ½ pt.	21	
	Lorsban* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Mustang MAX* (zeta-cypermethrin)	3.2 - 4.0 oz.	21	
	Mystic Z* (lambda-cyhalothrin)	1.5 - 1.92 fl. oz.	45	
	Nufos* 4E (chlorpyrifos)	½ - 1 pt	28	
	Orthene 97 (acephate)	0.25 - 0.5 lb.	14	
	Pennacp-M* (methyl parathion)	2 - 3 pt	20	
	Pilot* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Proaxis* (gamma-cyhalothrin)	3.20 - 3.84 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	1.28 - 1.54 fl. oz.	45	
	Sevin (carbaryl)	½ - 1½ qt. 4L or LXR	14	
		¾ - 1¼ lb. 80S	14	
	Silencer* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	45	
	Taiga Z* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	30	
Warhawk* (chlorpyrifos)	½ - 1 pt.	28		
Warrior* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	30		
Yuma* 4E (chlorpyrifos)	½ - 1 pt.	28		
Green Cloverworm	<i>Bacillus thuringiensis</i> (several Bt products)	Refer to label for rate	0	Rescue treatment is recommended when defoliation levels are greater than 40 percent pre-bloom; greater than 15 percent from bloom to pod-fill; and greater than 25 percent from full pod to harvest. Leaves are not damaged after plants start to turn yellow.
	Ambush* 25W (permethrin)	3.2 - 6.4 oz.	60	
	Arctic* 3.2 EC (permethrin)	2 - 4 fl. oz.	60	
	Adjourn* (esfenvalerate)	2.9 - 5.8 fl. oz.	21	
	Asana* XL (esfenvalerate)	2.9 - 5.8 fl. oz.	21	
	Baythroid* (cyfluthrin)	0.8 - 1.6 fl. oz. (2 or XL)	45	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	
Green Cloverworm (cont.)	Carbaryl (carbaryl)	½ - 1 qt. 4L, ⅝ - 1¼ lb. 80S	14	
	Chlorpyrifos* (chlorpyrifos)	½ - 1 pt. 4E AG	28	
	Delta Gold* (deltamethrin)	1.0 - 1.5 fl. oz.	21	
	Dimilin (diflubenzuron)	2 - 4 oz. 25W or 2L	21	
	Entrust (spinosad)	1 - 2 oz.	28	
	Intrepid* 2F (methoxyfenozide)	4 - 8 fl. oz.	14	
	Lannate* (methomyl)	¼ - ½ lb. SP, ¾ - 1½ pt. LV	14	
	Larvin (thiodicarb)	10 - 30 fl. oz.	28	
	Lorsban* 4E (chlorpyrifos)	½ - 1 pt	28	
	Mustang* MAX (zeta-cypermethrin)	2.8 - 4.0 oz.	21	
	Mystic Z* (lambda-cyhalothrin)	0.96 - 1.6 fl. oz.	30	
	Nufos* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Orthene 97 (acephate)	0.75 - 1.0 lb.	14	
	Pennacp-M* (methyl parathion)	2 - 3 pt.	20	
	Permethrin* (permethrin)	2 - 4 oz. 3.2AG 2 - 4 fl. oz. 3.2 EC	60 60	
	Pilot* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Pounce* (permethrin)	2 - 4 fl. oz. 3.2EC 3.2 - 6.4 oz. 25WP	60 60	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	0.77 - 1.28 fl. oz.	45	
	Sevin (carbaryl)	½ - 1 qt. XLR Plus or 4F ⅝ - 1¼ lb. 80S	14 14	
	Silencer* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Steward (indoxacarb)	5.6 - 11.3 fl. oz.	21	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Tracer (spinosad)	1 - 2 fl. oz.	28	
	Warhawk* (chlorpyrifos)	½ - 1 pt.	28	
	Warrior* (lambda-cyhalothrin)	1.92 - 3.2 fl. oz.	30	
	Yuma* 4E (chlorpyrifos)	½ - 1 pt.	28	

Pest	Product Name (Common Name)		Pre-Harvest Interval (days)	When to Treat
Japanese Beetle	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	21	Rescue treatment is recommended when defoliation levels are greater than 40 percent pre-bloom; greater than 15 percent from bloom to pod-fill; and greater than 25 percent from full pod to harvest. See Fact Sheet FC-22 for additional information.
	Ambush* 25W (permethrin)	6.4 - 12.8 fl. oz.	60	
	Arctic* 3.2 EC (permethrin)	2 - 4 fl. oz.	60	
	Asana* XL (esfenvalerate)	5.8 - 9.6 fl. oz.	21	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	45	
	Carbaryl (carbaryl)	½ - 1 qt. 4L ⅝ - 1¼ lb. 80S	14 14	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	21	
	Mustang Max* (zeta-cypermethrin)	2.8 - 4.0 fl. oz.	21	
	Mystic Z* (lambda-cyhalothrin)	1.6 - 1.92 fl. oz.	45	
	PennCap-M* (methyl parathion)	2 - 3 pt.	20	
	Permethrin* (permethrin)	2 - 4 oz. 3.2 AG 2 - 4 fl. oz. 3.2 EC	60 60	
	Pounce* (permethrin)	2 - 4 oz. 3.2 EC 3.2 - 6.4 oz. 25WP	60 60	
	Proaxis* (gamma-cyhalothrin)	3.20 - 3.84 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	1.28 - 1.54 fl. oz.	45	
	Sevin (carbaryl)	½ - 1 qt. 4F or XLR Plus ⅝ - 1¼ lb. 80S	14 14	
	Silencer* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	45	
	Taiga Z* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	30	
Warrior* (lambda-cyhalothrin)	3.20 - 3.84 fl. oz.	30		
Mexican Bean Beetle	Adjourn* (esfenvalerate)	2.9 - 5.8 fl. oz.	21	Rescue treatment is recommended when defoliation levels are greater than 40 percent pre-bloom; greater than 15 percent from bloom to pod-fill; and greater than 25 percent from full pod to harvest. Treatments should be applied only when the observed level of defoliation and numbers of MBB both indicate that damage will increase
	Ambush* 25W (permethrin)	3.2 - 6.4 oz.	60	
	Arctic* 3.2 EC (permethrin)	2 - 4 fl. oz.	60	
	Asana* XL (esfenvalerate)	2.9 - 5.8 fl. oz.	21	
	Baythroid* (cyfluthrin)	1.6 - 2.8 fl. oz. (2 or XL)	45	
	Carbaryl (carbaryl)	½ - 1 qt. 4L ⅝ - 1¼ lb. 80S	14 14	
	Chlorpyrifos* (chlorpyrifos)	1 - 1½ pt. 4E AG	28	

	(Common Name)	Amount per Acre	Interval (days)	When to Treat
Mexican Bean Beetle (cont.)	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	21	See Fact Sheet FC-22 for additional information.
	Dimethoate (dimethoate)	1 pt. (Dimate 4E) 1 pt. 400 or 4EC 1.5 pt. 2.67	21 21 21	
	Dimilin (diflubenzuron)	2 - 4 oz. 25W 2 - 4 fl. oz. 2L	21 21	
	Lannate* (methomyl)	¼ - ½ lb. SP ¾ - 1½ pt LV	14 14	
	Larvin (thiodicarb)	18 - 30 fl. oz.	28	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Mustang Max* (zeta-cypermethrin)	2.8 - 4.0 fl. oz.	21	
	Mystic Z* (lambda-cyhalothrin)	0.96 - 1.6 fl. oz.	45	
	Nufos* 4E (chlorpyrifos)	1 - 1½ pt.	28	
	Orthene 97 (acephate)	0.75 - 1.0 lb.	14	
	PennCap-M* (methyl parathion)	2 - 3 pt.	20	
	Permethrin* (permethrin)	2 - 4 oz 3.2 AG 2 - 4 fl. oz. 3.2 EC	60 60	
	Pilot* 4E (chlorpyrifos)	1 - 1½ pt.	28	
	Pounce* (permethrin)	2 - 4 fl. oz. 3.2EC 3.2 - 6.4 oz. 25WP	60 60	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	0.77 - 1.28 fl. oz.	45	
	Sevin (carbaryl)	½ - 1 qt. 4F or XLR Plus ¾ - 1¼ lb. 80S	14 14	
	Silencer* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	28	
Warrior* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30		
Yuma* 4E (chlorpyrifos)	1 - 2 pts.	28		
Potato Leafhopper	Adjourn* (esfenvalerate)	2.9 - 5.8 fl. oz.	21	Potato leafhopper damage to soybean is normally associated with areas bordering alfalfa early in the season. However,
	Ambush* 25W (permethrin)	3.2 - 6.4 fl. oz.	60	

Pest	Product Name	Amount per Acre	Pre-Harvest (days)	When to Treat
Potato Leafhopper (cont.)	Arctic* 3.2 EC (permethrin)	2 - 4 fl. oz.	60	late plantings where the soybean do not have sufficient development of their pubescence and leafhopper populations are large, usually in early June are also susceptible to injury.
	Asana* XL (esfenvalerate)	2.9 - 5.8 fl. oz.	21	
	Baythroid* (cyfluthrin)	0.8 - 1.6 fl. oz. (2 or XL)	45	
	Carbaryl (carbaryl)	1 qt. 4L 1¼ lb. 80S	14 14	
	Cruiser 5FS (thiamethoxam)	1.28 fl. oz./cwt seed	na	
	Delta Gold* (deltamethrin)	1.0 - 1.5 fl. oz.	21	
	Dimethoate (dimethoate)	1.5 pt. 2.67 1 pt. 400 or 4EC 1 pt. (Dimate 4E)	21 21 21	
	Mustang Max* (zeta-cypermethrin)	2.8 - 4.0 fl. oz.	21	
	Mystic Z* (lambda-cyhalothrin)	0.96 - 1.6 fl. oz.	45	
	Orthene 97 (acephate)	0.50 - 1.0 lb	14	
	PennCap-M* (methyl parathion)	2 - 3 pt	20	
	Permethrin* (permethrin)	2 - 4 oz. 3.2 AG 2 - 4 fl. oz. 3.2 EC	60 60	
	Pounce* (permethrin)	2 - 4 oz. 3.2EC 3.2 - 6.4 oz. 25WP	60 60	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	0.77 - 1.28 fl. oz.	45	
	Sevin (carbaryl)	1 qt. 4F or XLR Plus 1¼ lb. 80S	14 14	
	Silencer* (lambda-cyhalothrin)	1.92-3.20 fl. oz.	45	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Warrior* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Seedcorn Maggot	Cruiser 5FS (thiamethoxam)	1.28 fl. oz./cwt seed (commercially applied seed treatment)	
Gaucho 480 (imidacloprid)		2 - 4 fl. oz./cwt seed (commercially applied seed treatment)	na	
Kernel Guard Supreme (permethrin)		1.5 oz/50 lb. seed (hopper box seed treatment)	na	

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Seedcorn Maggot (cont.)	Kickstart VP (permethrin)	1.5 oz./50 lb. seed (hopper box seed treatment)	na	
Slugs	Deadline MPs (4% metaldehyde)	10 lb.	na	Treatment may be necessary if defoliation is greater than 40% on new growth or stand is being reduced.
	Orcal Slug and Snail Bait (3.5% metaldehyde)	10 lb.	na	
	Metarex (4% metaldehyde)	7.5 lb.	na	
	Sluggo (iron phosphate)	24 - 44 lb.	na	
Soybean Aphid	Adjourn* (esfenvalerate)	5.8 - 9.6 fl. oz.	21	The threshold for spraying for soybean aphid is 250 aphids per plant, beginning at growth stage R1 or the flowering stage, and continuing through pod fill. Aphid numbers should be on the increase before spraying occurs.
	Asana XL* (esfenvalerate)	5.8 - 9.6 fl. oz.	21	
	Baythroid* (cyfluthrin)	2.0 - 2.8 fl. oz. (2 or XL)	45	
	Chlorpyrifos* (chlorpyrifos)	1 - 2 pt. 4E AG	28	
	Delta Gold* (deltamethrin)	1.5 - 1.9 fl. oz.	21	
	Dimethoate (dimethoate)	1.5 pt. 2.67 1 pt. 400 or 4EC 1 pt. (Dimate 4E)	21 21 21	
	Furadan* 4F (carbofuran)	¼ - ½ pt.	21	
	Lorsban* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Mustang Max* (zeta-cypermethrin)	2.8 - 4.0 fl. oz.	21	
	Mystic Z* (lambda-cyhalothrin)	0.96 - 1.6 fl. oz.	45	
	Nufos* 4E (chlorpyrifos)	1 - 2 pt.	28	
	Orthene 97 (acephate)	0.75 - 1.0 lb.	14	
	PennCap-M* (methyl parathion)	1 - 3 pt	20	
	Proaxis* (gamma-cyhalothrin)	1.92 - 3.20 fl. oz.	45	
	Prolex* (gamma-cyhalothrin)	0.77 - 1.28 fl. oz.	45	
	Silencer* (lambda-cyhalothrin)	1.92-3.20 fl. oz.	45	
	Taiga Z* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	28	
	Warrior* (lambda-cyhalothrin)	1.92 - 3.20 fl. oz.	30	
	Yuma* 4E (chlorpyrifos)	1 - 2 pts.	28	

Pest	Product Name	Amount per Acre	Pre-Harvest (days)	When to Treat
Spider Mites	Chlorpyrifos* (chlorpyrifos)	½ - 1 pt. 4E AG	28	Rescue treatment is warranted when an entire field (all plants) exhibits some sign of infestation with speckling and some discoloration of the lower leaves. Treatment of soybean for TSM requires thorough penetration of the foliar canopy, preferably by ground-rig application if the chemical applied does not have systemic properties. See Fact Sheet FC-24 for additional information.
	Dimethoate (dimethoate)	1.5 pt. 2.67 1 pt. 400 or 4EC 1 pt. (Dimate 4E)	21 21 21	
	Lorsban-4E* (chlorpyrifos)	1 - 2 pt.	28	
	Mystic Z* (lambda-cyhalothrin)	1.92 fl. oz. (suppression only)	45	
	Nufos* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Pilot* 4E (chlorpyrifos)	½ - 1 pt.	28	
	Proaxis* (gamma-cyhalothrin)	3.84 fl. oz. (suppression only)	45	
	Prolex* (gamma-cyhalothrin)	1.54 fl. oz. (suppression only)	45	
	Silencer* (lambda-cyhalothrin)	3.84 fl. oz. (suppression only)	45	
	Taiga Z* (lambda-cyhalothrin)	3.84 fl. oz. (suppression only)	30	
	Warhawk* (chlorpyrifos)	1 - 2 pts.	28	
	Warrior* (lambda-cyhalothrin)	3.84 fl. oz. (suppression only)	30	
	Yuma* 4E (chlorpyrifos)	1 - 2 pts.	28	

HANDLING OF PESTICIDES

Ohio's Restricted Pesticides

Under Ohio's Pesticide Use and Applicator Law, certain pesticides are restricted and can be obtained and used only by (1) pesticide applicators and public operators licensed by the Ohio Department of Agriculture and (2) individuals obtaining a user's permit from the county OSU Extension agent.

Copies of the Pesticide Use and Applicator Law are available from:

Ohio Department of Agriculture
Pesticide Regulation
Reynoldsburg, OH 43068

Certain restricted pesticides require that notification be given before their use. At least 24 hours before treatment, applicators must notify all occupants within 1,000 ft of the affected area. These occupants also must be notified of the safety precautions for humans and animals. Specific pesticide formulations may be labeled "Restricted Use Only" by the Ohio Environmental Protection Agency or the registrant company.

Toxicity of Pesticides

All pesticides are poisonous. However, some are more poisonous than others. The product label usually states the toxicity of the pesticide. For example, the "skull-and-crossbones" symbol always is placed on the label of highly toxic pesticides. Accordingly, those of medium toxicity carry less severe warning statements.

Pesticide toxicity is expressed in the terms of "oral LD50" and "dermal LD50". LD50 is the dosage of poison lethal to 50 percent of the test animals (usually rats or rabbits). The poison is administered in only one application, in "pure" form, for the given weight of the animal. LD50 is expressed in milligrams per kilogram of body weight (mg/kg); the lower the LD50 value, the greater the toxicity of the material.

Oral LD50 is the measure of toxicity of the pure pesticide when applied internally to the test animal. Dermal LD50 is the measure of toxicity of the pure pesticide when applied to the skin of the test animal. In general, oral application is more toxic than dermal.

Keep the following points in mind when interpreting LD50 values:

1. Hazards presented by any compound depend on how it is used rather than its toxicity.

2. Toxicity may vary with species, age, sex, nutritional state, and pesticide formulation, as well as method of application. LD50 values are determined with test animals, so the values must be applied with reservations to humans.

3. An LD50 value is a statistic that in itself provides limited information about the dosage fatal to a very small proportion of a large group of animals.

4. LD50 values usually are expressed in terms of single dosages only. Thus, these values provide no information about possible cumulative effects of a compound.

Despite shortcomings, the LD50 value provides a general measure of a compound's relative toxicity. Many publications are available that list the LD50 values of major pesticides. For additional information, contact your county agricultural Extension educator, or write:

Department of Entomology
The Ohio State University
1735 Neil Ave
Columbus, OH 43210-1293

Safety Tips

- Do not breathe spray mist or dust.
- Do not smoke when handling or applying pesticides.
- Do not get pesticides in eyes or on skin or clothing.
- When using specific pesticides, wear a respirator of the type approved by the USDA. Information on respirators is available from your local county Extension offices.
- Wear natural rubber gloves and freshly laundered protective clothing.
- Wash thoroughly if pesticide is spilled on skin or clothing.
- Bathe promptly after working with these pesticides, and wash clothing with soap and water before reuse.
- Do not take pesticides internally.
- Wash hands and face thoroughly before eating.
- Dispose of pesticides and containers according to label instructions.
- Keep pesticides out of reach of children, preferably under lock and key.
- Call a physician at once in all cases of suspected poisoning. Symptoms of organic phosphate poisoning include blurred vision, abdominal cramps and tightness in the chest. Atropine is antidotal for some organophosphorous insecticides.

Rinsing Empty Containers

Hazardous waste regulations that became effective November 19, 1980, address the disposal of empty pesticide containers. They require that containers that held waste pesticides or chemicals classified by EPA as hazardous waste be disposed of in designated hazardous waste sites, unless triple-rinsing and other requirements are met by the commercial pesticide applicator. Farmers or private applicators are exempt from these regulations, providing they follow instructions on the product label when disposing of waste pesticides and empty containers. Triple-rinsing each emptied container, using the rinse in the tank mix whenever possible, or disposing of the residue on the farm is required. Triple-rinsed containers may be disposed of at a sanitary landfill.

Protecting Bees

Honeybees and other useful insect pollinators gather nectar and pollen in all fields with blooming plants. Honeybees work corn plants, soybean plants, hay fields, and weeds in bloom. Insecticides sprayed to prevent corn rootworm beetle and Japanese beetle damage to silks in corn fields, potato leafhopper damage in hay fields, and insect defoliation damage in soybean fields during bloom have the greatest potential for killing honeybees with insecticides at this time.

Ohio regulations state in 901:5-11-02 (Trained Servicepersons, Safety and Restrictions) of the Ohio Administrative Code " *No person shall: (15) Apply or cause to be applied any pesticide that is required to carry a special warning on its label indicating that it is toxic to honey bees, over an area of one-half acre or more in which the crop-plant is in flower unless the owner or caretaker of any apiary located within one-half mile of the treatment site has been notified by the person no less than twenty-four hours in advance of the intended treatment; provided the apiary is registered and identified as required by section 909.02 of the Revised Code of Ohio, and that the apiary has been posted with the name and telephone number of the owner or responsible caretaker. (16) Apply pesticides which are hazardous to honey bees at times when pollinating insects are actively working in the target area, however, application of calyx sprays on fruits and other similar applications may be made.*" The names and addresses of registered apiaries are available at the Ohio Department of Agriculture at 1-614-728-6270 (Division of Plant Industry - Apiaries). Growers or applicators should contact this number as early as possible prior to a potential treatment to give them enough lead time to respond to your requests.

The following practices should also be observed:

- Do not spray a blooming crop unless absolutely necessary. Do not spray if there is danger of insecticide drift to nearby plants in bloom.
- Spray when bees are least active late in the evening (after 7:30 p.m.) or early in the morning (before 8 a.m.). Warm evening or mornings may extend these times.
- Quickly clean insecticide spills. Never allow sprays to puddle on the ground where bees may drink the liquid.
- Use an insecticide and insecticide formulation less toxic to bees whenever possible.

Aerial Applications

Aerial insecticide applications for control of insects can be effective, but proper distribution of the insecticides is essential. Final results are influenced by wind velocity, altitude, location of the field in relation to obstructions, atmospheric conditions, and many other factors.

The highly toxic nature of some compounds requires that aerial application of these materials be done only by and for persons willing to assume full responsibility for the consequences of drift onto nontarget objects and areas, including human beings, livestock, apiaries, susceptible crops, schools, homes, pastures, reservoirs, and streams. The control of drift to adjoining property is the responsibility of the applicator.

Applications should be made at the lowest height compatible with effective dispersal and aerial safety and only when atmospheric conditions will minimize drift of released material from the target field. Specific details and precautions are available from pesticide manufacturer labels and United States Department of Agriculture (USDA) Handbook No. 287, Aerial Application of Agricultural Chemicals.

Sprayer Delivery Rates

Pesticides must be applied at specified rates to provide the best control and protection and to stay within residue tolerances. Application equipment should be checked carefully for accurate delivery rates.

Toxicity of Pesticides

Common Name (Other Name)	Classifi- cation ¹	Technical LD ₅₀ ²		Formulation LD ₅₀ ²		Fish	Bees	Birds
		Oral	Dermal	Oral	Dermal			
Bifenthrin (Bifenthrin, Capture Discipline, Sniper)	R	54.5	> 2,000	262	> 2,000	VH	VL	L
Carbaryl (Carbaryl, Sevin)	NR	255	> 2,000	281	> 2,000	M	H	L
Carbofuran (Furadan)	R	7.34	> 2,000	8.29	> 2,000	H	H	VH
Chlorethoxyfos (Fortress)	R	2	13-19	44	> 2,000	H		H
Chlorpyrifos (Chlorpyrifos,Lorsban, Nufos, Saurus,Yuma)	SR	97	504	272	2,000	VH	H	H
Clothianidin (Poncho 250, Poncho 1250)	NR			> 2,000	> 4,000	H		
Cyfluthrin (Baythroid)	R	500	> 5,000	900	> 5,000	VH	H	L
Diazinon	NR	66	> 2,000	910	3,610	H	H	H
Diflubenzuron (Dimilin)	R			> 5,000	> 2,000	H	L	L
Dimethoate (Dimate, Dimethoate)	NR	290		714	2,966	H	H	H
Endosulfan (Endosulfan)	NR	70	359	160	359	VH	M	M
Esfenvalerate (Adjourn, Asana)	R	75	> 2,000	458	> 2,000	VH	H	L
Fipronil (Regent)	R			336	382	H		H
Gamma-cyhalothrin (Prolex, Proaxis)	R	> 50	>1,500	2,250	> 5000	VH	H	L
Lamda-cyhalothrin (Mystic Z, Silencer, Taiga, Warrior)	R	56		61-141	> 2,000	VH	H	L
Imidacloprid (Concur, Gaucho, Latitude)	NR			> 2,000	> 4,000	VH		VH
Malathion (Malathion)	NR	1,375	4,100	2,800	4,100	H	H	M
Methomyl (Lannate)	R	17	> 5,000	83-160	> 5,880	M	H	H
Methyl Parathion (Pennacp-M)	R	4.5		270	> 5,450	M	H	H
Permethrin (Ambush,Arctic,Permethrin, Pounce)	R	430-4,300		4,000	4,000	VH	H	L
Phosmet (Imidan)	NR	113	> 3,160	132-190	> 4,640	H	H	L
Spinosad (Tracer)	NR	> 5,000	> 5,000	> 5,000	> 5,000	VH	H	H
Tebupirimphos & Cyfluthrin (Aztec, Defcon)	R	2	9-31		> 2,000	VH	H	L
Tefluthrin (Force)	R	22	177	1,531	> 2,000	VH	H	L
Terbufos (Counter)	R	2	1	29	182	VH	M	H
Thiamethoxam (Cruiser)	NR			> 5,523	> 2,000	L	H	L
Thiodicarb (Larvin)	NR	66	> 2,000	129	> 2,000	M	M	L
Zeta-cypermethrin (Mustang MAX)	R	106	> 2,000	234	> 2,000	VH	VL	L

1) Classification: NR, not restricted; R, restricted; SR, some restricted.

2) Source: Tomlin, C. 1994. The Pesticide Manual, Tenth Edition. Bath Press, Bath UK. and US EPA. 1988. Pesticide Fact Handbook. Noyes Data Corporation, Park Ridge, New Jersey.

3) Source: 1993, MSDS Reference for Crop Protection Chemicals, John Wiley & Sons, Inc., New York, N.Y.

4) Toxicity: L, low; VL, very low; M, moderate; H, high; VH, very high.