



Current Report

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Management of Insect and Mite Pests in Canola

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There are several arthropod pests that damage canola sporadically throughout the region. Pesticides should not be used as a substitute for good agronomic practices or as “preventative insurance” because this approach can cause pest resurgence issues and is rarely economically or environmentally justifiable. Many canola pest problems can be reduced by following good cultural practices, such as selecting varieties that are adapted to Oklahoma growing conditions, planting at an optimal date and providing proper fertilization and effective weed control.

Pesticide recommendations in this publication were correct as of the “Edited Date” listed on the OSU Fact Sheet database. The number [in brackets] following a product is its Mode of Action number [MOA]. The first name listed is the trade name of a product registered for use in canola for the listed pest. The pesticide name in (parentheses) is the active ingredient name and can be used to select other registered products containing the same active ingredient if available for sale in Oklahoma. Such products may cost less, so producers should compare prices. The information herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination

is intended and no endorsement by the Cooperative Extension Service is implied.

Refer to the following publications for additional information on pest management in canola.

- BAE-1110 Storing Oklahoma Winter Canola
- CR-2133 Crop and Forage Recordkeeping Software
- CR-2144 Winter Canola Performance Tests
- EPP-7085 Pest Management Needs Assessment for Oklahoma Canola Producers
- EPP-7089 Caterpillars in Canola
- EPP-7196 Grasshopper Management in Rangeland, Pastures, and Crops
- PSS-2130 Producing Winter Hardy Canola in Oklahoma
- PSS-2131 Winter Canola Planting Guide for the Southern Great Plains

An additional source of information is MF-2734, “Great Plains Canola Production Handbook,” is a joint publication of Kansas State University, Oklahoma State University and the University of Nebraska. It is available by contacting the following website: www.oznet.ksu.edu

Management of Insect and Mite Pests in Canola

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] and (Active Ingredient)</i>	<i>Rate of Product and (lb active ingredient) per Acre</i>	<i>Comments</i>
Aphids			
Cabbage aphid: small blue-gray aphid with short cornicles, and is usually covered with a powdery wax secretion.	Planting Time		Research data indicates that aphids are a consistent pest of winter canola in fall and winter. The use of seed treatments is highly recommended for early-season management of aphids. Additional foliar insecticide applications may be necessary for late-season control of aphids. Green peach aphid is known to have resistance to pyrethroid [MOA group 3] insecticides. Products that contain these active ingredients are often bundled with fungicides.
	Gaucho 600 [4A] (imidacloprid)	10.24 to 25.6 fl oz/cwt seed	
	Helix EXtra [4A] (thiamethoxam)	23 fl oz/cwt seed	
	Poncho [4A] (clothianidin)	3.84 to 10.23 fl oz/cwt seed	
	Post-Plant		
	Azadirachtin [un]	1 pt	
Green peach aphid: Pale green to yellow (sometimes pink) with long cornicles and three dark lines on abdomen.			No PHI for harvest. (Aza-direct, Ecozin) (Listed under rapeseed) 7 day PHI.
	Beleaf 50 SG [9C] (flonicamid)	2.8 fl oz (0.089 lb)	
Turnip aphid: Pale gray green with short, swollen cornicles, 1/16 inch. Winged adults can be recognized by presence of transverse dark bands on last two abdominal segments.			

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [MOA Group] and (Active Ingredient)	Rate of Product and (lb active ingredient) per Acre	Comments
<p>Aphids (cont'd) <u>Damage:</u> High populations can cause stunting and discoloration of leaves. Feeding by cabbage aphid can stop terminal growth and reduce yield. Damage is of little consequence after pod formation is completed.</p> <p><u>Threshold:</u> Treat rosette stage plants only when aphids exceed 100 to 200 per plant. Treat bud and early bloom stage when infested plants (racemes) exceed 15%. Don't treat at late flower or pod stage.</p>	<p>Besiege [28,3] (chlorantraniliprol + lambda cyhalothrin)</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Carbine 50 WG [9C] (flonicamid)</p> <p>Grandevo (<i>Chromobacterium substugae</i>)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p> <p>Transform WG [4C] (sulfoxaflor)</p>	<p>10 fl oz</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>2.8 oz (0.089 lb ai)</p> <p>2-3 lb/A</p> <p>4.5 to 5.95 fl oz (0.04 to 0.053 lb ai)</p> <p>1.92 fl oz (0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai/A)</p> <p>3.84 fl oz (0.015 lb ai)</p> <p>0.75 oz (0.023 lb ai)</p>	<p>21 day PHI.</p> <p>35 day PHI for harvest. (other names: Annex, Bifenture, Discipline, Empower, Fanfare, Sniper)</p> <p>(Listed under rapeseed) 7 day PHI.</p> <p>0 day PHI.</p> <p>35 day PHI for harvest. (Steed is another mixture of the same active ingredients).</p> <p>7 day PHI for harvest or grazing.</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p> <p>14 day PHI; do not apply between three days prior to bloom and completion of petal fall.</p> <p>Note restrictions on label for pollinators. At a minimum, spray in evening during bloom to avoid killing honeybees. Notify beekeepers before spraying if possible.</p>
<p>Army cutworm Gray striped caterpillar that curls up in to a tight "C" when disturbed. Evident from January through March.</p> <p><u>Damage:</u> Cuts plants at soil line, can kill plants if it eats the growing point.</p> <p><u>Threshold:</u> 1-2 per foot of row.</p>	<p>Brigade 2EC [3] (bifenthrin)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p>	<p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>2.8 to 5.95 fl oz (0.025 to 0.053 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai/A)</p>	<p>35 day PHI for harvest. (other names: Annex, Bifenture, Discipline, Empower, Fanfare, Sniper)</p> <p>35 day PHI for harvest (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing.</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p>
<p>Beet/Fall Armyworm Beet armyworm: Green caterpillar, darker above with a white stripe along the side of the body and a small black spot above the second pair of true legs, three pairs of true (thoracic legs) and four pair of abdominal prolegs.</p> <p>Fall armyworm: Brown, green, or largely black striped caterpillar, up to 1.5 inches, with a light-colored inverted "Y" on head.</p>	<p>Azadirachtin (un)</p> <p><i>B. thuringiensis</i> [11]</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Coragen [28] (chlorantraniliprole)</p> <p>Delta Gold 1.5 EC [3] (deltamethrin)</p>	<p>Apply per label</p> <p>Apply per label</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>3.5 to 5.0 fl oz (0.045 to 0.065 lb ai)</p> <p>0.8 fl oz (0.009 lb ai)</p>	<p>No PHI for harvest. (Aza-direct, Ecozin)</p> <p>No PHI for harvest. (Dipel, Javelin, Leipnox, Xentari)</p> <p>35 day PHI for harvest. (other names: Bifenture, Discipline, Empower, Fanfare, Sniper, Tailgunner, Tundra)</p> <p>21 day PHI for harvest.</p> <p>7 day PHI</p>

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [MOA Group] and (Active Ingredient)	Rate of Product and (lb active ingredient) per Acre	Comments
<p>Beet/Fall Armyworm (cont'd) <u>Damage:</u> Caterpillars can reduce seedling stand and chew conspicuous, irregular-shaped holes in leaves.</p> <p><u>Threshold:</u> Seedling, treat when scouting indicates 1 or more per row-ft. Treat when defoliation becomes severe, and larvae are present.</p>	<p>Grandevo (<i>Chromobacterium substugae</i>)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Prevathon [28] (chlorantraniliprole)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p>	<p>1 to 3 lb/A</p> <p>4.0 to 5.5 fl oz (0.04 to 0.053 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>0 Day PHI</p> <p>35 day PHI for harvest (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>21 day PHI. While beet/fall armyworms are not specifically listed on the label, Prevathon is labeled for use in canola, and can be applied under the 2ee label at the listed rate, which is labeled for beet/fall armyworm on other crops. However since these pests are not specifically named in canola recommendations, the user assumes all responsibility for the application and results.</p> <p>7 Day PHI for harvest or grazing</p>
<p>Cabbage looper Green caterpillar, with a thin white line along each side of the body, three pairs of thoracic legs and three pair of abdominal prolegs.</p> <p><u>Damage:</u> Caterpillars chew conspicuous, irregular-shaped holes in leaves.</p> <p><u>Threshold:</u> Treat when defoliation becomes severe, and larvae are present.</p>	<p>Azadirachtin (un)</p> <p><i>B. thuringiensis</i> [11]</p> <p>Besiege [28,3] (chlorantraniliprol + lambda cyhalothrin)</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Grandevo (<i>Chromobacterium substugae</i>)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p>	<p>Apply per label.</p> <p>Apply per label.</p> <p>5.0 to 10.0 fl oz</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>1-3 lb/A</p> <p>4.5 to 5.95 fl oz (0.04 to 0.053 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>No PHI for harvest.</p> <p>No PHI for harvest.</p> <p>21 day PHI.</p> <p>35 day PHI for harvest. (other names: Annex, Bifenture, Discipline, Empower, Fanfare, Sniper)</p> <p>0 day PHI</p> <p>35 day PHI for harvest (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p>

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [MOA Group] and (Active Ingredient)	Rate of Product and (lb active ingredient) per Acre	Comments
<p>Diamondback moth Adult moths are light grayish-brown with a white diamond-shaped marking along back when wings are folded. Larvae are slightly tapered at each end and pale green in color. Wriggle rapidly when disturbed.</p> <p><u>Damage:</u> Larvae feed on all plant parts, preferring the undersides of older leaves.</p> <p><u>Threshold:</u> No threshold has been established.</p>	<p>Azadirachtin (un)</p> <p><i>B. thuringiensis</i> [11]</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Coragen [28] (chlorantraniliprole)</p> <p>Delta Gold 1.5 EC [3] (deltamethrin)</p> <p>Grandevo <i>Chromobacterium substugae</i></p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Prevathon [28] (chlorantraniliprole)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p>	<p>Apply per label.</p> <p>Apply per label.</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>3.5 to 5.0 fl oz (0.045 to 0.065 lb ai)</p> <p>0.8 fl oz (0.009 lb ai)</p> <p>1 to 3 lb/A</p> <p>4.0 to 5.5 fl oz (0.04 to 0.053 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>No PHI for harvest (Aza-direct, Ecozin)</p> <p>No PHI for harvest (Dipel. Javelin, Leipnox, Xentari)</p> <p>35 day PHI for harvest. (other names: Bifenture, Discipline, Empower, Fanfare, Sniper, Tailgunner, Tundra)</p> <p>21 day PHI for harvest.</p> <p>7 day PHI.</p> <p>0 Day PHI.</p> <p>35 day PHI for harvest. (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>21 day PHI.</p> <p>7 Day PHI for harvest or grazing.</p> <p>Diamondback moth is known for developing resistance to many insecticides, especially pyrethroids (Class 3 MOA), therefore thorough field scouting and class rotation of insecticides is encouraged.</p>
<p>False chinch bug Adults 1/8 inch, long dirty gray, with brown or black markings, piercing mouthparts.</p> <p><u>Damage:</u> Feed in groups. Large numbers may cause wilting of heads or small plants.</p> <p><u>Threshold:</u> Flowering: Treat when there is an AVERAGE of 20-30 per head. Early seed pod: Treat when there is an AVERAGE of 40-50 per head.</p>	<p>Azadirachtin [un]</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p>	<p>Apply per label.</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>4.5 to 5.95 fl oz (0.04 to 0.053 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>3.84 fl oz</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p>	<p>No PHI for harvest.</p> <p>35 day PHI for harvest. (other names: Annex, Bifenture, Discipline, Empower, Fanfare, Sniper)</p> <p>35 day PHI for harvest. (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p> <p>7 day PHI for harvest or grazing. (other names: Karate, Grizzly Z, Lambda Cy, Silencer, Tiaga)</p> <p>False chinch bugs thrive in hot, dry conditions which makes it more difficult to control them. For best results, use highest levels of water carrier for thorough coverage.</p>

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [MOA Group] and (Active Ingredient)	Rate of Product and (lb active ingredient) per Acre	Comments
<p>Flea beetle Shiny black beetle about 1/16 inch long, jumps when disturbed.</p> <p><u>Damage:</u> Early spring. Feeding damage results in plant tissue that is scraped from leaf and/or small holes chewed in leaves. Can cause delayed development in cool growing conditions</p> <p><u>Threshold:</u> No threshold has been established.</p>	<p style="text-align: center;">Planting Time</p> <p>DynaShield [4A] (imidacloprid) 10.24 to 25.6 fl oz/cwt seed</p> <p>Helix EXtra [4A] (thiamethoxam) 23 fl oz/cwt seed</p> <p>Poncho [4A] (clothianidin) 3.84 to 10.23 fl oz/cwt seed</p> <p style="text-align: center;">Post-Plant</p> <p>Azadirachtin [un] Apply per label.</p> <p>Brigade 2EC [3] (bifenthrin) 2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>Delta Gold 1.5 EC [3] (deltamethrin) 0.8 fl oz (0.009 lb ai)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin) 2.6 to 5.5 fl oz (0.025 to 0.053 lb ai)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin) 0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin) 4.0 fl oz (0.025 lb ai)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin) 1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>Harvested seed can only be used for industrial purposes, <u>not for edible oil.</u></p> <p>30 waiting period for planting all crops except winter wheat following harvest.</p> <p>May plant field immediately with corn, or canola. 30 post-harvest waiting period for cereal grains, grasses soybeans and dried beans. 4 month waiting period for all other crops.</p> <p>No PHI for harvest.</p> <p>35 day PHI for harvest. (other names: Bifenture, Discipline, Empower, Fanfare, Sniper, Tailgunner, Tundra)</p> <p>7 day PHI.</p> <p>35 day PHI for harvest. (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing. (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p>	
<p>Harlequin bug Black shield-shaped with orange, red and yellow markings. Measures 3/8 inch long. Eggs barrel shaped and laid in clusters.</p> <p><u>Damage:</u> Adults and nymphs pierce stalks, leaves with sucking mouthparts.</p> <p><u>Threshold:</u> No threshold has been established.</p>	<p>Azadirachtin (un) Apply per label.</p> <p>Brigade 2EC [3] (bifenthrin) 2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin) 4.0 to 5.5 fl oz (0.04 to 0.053 lb ai)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin) 0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin) 4.0 fl oz (0.025 lb ai)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin) 1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>No PHI for harvest.</p> <p>35 day PHI for harvest. (other names: Bifenture, Discipline, Empower, Fanfare, Sniper, Tailgunner, Tundra)</p> <p>35 day PHI for harvest (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest or grazing (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p>	

Pest, Damage and Treatment Threshold	Insecticide, Formulation, [MOA Group] and (Active Ingredient)	Rate of Product and (lb active ingredient) per Acre	Comments
<p>Grasshopper 1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping.</p> <p><u>Damage:</u> Chew leaves. Leaves may have ragged edges or leaf blade may be completely chewed. Small plants may be killed.</p> <p><u>Threshold:</u> 15-20 per square yard. If nymph populations exceed threshold field borders (25 to 40 per square yard), treat before they move into canola. See EPP-7196: Grasshopper Management in Rangeland, Pastures, and Crops</p>	<p>Besiege [28,3] (chlorantraniliprol + lambda cyhalothrin)</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Delta Gold 1.5 EC [3] (deltamethrin)</p> <p>Hero [3] (zeta cypermethrin + bifenthrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p>	<p>5 to 10 fl oz</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>0.8 fl oz</p> <p>4.5 to 5.95 fl oz (0.04 to 0.053 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p>	<p>21 day PHI.</p> <p>35 day PHI for harvest. (other names: Annex, Bifenture, Discipline, Empower, Fanfare, Sniper)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>35 day PHI for harvest. (Steed is another mixture of the same active ingredients)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p> <p>7 day PHI for harvest or grazing. (other names: Karate, Grizzly Z, Lambda Cy, Silencer, Tiaga)</p>
<p>Lygus bug Several species. Generally oval, about 1/4 inch long, brown with some yellow or reddish markings.</p> <p><u>Damage:</u> Feed on developing seeds, flowers, and leaves. Feed on buds. Thresholds are for infestations before or during petal fall.</p> <p><u>Threshold:</u> North Dakota thresholds are 15 per 10 sweeps before petal fall, and 20 per 10 sweeps after petal fall.</p>	<p>Azadirachtin (un)</p> <p>Brigade 2EC [3] (bifenthrin)</p> <p>Delta Gold 1.5 EC [3] (deltamethrin)</p> <p>Karate/Warrior II [3] (lambda cyhalothrin)</p> <p>Mustang MAXX EC [3] (zeta cypermethrin)</p> <p>Proaxis 0.5 CS [3] (gamma cyhalothrin)</p>	<p>Apply per label.</p> <p>2.1 to 2.6 fl oz (0.033 to 0.04 lb ai)</p> <p>0.8 fl oz (0.009 lb ai)</p> <p>0.96 to 1.92 fl oz (0.015 to 0.03 lb ai)</p> <p>4.0 fl oz (0.025 lb ai)</p> <p>1.92 to 3.84 fl oz (0.0075 to 0.015 lb ai)</p>	<p>No PHI for harvest. (Aza-direct, Ecozin)</p> <p>35 day PHI for harvest. (other names: Bifenture, Discipline, Empower, Fanfare, Sniper, Tailgunner, Tundra)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 day PHI for harvest or grazing. (other names: (Karate, Grizzly Z, Lambda Cy, Lamcap, Paradigm, Province, Silencer)</p> <p>7 day PHI for harvest. Do not make applications less than seven days apart.</p> <p>7 Day PHI for harvest or grazing.</p>
<p>White grub Large, "C" shaped grub with a white body and a brown head.</p> <p><u>Damage:</u> Grubs feed on roots of seedling plants. Damage potential is dependent on planting date and speed of growth of the plant.</p> <p><u>Threshold:</u> Seed treatments are registered for protection against early season damage. Treat if field history indicates a problem.</p>	<p>Planting Time</p> <p>DynaShield [4A] (imidacloprid)</p> <p>Helix EXtra [4A] (thiamethoxam)</p> <p>Poncho [4A] (clothianidin)</p>	<p>10.24 to 25.6 fl oz/cwt seed</p> <p>23 fl oz/cwt seed</p> <p>3.84-10.23 fl oz/cwt seed</p>	<p>Do not use treated seed for feed, food or oil purposes.</p> <p>Harvested seed can only be used for industrial purposes, <u>not for edible oil.</u></p> <p>30 post-harvest waiting period for planting all crops except winter wheat.</p> <p>30 post-harvest waiting period for planting all crops except corn.</p>

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide, Formulation, [MOA Group] and (Active Ingredient)</i>	<i>Rate of Product and (lb active ingredient) per Acre</i>	<i>Comments</i>
Wireworm Hard-shelled, smooth, cylindrical, yellowish to brown worms. 2- to 6-year life cycle. <u>Damage:</u> Feed on seed, seedling. Cause stand loss. <u>Threshold:</u> Seed treatments are registered for protection against early season damage. Treat if field history indicates a problem.	Planting Time		
	DynaShield [4A] (imidacloprid)	10.24 to 25.6 fl oz/cwt seed	Do not use treated seed for feed, food or oil purposes.
	Helix EXtra [4A] (thiamethoxam)	23 fl oz/cwt seed	Harvested seed can only be used for industrial purposes, <u>not for edible oil</u> .
	Poncho [4A] (clothianidin)	3.84-10.23 fl oz/cwt seed	30 post-harvest waiting period for planting all crops except winter wheat. May plant field immediately with corn, or canola. 30 post-harvest waiting period for cereal grains, grasses soybeans and dried beans. 4 month waiting period for all other crops.

Pre-harvest Intervals and grazing restrictions

Azadirachtin (neem)	0 day PHI for harvest
<i>Bacillus thuringiensis</i>	0 day PHI for harvest.
Besiege	7 day PHI
Brigade	35 day PHI for harvest.
Carbine	7 day PHI for harvest
Delta Gold	7 day PHI for harvest
DynaShield	Harvested seed can only be used for industrial purposes, <u>not for edible oil</u> .
Grandivo	0 day PHI
Hero	35 day PHI for harvest
Helix EXtra	No PHI listed. Do not graze
Karate/Warrior	30 day PHI for harvest or grazing
Mustang MAXX	7 day PHI for harvest
Prevathon	21 day PHI
Prosper FX	No PHI listed
Proaxis	30 Day PHI for harvest or grazing
Transform	14 day PHI, do not apply between 3 days prior to bloom and completion of petal fall.

* Group numbers in brackets [#] after the insecticide name are used to designate the mode of action of the insecticide according to the classification system developed by the Insecticide Resistance Action Committee, (IRAC) in 2011. It is intended to help in the selection of insecticides for preventative resistance management. If you make multiple applications for a specific pest during a growing season, simply select a registered insecticide with a different number for each application. To further delay resistance from developing, integrate other control methods into your pest management programs

The pesticide information presented in this publication was current with federal and state regulations at the time of revision. READ and FOLLOW all LABEL directions.

The Oklahoma Cooperative Extension Service

Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

The pesticide information presented in this publication was current with federal and state regulations at the time of printing. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

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