

1

INSECT PEST MANAGEMENT FOR FIELD AND FORAGE CROPS

This chapter focuses on the use of insecticides for control of insects that attack field and forage crops in Illinois. Although effective, practical, nonchemical control measures are strongly encouraged, insecticides often are the only efficient tool for responding to insect pest outbreaks. We recommend that insecticides be used only to supplement a completely integrated pest management (IPM) program that includes the use of multiple control tactics.

The guidelines provided in this chapter are based upon research results from the University of Illinois, College of Agricultural, Consumer, and Environmental Sciences; other land-grant universities; and the U.S. Department of Agriculture. The information in the handbook is revised annually and is intended for use during the current calendar year only.

The insecticides included in this chapter have been registered by the U.S. Environmental Protection Agency (USEPA). However, not all products registered for control of crop insect pests are included. *Effective insect-control products that do not present an undue hazard to the user or the environment are suggested whenever possible.*

When this publication was prepared, only currently registered products were included. New registrations and changes in registration, labels, and recommendations will be announced through appropriate media sources.

Some generic insecticides are formulated or sold by numerous pesticide formulators and distributors. However, names and formulations of these generic insecticides are diverse, so their inclusion in this chapter is limited. The most commonly available trade name and formulation of each insecticide are included in this chapter. This practice does not represent discrimination against other trade names and formulations of

the same product. Producers are advised to discuss the availability of generic products with an agricultural supplier.

Insecticides suggested for use in field and forage crops are listed in Tables 1 to 7. Use rates and placement and timing of applications, as well as supportive comments, also are provided in the tables.

Directions for use, precautionary statements, and environmental and health hazards associated with insecticides have become increasingly complex and detailed, and such information changes frequently. Consequently, we have not provided this type of information in this chapter. However, it is important that you obtain the most current information about insecticides either from the manufacturers or from comprehensive publications. The *Crop Protection Handbook*, published by Meister Media Worldwide, Willoughby, Ohio, is an excellent reference for detailed and up-to-date information about all farm chemicals, including insecticides. The *Crop Protection Reference*, published by Vane Publishing Corporation, Lenexa, Kansas, is another comprehensive publication that contains current labels for most registered pesticides. Information from this publication is also available on the Web at <http://www.greenbook.net>. Labels of pesticides available from many companies also can be accessed from the home page of Crop Data Management Systems, Inc., <http://www.cdms.net>.

Transgenic corn hybrids modified by insertion of genes from the soil bacterium *Bacillus thuringiensis* that express crystalline proteins toxic to specific insects were commercialized for the first time in the mid-1990s. These corn hybrids are commonly referred to as Bt corn hybrids. The U.S. EPA has registered several products for control of a number of important insect pests of corn, including corn rootworms and

The information in this chapter is provided for educational purposes only. Product trade names have been used for clarity, but reference to trade names does not imply endorsement by the University of Illinois; discrimination is not intended against any product. The reader is urged to exercise caution in making purchases or evaluating product information.

Label registrations can change at any time. Thus the recommendations in this chapter may become invalid. The user must read carefully the entire, most recent label and follow all directions and restrictions. Purchase only enough pesticide for the current growing season.

several caterpillars—black cutworm, corn earworm, European corn borer, fall armyworm, southwestern corn borer, and western bean cutworm. Currently, there are three “families” of Bt corn products—Agrisure (Syngenta Seeds Inc.), Herculex (Dow AgroSciences LLC and Pioneer Hi-Bred International, Inc.), and YieldGard (Monsanto Company). All three families include transgenic Bt corn hybrids that control corn rootworms and caterpillars, either individually or in combination (that is, hybrids with “stacked” traits).

Because so many corn hybrids with transgenic traits (including genetic traits for herbicide tolerance or resistance) will be available for planting in 2008, a comprehensive list of these products is not included in this chapter. Individuals interested in learning more about transgenic corn hybrids are encouraged to contact one or more of the aforementioned seed companies. We strongly encourage corn growers who plant transgenic Bt corn hybrids for management of insect pests to comply with the insect-resistance-management (IRM) guidelines associated with all Bt corn products. In general, the IRM requirements, which are mandated by the U.S. EPA, include, but are not limited to, planting a non-Bt corn refuge on a minimum of 20 percent of the corn acres on a farm. For a practical and thorough explanation of the IRM requirements associated with transgenic Bt corn, visit the National Corn Growers Association (NCGA) Web site at <http://www.ncga.com>.

ADDITIONAL RESOURCES FOR INFORMATION ABOUT INSECT PESTS OF FIELD AND FORAGE CROPS

The information provided in this chapter is intended primarily for individuals who make insect-control decisions during the growing season, which usually means application of an insecticide after scouting indicates the density of an insect has reached or exceeded an economic threshold. The guidelines in this chapter are complemented by many other resources that provide more detailed information about insects and their management.

In past volumes of this handbook, we provided considerable information about key insect pests of corn and soybean—biology, scouting procedures, management guidelines. However, many of these aspects of insect management are dynamic, often changing within a given growing season. This type of information is more suitable for dissemination over the Internet, allowing for revisions and updates. You can access this information from the University of Illinois IPM Web site, <http://www.ipm.uiuc.edu>. During the growing season, time-sensitive information about pest man-

agement and crop development is published weekly or more frequently in *the Bulletin on the Web*, <http://www.ipm.uiuc.edu/bulletin>.

Descriptions and life cycles of the major pests, scouting procedures, and nonchemical control tactics also are important for development of a completely integrated insect management program. More detailed discussions of scouting procedures and economic thresholds are published in the *Field Crop Scouting Manual* (University of Illinois) and in *Corn Insect Pests—A Diagnostic Guide* (University of Missouri and University of Illinois). Both publications include color photographs and discussions of life cycles. The *Field Crop Scouting Manual* is available in both print and CD format, and *Corn Insect Pests—A Diagnostic Guide* can be viewed on the Web at <http://www.ipm.uiuc.edu/pubs/cip.pdf>. More information about nonchemical management tactics and detailed information about the key insect pests of alfalfa, corn, soybean, and wheat are discussed in the *Field Crop Scouting Manual*.

Information about University of Illinois publications is available from your nearest Extension office or from Information Technology and Communication Services, Marketing and Distribution, 1917 S. Wright St., Champaign, IL 61820; (217)333-2007 or (800)345-6087; or online at <https://PubsPlus.uiuc.edu/>.

RECOMMENDED WEB RESOURCES

The Internet provides access to a multitude of informational sites that focus on management of pests. Following are a few relevant Web sites that provide very useful and timely information:

<http://www.ipm.uiuc.edu/>
University of Illinois IPM site

<http://www.ipm.uiuc.edu/bulletin>
the Bulletin. Pest management information throughout the growing season.

<http://www.greenbook.net>
Excellent site for current pesticide labels and material safety data sheets

<http://www.cdms.net>
An excellent index of chemical companies involved in agriculture, with links to companies' Web sites.

Land-grant universities in the north-central states issue weekly newsletters during the growing season with some focus on insect pests of field and forage crops, as well as on plant diseases and weeds. Following are the Web addresses for the newsletters published in other north-central states.

Indiana (Purdue University):
http://www.entm/purdue.edu/entomology/ext/ext_newsletters.html

Iowa State University:
<http://www.ipm.iastate.edu/ipm/icm>

Kansas State University:
http://www.oznet.ksu.edu/entomology/extension/KIN/KIN_current.htm

Kentucky, University of:
<http://www.uky.edu/Ag/kpn/kpnhome.htm>

Michigan State University:
<http://www.ipm.msu.edu/field-cat.htm>

Minnesota, University of:
<http://www.extension.umn.edu/CropEnews>

Missouri, University of:
<http://ipm.missouri.edu/ipcm>

Nebraska, University of:
<http://cropwatch.unl.edu>

North Dakota State University:
<http://www.ag.ndsu.nodak.edu/aginfo/entomology/ndsucpr>

Ohio State University:
<http://corn.osu.edu>

Wisconsin, University of:
<http://ipcm.wisc.edu/wcm>

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Table 1. Insecticides for field corn

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
Armyworm	*Ambush 25W	6.4 to 12.8 oz	Broadcast	<i>Seedling corn:</i> Control may be justified when 25% of the plants are being damaged. <i>After pollen shed:</i> Control may be justified when armyworms are eating leaves above ear level.
	*Asana XL	5.8 to 9.6 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	4 to 10.3 oz		
	Intrepid 2F	4 to 8 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	3.2 to 4 oz		
	*PennCap-M	2 to 3 pt		
	*Pounce 3.2EC	4 to 8 oz		
	Tracer	1 to 3 oz		
*Warrior	2.56 to 3.84 oz			
Billbugs	*Cobalt	38 to 42 oz	Spray at base of plant or over row	Apply as a postemergence rescue treatment. Use only ground equipment, and apply 20 to 40 gallons of finished spray per acre.
	*Lorsban-4E	2 pt		
Chinch bug	*Asana XL	5.8 to 9.6 oz	Spray at base of plant	Treat border rows at the start of migration from small grains. Use only ground equipment.
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	19 to 38 oz		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	3.2 to 4 oz		
	*Proaxis	3.84 oz		
	Sevin XLR Plus	1 to 2 qt		
*Warrior	3.84 oz			
Corn earworm	*Ambush 25W	6.4 to 12.8 oz	Overall spray or directed toward ear zone	Treatment is usually justified only in seed-corn fields. Treatments are rarely effective for the control of earworms after worms enter ear tips.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	19 to 38 oz		
	*Hero	4 to 10.3 oz		
	*Mustang Max	2.72 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	Tracer	2 to 3 oz		
*Warrior	1.92 to 3.2 oz			
Corn leaf aphid	*Asana XL	5.8 to 9.6 oz	Broadcast	Apply during late whorl to early tassel when 50% of plants have light to moderate infestations (50 to 400 aphids per plant) and plants are under drought stress. If soil moisture is adequate, treatment may be warranted if there are more than 400 aphids per plant. Do not apply dimethoate to corn during the pollen-shed period.
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	Dimethoate 4EC	2/3 to 1 pt		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
*PennCap-M	2 to 3 pt			

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
Corn rootworm adults	*Ambush 25W	6.4 to 12.8 oz	Overall spray or directed toward ear zone	To protect pollination, treat if there are 5 or more beetles per plant, pollination is not complete, and silk clipping is observed.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.72 to 4 oz		
	*PennCap-M	1 to 2 pt		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
Sevin XLR Plus	1 to 2 qt			
*Warrior	2.56 to 3.84 oz			
Corn rootworm larvae	*Aztec 2.1%G	6.7 oz/1,000 ft row	Band, ^c furrow	At planting. To minimize potential adverse effects to wildlife, incorporate insecticide granules or apply the insect- icide in-furrow (if labeled) and shut off insecticide units in turn rows.
	*Aztec 4.67G ^d	3 oz/1,000 ft row	Band, ^c furrow	
	*Capture 2EC	0.3 oz/1,000 ft row	Band ^c	
	*Counter15G ^d	8 oz/1,000 ft row	Band, ^c furrow	
	*Force 3G ^d	4 to 5 oz/1,000 ft row	Band, ^c furrow	
	*Force CS	0.46 to 0.57 oz/1,000 ft row	Band, ^c furrow	
	*Fortress 2.5G	7.5 to 9 oz/1,000 ft row	Furrow	
	*Fortress 5G ^d	3 to 4.5 oz/1,000 ft row	Furrow	
	*Lorsban-4E	2.4 fl oz/1,000 ft row	Band ^b	
	Lorsban 15G ^d	8 oz/1,000 ft row	Band ^b	
	Poncho 1250	See product label.	On seed	
Cutworms ^e	*Ambush 25W	6.4 to 12.8 oz	Broadcast	Apply as a postemergence rescue treat- ment when 3 to 5% or more of the plants are cut and larvae are present.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	0.8 to 1.6 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	2.6 to 6.1 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	1.28 to 2.8 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	*Warrior	1.92 to 3.2 oz		
European corn borer, first gen- eration (continues)	*Ambush 25W	6.4 to 12.8 oz	Broadcast	Use "Management Worksheet for First- Generation European Corn Borer" to aid in decision making (http://www. ipm.uiuc.edu/decision/corn_ borer_first.html).
	<i>Bacillus thuringiensis</i>	See product label.	See product label.	
	*Baythroid XL	1.6 to 2.8 oz	Broadcast	
	*Capture 2EC	2.1 to 6.4 oz	Broadcast	
	*Cobalt	26 to 38 oz	Broadcast	
	*Hero	4 to 10.3 oz	Broadcast	
	Intrepid 2F	4 to 8 oz	Broadcast	
*Lorsban-4E	1½ to 2 pt	Broadcast		
Lorsban 15G	3.5 to 8 oz/1,000 ft row	Over whorls		

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
European corn borer, first genera- tion (cont.)	Lorsban 15G	5 to 6.5 lb	Broadcast	
	*Mustang Max	2.72 to 4 oz	Broadcast	
	*Pennacap-M	2 pt	Over whorls	
	*Pennacap-M	3 to 4 pt	Broadcast	
	*Pounce 1.5G	5 to 10 lb	Over whorls	
	*Pounce 1.5G	6.7 to 13.3 lb	Broadcast	
	*Pounce 3.2EC	4 to 8 oz	Broadcast	
	*Proaxis	2.56 to 3.84 oz	Broadcast	
	Tracer	1 to 3 oz	Broadcast	
*Warrior	2.56 to 3.84 oz	Broadcast		
European corn borer, second generation	*Ambush 25W	6.4 to 12.8 oz	Broadcast	Use "Management Worksheet for Second-Generation European Corn Borer" to aid in decision making (http://www.ipm.uiuc.edu/ decision/corn_borer_second.html).
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	26 to 38 oz		
	*Hero	4 to 10.3 oz		
	Intrepid 2F	4 to 8 oz		
	*Lorsban-4E	1½ to 2 pt		
	Lorsban 15G	6.5 lb		
	*Mustang Max	2.72 to 4 oz		
	*Pennacap-M	2 to 4 pt		
	*Pounce 1.5G	6.7 to 13.3 lb		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	Tracer	1 to 3 oz		
*Warrior	2.56 to 3.84 oz			
Fall army- worm	*Capture 2EC	2.1 to 6.4 oz	Broadcast	Treat when 75% of plants have whorl damage and if worms are present. Ground sprays directed over the row are more effective than broadcast sprays. Treatments to control worms in ear tips are not effective.
	*Cobalt	13 to 26 oz		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	3.2 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	Tracer	1 to 3 oz		
	*Warrior	2.56 to 3.84 oz		
Flea beetles	*Ambush 25W	6.4 to 12.8 oz	Over row as spray	Treat when leaves on seedling plants are severely damaged and plants are being killed. For Lorsban, use only ground equipment and apply 20 to 40 gallons of finished spray per acre.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	0.8 to 1.6 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	2.6 to 6.1 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.72 to 4 oz		
	*Pennacap-M	2 to 3 pt		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	1 to 2 qt		
*Warrior	2.56 to 3.84 oz			

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
Grass- hoppers	*Asana XL	5.8 to 9.6 oz	Broadcast	Treatment may be warranted when there are 7 or more grasshoppers per square yard. After pollen shed, control may be justified when grasshoppers are feeding on leaves above ear level. Do not apply dimethoate to corn during the pollen-shed period.
	*Baythroid XL	2.1 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC	1 pt		
	*Hero	2.6 to 6.1 oz		
	*Lorsban-4E	½ to 1 pt		
	*Mustang Max	2.72 to 4 oz		
	*PennCap-M	2 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
Sevin XLR Plus	½ to 1½ qt			
*Warrior	2.56 to 3.84 oz			
Hop vine borer	*Cobalt	19 to 38 oz	Broadcast	Apply postemergence sprays when young larvae are moving from weed hosts into corn.
	*Hero	2.6 to 6.1 oz		
	*Mustang Max	2.72 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
*Warrior	2.56 to 3.84 oz			
Japanese beetle (adults)	*Asana XL	5.8 to 9.6 oz	Broadcast	Treat during tasseling and silking if there are 3 or more beetles per ear and pollination is not complete.
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	38 to 42 oz		
	*Hero	4 to 10.3 oz		
	*Mustang Max	2.72 to 4 oz		
	*PennCap-M	2 to 4 pt		
	*Proaxis	2.56 to 3.84 oz		
Sevin XLR Plus	1 to 2 qt			
*Warrior	2.56 to 3.84 oz			
Picnic, sap beetles	*Capture 2EC	2.1 to 6.4 oz	Broadcast	Treatment is justified only in seed-corn fields when beetles are causing significant injury to ear tips.
	*Cobalt	19 to 38 oz		
	*Hero	4 to 10.3 oz		
	*Mustang Max	2.72 to 4 oz		
	*PennCap-M	2 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	1 to 2 qt		
*Warrior	2.56 to 3.84 oz			
Seedcorn maggot	Cruiser	See product label.	On seed	Use formulations that are prepared as seed treaters, or select hybrids treated with Cruiser or Poncho. Seed treatments should be considered for fields that do not receive a soil insecticide at planting. See label for proper disposal of treated seeds.
	diazinon + lindane	See product label.	On seed	
	imidacloprid	See product label.	On seed	
	permethrin	See product label.	On seed	
	Poncho	See product label.	On seed	

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
Southern corn leaf beetle	*Baythroid XL	1.6 to 2.8 oz	Broadcast	Apply as a postemergence rescue treatment.
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.72 to 4 oz		
	*Warrior	3.84 oz		
Southwestern corn borer, second gen- eration	*Ambush 25W	6.4 to 12.8 oz	Broadcast	Treatment may be warranted when 20 to 25% of the plants are infested with eggs or newly hatched larvae.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	19 to 38 oz		
	*Hero	4 to 10.3 oz		
	Intrepid 2F	4 to 8 oz		
	*Lorsban-4E	1½ to 2 pt		
	Lorsban 15G	6.5 lb		
	*Mustang Max	2.72 to 4 oz		
	*Penncap-M	2 to 4 pt		
	*Pounce 1.5G	6.7 to 13.3 lb		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
Tracer	2 to 3 oz			
*Warrior	2.56 to 3.84 oz			
Spider mites	*Capture 2EC	5.12 to 6.4 oz	Broadcast	Begin control if the majority of plants are infested with mites severely enough to cause some yellowing or browning of the lower leaves before dent stage. Do not apply dimethoate to corn during the pollen-shed period.
	Dimethoate 4EC	⅔ to 1 pt		
	*Hero	10.3 oz		
Stalk borer	*Ambush 25W	6.4 to 12.8 oz	Broadcast	Apply postemergence sprays when young larvae are moving from weed hosts to corn. See labels for more specific instructions about effective control.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	38 to 42 oz		
	*Hero	2.6 to 6.1 oz		
	*Lorsban-4E	2 pt		
	*Mustang Max	2.72 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	*Warrior	2.56 to 3.84 oz		

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
Stink bugs	*Baythroid XL	1.6 to 2.8 oz	Broadcast	Apply as a postemergence rescue treatment.
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	38 to 42 oz		
	*Hero	4 to 10.3 oz		
	*Mustang Max	2.72 to 4 oz		
	*Pennacap-M	1 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
*Warrior	2.56 to 3.84 oz			
Webworms	*Baythroid XL	1.6 to 2.8 oz	Broadcast	For Lorsban, shallow incorporation using a rotary hoe or other suitable equipment immediately before or soon after treatment is necessary.
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	4 to 10.3 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.72 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
*Warrior	2.56 to 3.84 oz			
Western bean cutworm	*Asana XL	2.9 to 5.8 oz	Broadcast	Treatment may be warranted when 8% of plants have egg masses and/or small larvae.
	*Baythroid XL	1.6 to 2.8 oz		
	*Capture 2EC	2.1 to 6.4 oz		
	*Cobalt	13 to 26 oz		
	*Hero	2.6 to 6.1 oz		
	Intrepid 2F	4 to 8 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	1.76 to 4 oz		
	*Pennacap-M	2 to 4 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.20 oz		
	Sevin XLR Plus	2 qt		
Tracer	2 to 3 oz			
*Warrior	1.92 to 3.20 oz			
White grubs (continues)	*Aztec 2.1%G	6.7 oz/1,000 ft row	Band, ^c furrow	Treat if crop history and previous crop losses can be directly linked to a repeated history of grub problems. To minimize potential adverse effects to wildlife, incorporate insecticide granules or apply the insecticide in-furrow (if labeled) and shut off insecticide units in turn rows.
	*Aztec 4.67G ^d	3 oz/1,000 ft row	Band, ^c furrow	
	*Capture 2EC	0.15 to 0.3 oz/1,000 ft row	Band ^c	
	*Capture 2EC	3 to 4 oz	BC-PPI ^f	
	*Counter 15G ^d	8 oz/1,000 ft row	Band, ^c furrow	
	*Force 3G ^d	4 to 5 oz/1,000 ft row	Furrow	
	*Force CS	0.46 to 0.57 oz/1,000 ft row	Furrow	
	*Fortress 2.5G	6 to 7.5 oz/1,000 ft row	Furrow	
	*Fortress 5G ^d	3 to 3.75 oz/1,000 ft row	Furrow	
	*Lorsban-4E	4 pt	BC-PPI ^f	
	Lorsban 15G ^d	8 oz/1,000 ft row	Band, ^c furrow	

Table 1. Insecticides for field corn (cont.)

Insect	Insecticide ^a	Amount of product ^a per acre or per 1,000 ft row (where indi- cated)	Placement	Timing of application, comments ^b
White grubs (cont.)	*Proaxis	0.66 oz/1,000 ft row	Band, ^c furrow	
	*Regent 4SC	0.24 oz/1,000 ft row	Furrow	
	*Warrior	0.66 oz/1,000 ft row	Band, ^c furrow	
	Cruiser Poncho	See product label. See product label.	On seed On seed	Select hybrids treated with Cruiser or Poncho.
Wireworms	*Aztec 2.1%G	6.7 oz/1,000 ft row	Band, ^c furrow	Treat at planting if crop history or bait stations or both indicate a potential for wireworm damage. To minimize potential adverse effects to wildlife, incorporate insecticide granules or apply the insecticide in-furrow (if labeled) and shut off insecticide units in turn rows.
	*Aztec 4.67G ^d	3 oz/1,000 ft row	Band, ^c furrow	
	*Capture 2EC	0.15 to 0.3 oz/1,000 ft row	Band ^c	
	*Capture 2EC	3 to 4 oz	BC-PPI ^f	
	*Counter 15G ^d	8 oz/1,000 ft row	Band, ^c furrow	
	*Force 3G ^d	4 to 5 oz/1,000 ft row	Furrow	
	*Force CS	0.46 to 0.57 oz/1,000 ft row	Furrow	
	*Fortress 2.5G	6 to 7.5 oz/1,000 ft row	Furrow	
	*Fortress 5G ^d	3 to 3.75 oz/1,000 ft row	Furrow	
	*Lorsban-4E	4 pt	BC-PPI ^f	
	Lorsban 15G	8 oz/1,000 ft row	Furrow	
	*Pounce 1.5G	8 oz/1,000 ft row	Furrow	
	*Pounce 3.2EC	0.3 oz/1,000 ft row	Furrow	
	*Regent 4SC	0.24 oz/1,000 ft row	Furrow	
	*Warrior	0.66 oz/1,000 ft row	Band, ^c furrow	
		Cruiser diazinon + lindane	See product label. See product label.	
	imidacloprid	See product label.	On seed	
	permethrin	See product label.	On seed	
	Poncho	See product label.	On seed	

^aUse restricted to certified applicators.

^bThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^cThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

^dBand = band over the row, or T-band over an open seed furrow. Refer to product label for specific information and band width.

^eAztec 4.67G and Fortress 5G are available only in the SmartBox closed handling and application system. Counter 15G, Force 3G, and Lorsban 15G also are available in the SmartBox closed handling and application system.

^fWe recommend that cutworms be controlled with insecticides only if densities of cutworms exceed established economic thresholds.

^gBC-PPI = broadcast-preplant incorporated.

Table 2. Insecticides for soybean

Spraying blossoming soybean can be extremely hazardous to bees. Coordinate with local beekeepers before applying sprays. Beekeepers' names and colony locations may be obtained from your local Extension office.

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Bean leaf beetle	*Ambush 25W	3.2 to 6.4 oz	On foliage	<i>Seedlings:</i> In fields with a history of bean pod mottle virus transmitted by bean leaf beetles, preventive treatments may be justified. The seed treatments Cruiser and Gaucho control bean leaf beetles early in the season. In areas without a history of bean pod mottle virus, densities of 16 beetles per foot of row in the early seedling state or 39 per foot of row at stage V2+ are necessary for economic damage. <i>Before bloom:</i> Treat when defoliation reaches 30% and there are 5 or more beetles per foot of row. <i>Bloom to pod fill:</i> Treat when defoliation reaches 20%. <i>Seed maturation:</i> Treat when 5 to 10% of the pods are damaged, the leaves are green, and there are 10 or more beetles per foot of row.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	0.8 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	Dimethoate 4EC	1 pt		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	Orthene 90S	0.83 to 1.1 lb		
	*PennCap-M	2 to 3 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
Sevin XLR Plus	½ to 1 qt			
*Warrior	1.92 to 3.2 oz			
Blister beetles	*Baythroid XL	1.6 to 2.8 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Cobalt	13 to 26 oz		
	*Mustang Max	2.8 to 4 oz		
	*Proaxis	3.2 to 3.84 oz		
	Sevin XLR Plus	½ to 1 qt		
	*Warrior	3.2 to 3.84 oz		
Corn ear-worm	*Ambush 25W	6.4 to 12.8 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill, or when 5 to 10% of the pods are damaged.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	*Mustang Max	2.8 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	Tracer	1.5 to 2 oz		
	*Warrior	1.92 to 3.2 oz		
Cutworms	*Asana XL	5.8 to 9.6 oz	Broadcast	Scout as plants are emerging. Treat if 20% of plants are cut, stand has gaps of 1 foot or more, and cutworms are present.
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	13 to 26 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	1.28 to 4 oz		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
	*Warrior	1.92 to 3.2 oz		

Table 2. Insecticides for soybean (cont.)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Grasshoppers	*Asana XL	5.8 to 9.6 oz	On foliage	Treat when migration into fields begins and defoliation or pod feeding reaches economic levels; when defoliation reaches 30% before bloom and 20% between bloom and pod fill; when 5 to 10% of the pods are damaged.
	*Baythroid XL	2 to 2.8 oz		
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC	1 pt		
	*Lorsban-4E	½ to 1 pt		
	*Mustang Max	3.2 to 4 oz		
	Orthene 90S	0.28 to 0.56 lb		
	*PennCap-M	2 to 3 pt		
	*Proaxis	3.2 to 3.84 oz		
Sevin XLR Plus	½ to 1½ qt			
*Warrior	3.2 to 3.84 oz			
Green clover-worm	*Ambush 25W	3.2 to 6.4 oz	On foliage	Treat when defoliation occurs during blooming, pod set, and pod fill. Usually requires 12 or more half-grown worms per foot of row and 20% defoliation to justify treatment.
	*Asana XL	2.9 to 5.8 oz		
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	7 to 13 oz		
	*Lorsban-4E	½ to 1 pt		
	*Mustang Max	2.8 to 4 oz		
	Orthene 90S	0.83 to 1.1 lb		
	*PennCap-M	2 to 3 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	½ to 1 qt		
Tracer	1 to 2 oz			
*Warrior	1.92 to 3.2 oz			
Japanese beetle adults	*Ambush 25W	6.4 to 12.8 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Asana XL	5.8 to 9.6 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	*Mustang Max	2.8 to 4 oz		
	*PennCap-M	2 to 3 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	3.2 to 3.84 oz		
	Sevin XLR Plus	½ to 1 qt		
*Warrior	3.2 to 3.84 oz			
Mexican bean beetle	*Ambush 25W	3.2 to 6.4 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Asana XL	2.9 to 5.8 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	Dimethoate 4EC	1 pt		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	Orthene 90S	0.83 to 1.1 lb		
	*PennCap-M	2 to 3 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
Sevin XLR Plus	½ to 1 qt			
*Warrior	1.92 to 3.2 oz			

Table 2. Insecticides for soybean (cont.)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Potato leafhopper	*Ambush 25W	3.2 to 6.4 oz	On foliage	Treat when leafhoppers are numerous and the edges of the leaves appear burned. For susceptible varieties, control in blooming soybeans may be warranted when 6 or more leafhoppers are found per plant. During early seed formation, control may be warranted if 13 or more leafhoppers are found per plant.
	*Asana XL	2.9 to 5.8 oz		
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	19 to 38 oz		
	Dimethoate 4EC	1 pt		
	*Mustang Max	2.8 to 4 oz		
	Orthene 90S	0.56 to 1.1 lb		
	*Pennacp-M	2 to 3 pt		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
Sevin XLR Plus	1 qt			
*Warrior	1.92 to 3.2 oz			
Seedcorn maggot	Cruiser	See product label.	On seed	Use formulations that are prepared as seed treaters, or select varieties treated with Cruiser or Gaucho. See label for proper disposal of treated seeds.
	Gaucho	See product label.	On seed	
	permethrin	See product label.	On seed	
Soybean aphid	*Asana XL	5.8 to 9.6 oz	On foliage	Treatment may be warranted if there are 250 or more aphids per plant at the R1 through R5 stages of development, 80% of the plants are infested, and natural enemies are not suppressing the aphid population.
	*Baythroid XL	2 to 2.8 oz		
	*Cobalt	13 to 26 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	Orthene 90S	0.83 to 1.1 lb		
	*Pennacp-M	1 to 3 pt		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
*Warrior	1.92 to 3.2 oz			
Soybean looper	*Ambush 25W	6.4 to 12.8 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Mustang Max	3.2 to 4 oz		
	*Pennacp-M	2 to 3 pt		
	*Pounce 3.2EC	4 to 8 oz		
	Tracer	1 to 2 oz		
Spider mites	Dimethoate 4EC	1 pt	On foliage	Treat when 20 to 25% discoloration is noted before pod set, or 10 to 15% discoloration after pod set.
	*Lorsban-4E	1 to 2 pt		
Stink bugs	*Asana XL	5.8 to 9.6 oz	On foliage	Treat when adult bugs or large nymphs reach 1 per foot of row during pod fill.
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	*Lorsban-4E	2 pt		
	*Mustang Max	3.2 to 4 oz		
	Orthene 90S	0.56 to 1.1 lb		
	*Pennacp-M	1 to 3 pt		
	*Proaxis	3.2 to 3.84 oz		
	Sevin XLR Plus	1 to 1½ qt		
	*Warrior	3.2 to 3.84 oz		

Table 2. Insecticides for soybean (cont.)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Thistle caterpillar	*Cobalt	13 to 26 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Mustang Max	1.28 to 4 oz		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	1½ qt		
*Warrior	1.92 to 3.2 oz			
Thrips	*Baythroid XL	0.8 to 1.6 oz	On foliage	Treat if seedlings are being seriously damaged and some plants are being killed.
	*Cobalt	19 to 38 oz		
	Orthene 90S	0.28 to 0.56 lb		
	*PennCap-M	2 to 3 pt		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	1 qt		
*Warrior	1.92 to 3.2 oz			
Woollybear caterpillars	*Ambush 25W	3.2 to 6.4 oz	On foliage	Treat when defoliation reaches 30% before bloom and 20% between bloom and pod fill.
	*Asana XL	2.9 to 5.8 oz		
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	13 to 26 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	*Pounce 3.2EC	2 to 4 oz		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	1½ qt		
	Tracer	1.5 to 2 oz		
*Warrior	1.92 to 3.2 oz			

^aUse restricted to certified applicators.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

Table 3. Insecticides for alfalfa

Spraying blossoming alfalfa can be extremely hazardous to bees. Coordinate with local beekeepers before applying sprays. Beekeepers' names and colony locations may be obtained from your local Extension office.

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Alfalfa blotch leafminer	*Baythroid XL	2 to 2.8 oz	On foliage	Specific economic thresholds have not been established in the Midwest. Treatment may be warranted if injury is severe.
	*Cobalt	19 to 38 oz		
	*Lorsban-4E	1 to 2 pt		
	*Proaxis	3.84 oz		
	Sevin XLR Plus	1 to 1½ qt		
	*Warrior	3.84 oz		
Alfalfa caterpillar	*Ambush 25W	3.2 to 12.8 oz	On foliage	Treat when damage to foliage is obvious and there are at least 10 nonparasitized larvae per sweep.
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	13 to 26 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	2 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
Sevin XLR Plus	1 qt			
	*Warrior	1.92 to 3.2 oz		
Alfalfa weevil	*Ambush 25W	12.8 oz	On foliage	When 25 to 50% of tips are being skeletonized and there are 3 or more larvae per stem, treat immediately. Do not apply sprays during bloom. Instead, cut and remove the hay. Control also may be warranted after a cutting when larvae and adults are feeding on more than 50% of the crowns and regrowth is prevented for 3 to 6 days.
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	Imidan 70W	1 to 1½ lb		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	*Warrior	2.56 to 3.84 oz		
Blister beetles	*Cobalt	19 to 38 oz	On foliage	Although blister beetles rarely cause economic damage to alfalfa, their presence in hay could injure horses if the horses ingest the beetles.
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	½ to 1 qt		
	*Warrior	2.56 to 3.84 oz		
Cowpea aphid	*Cobalt	19 to 38 oz	On foliage, stems	No economic thresholds have been established for the cowpea aphid in alfalfa. The thresholds for the blue alfalfa aphid may suffice: plant height < 10 inches, 10 to 12 aphids per stem; plant height 10 inches or taller, 40 to 50 aphids per stem.
	Dimethoate 4EC	½ to 1 pt		
	*Lorsban-4E	1 to 2 pt		
	*Proaxis	2.56 to 3.84 oz		
	*Warrior	2.56 to 3.84 oz		
Cutworms	*Ambush 25W	3.2 to 12.8 oz	On seedlings	Control may be warranted when larvae reduce the stand of a new seeding or prevent regrowth after harvest.
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	13 to 26 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	2 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	*Warrior	1.92 to 3.2 oz		

Table 3. Insecticides for alfalfa (cont.)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Fall armyworm	*Ambush 25W	3.2 to 12.8 oz	On seedlings	Control may be warranted when larvae reduce the stand of a new seeding, when there are 2 or more larvae per sweep, or when there are 1 to 2 half-grown larvae per square foot.
	*Cobalt	19 to 38 oz		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	*Pounce 3.2EC	2 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	*Warrior	2.56 to 3.84 oz		
Grasshoppers	*Baythroid XL	2 to 2.8 oz	On foliage	Treat when grasshoppers are small, before damage is severe, and when there are 15 to 20 per square yard.
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC	½ to 1 pt		
	Imidan 70W	1 to 1½ lb		
	*Lorsban-4E	½ to 1 pt		
	*Mustang Max	2.8 to 4 oz		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	½ to 1½ qt		
*Warrior	2.56 to 3.84 oz			
Meadow spittlebug	*Ambush 25W	6.4 to 12.8 oz	On foliage	Treat when spittle masses are found and nymphs average more than 1 per stem.
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	19 to 38 oz		
	Imidan 70W	1 to 1½ lb		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
*Warrior	2.56 to 3.84 oz			
Plant bugs	*Ambush 25W	12.8 oz	On foliage	Treat when tip damage is obvious and nymphs and adults average 3 per sweep on alfalfa less than 3 inches tall, or 5 per sweep on alfalfa taller than 3 inches.
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	Dimethoate 4EC	½ to 1 pt		
	*Lorsban-4E	1 to 2 pt		
	*Mustang Max	2.8 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	1 to 1½ qt		
	*Warrior	2.56 to 3.84 oz		
Potato leafhopper	*Ambush 25W	3.2 to 12.8 oz	On foliage	Treatment is justified at these combinations of alfalfa height and leafhopper numbers:
	*Baythroid XL	0.8 to 1.6 oz		
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC	½ to 1 pt		
	Imidan 70W	1 to 1½ lb		
	*Lorsban-4E	½ to 1 pt		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	4 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	1 qt		
	*Warrior	1.92 to 3.2 oz		
			Alfalfa height (inches)	Leafhoppers per sweep
			Under 3	0.2
			3 to 6	0.5
			6 to 12	1.0
			12 or taller	2.0

Table 3. Insecticides for alfalfa (cont.)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Webworms	*Ambush 25W	3.2 to 12.8 oz	On seedlings or foliage	Control may be warranted when larvae reduce the stand of a new seeding or when heavy infestations result in copious webbing.
	*Baythroid XL	1.6 to 2.8 oz		
	*Cobalt	13 to 26 oz		
	*Mustang Max	2.24 to 4 oz		
	*Pounce 3.2EC	2 to 8 oz		
	*Proaxis	1.92 to 3.2 oz		
	Sevin XLR Plus	1 to 1½ qt		
*Warrior	1.92 to 3.2 oz			

*Use restricted to certified applicators.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insects pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

Table 4. Insecticides for grain sorghum

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Chinch bug	*Asana XL	5.8 to 9.6 oz	At plant base	Direct spray toward base of plant. Use only ground equipment.
	*Baythroid XL	2 to 2.8 oz		
	*Cobalt	13 to 38 oz		
	*Lorsban-4E ^c	1 to 2 pt		
	*Mustang Max	3.2 to 4 oz		
	*Proaxis	3.84 oz		
	Sevin XLR Plus	1 to 2 qt		
*Warrior	3.84 oz			
Corn earworm (headworm)	*Asana XL	5.8 to 9.6 oz	Over row	Treat when there is an average of 2 or more larvae per head.
	*Baythroid XL	1.3 to 2.8 oz		
	*Cobalt	19 to 38 oz		
	*Mustang Max	1.76 to 4 oz		
	*Proaxis	2.56 to 3.84 oz		
	Tracer	1.5 to 3 oz		
Corn leaf aphid	Dimethoate 4EC ^c	½ to 1 pt	Over row	Corn leaf aphids rarely cause economic damage unless populations are heavy and drought conditions exist.
	*Lorsban-4E ^c	½ to 1 pt		
Cutworms	*Asana XL	5.8 to 9.6 oz	Broadcast	Treat when seedling plants are being cut.
	*Baythroid XL	1 to 1.3 oz		
	*Cobalt	13 to 38 oz		
	*Lorsban-4E ^c	1 to 2 pt		
	*Mustang Max	1.28 to 4 oz		
	*Proaxis	1.92 to 2.56 oz		
*Warrior	1.92 to 2.56 oz			

Table 4. Insecticides for grain sorghum (cont.)

Insect	Insecticide ^{a,b}	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Fall armyworm	*Cobalt	13 to 38 oz	Over row	Treat when there is an average of 2 or more larvae per head. Leaf feeding or whorl damage seldom has an economic effect.
	*Lorsban-4E ^c	1 to 2 pt		
	*Mustang Max	1.76 to 4 oz		
	Tracer	1.5 to 3 oz		
Grasshoppers	*Baythroid XL	2 to 2.8 oz		Treatment may be warranted when there are 7 or more grasshoppers per square yard.
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC ^c	1 pt		
	*Lorsban-4E ^c	½ to 1 pt		
	*Mustang Max	3.2 to 4 oz		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	½ to 1½ qt		
*Warrior	2.56 to 3.84 oz			
Greenbug	*Cobalt	13 to 38 oz	Over row	Treat when greenbug damage is sufficient to cause death of more than 2 normal-sized leaves before the hard-dough stage.
	Dimethoate 4EC ^c	½ to 1 pt		
	*Lorsban-4E ^c	½ to 2 pt		
Sorghum midge	*Asana XL	2.9 to 5.8 oz	Over row	Apply during bloom when 50% of heads have begun to bloom and there is 1 or more midge adults (flies) per head.
	*Baythroid XL	1 to 1.3 oz		
	*Cobalt	7 to 13 oz		
	Dimethoate 4EC ^c	¼ to ½ pt		
	*Lorsban-4E ^c	½ pt		
	*Mustang Max	1.28 to 4 oz		
	*Proaxis	1.92 to 2.56 oz		
	*Warrior	1.92 to 2.56 oz		
Webworms	*Baythroid XL	1.3 to 2.8 oz	Over row	Treat when there are 5 or more larvae per head.
	*Cobalt	19 to 38 oz		
	*Lorsban-4E ^c	1 pt		
	*Mustang Max	1.76 to 4 oz		
	*Proaxis	2.56 to 3.84 oz		
	Tracer	1.5 to 3 oz		
	*Warrior	2.56 to 3.84 oz		
Yellow sugarcane aphid	*Cobalt	7 to 13 oz	Over row	Sprays should be applied at first sign of damage to seedling sorghum; 5 to 10 aphids per leaf.
	Dimethoate 4EC ^c	½ to 1 pt		
	*Lorsban-4E ^c	½ to 1 pt		

*Use restricted to certified applicators.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

^cSome sorghum varieties are sensitive to organophosphate insecticides.

Table 5. Insecticides for small grains (barley, oats, rye, wheat)

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Aphids (English grain aphid, green-bug, bird cherry-oat aphid)	*Baythroid XL	1.8 to 2.4 oz	On foliage	Treat when there are 12 to 15 aphids per tiller during seedling to boot stage. Baythroid, Dimethoate, Proaxis, and Warrior are labeled for use only in wheat. Do not use Pennncap-M in rye.
	Dimethoate 4EC	½ to ¾ pt		
	*Pennncap-M	2 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
	*Warrior	2.56 to 3.84 oz		
Armyworm	*Mustang Max	1.76 to 4 oz	On foliage	Treat when there are 6 or more non-parasitized armyworms (¾ to 1¼ inches long) per linear foot of row and before extensive head cutting occurs. Do not use Pennncap-M in rye. Baythroid, Mustang Max, Proaxis, and Warrior are labeled for use only in wheat.
	*Pennncap-M	2 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
	Tracer	1 to 3 oz		
	*Warrior	2.56 to 3.84 oz		
Cereal leaf beetle	*Baythroid XL	1 to 1.8 oz	On foliage	Treat when the combination of eggs and larvae averages 3 or more per stem. Baythroid, Mustang Max, Proaxis, Sevin, and Warrior are labeled for use only in wheat.
	*Mustang Max	1.76 to 4 oz		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	1 qt		
	Tracer	1 to 3 oz		
	*Warrior	2.56 to 3.84 oz		
Grasshoppers	*Baythroid XL	1.8 to 2.4 oz	On foliage	During fall when damage is apparent, treat field borders and noncrop areas to stop migration. Do not use Pennncap-M in rye. Baythroid, Dimethoate, Mustang Max, Proaxis, Sevin, and Warrior are labeled for use only in wheat.
	Dimethoate 4EC	¾ pt		
	*Mustang Max	3.2 to 4 oz		
	*Pennncap-M	2 to 3 pt		
	*Proaxis	2.56 to 3.84 oz		
	Sevin XLR Plus	½ to 1½ qt		
*Warrior	2.56 to 3.84 oz			

*Use restricted to certified applicators.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

Table 6. Insecticides for grass hay or pasture

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Armyworm	Sevin XLR Plus Tracer	1 to 1½ qt 1 to 2 oz	On foliage	Do not apply when weeds are blooming.
Grasshoppers	Sevin XLR Plus	1 to 1½ qt	On foliage	Treat when there are 15 to 20 grasshoppers per square yard. Do not apply when weeds are blooming.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)

Table 7. Insecticides for noncrop areas

To avoid injury to bees, do not apply sprays to noncrop areas if weeds are blooming.

Insect	Insecticide ^a	Amount of product per acre ^a	Placement	Timing of application, comments ^b
Grasshoppers	*Asana XL Imidan 70W Sevin XLR Plus	2.9 to 5.8 oz 2⅛ to 2¾ lb ½ to 1½ qt	On foliage	Treat when grasshopper nymphs average 15 to 20 per square yard along roadsides and fencerows. Apply treatments while hoppers are small and before they migrate into row crops. Do not spray areas adjacent to water or where runoff is likely to occur. Do not spray ditch banks.

*Use restricted to certified applicators.

^aThe formulation of the product most commonly used in Illinois is listed. If you use another formulation, *read the label* to determine the amount of product per acre. Also, read the product label for precautions and restrictions.

^bThe economic thresholds indicated are nominal (based on experience) or simple (based on research regarding the average response of the crop to insect injury). Dynamic thresholds that vary with cost of control, expected yield, crop value, and other variables have been developed for some insect pests. These dynamic thresholds often are published in newsletters during the growing season (refer to Web addresses on page 2.)