



# Current Report

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## Management of Insect and Mite Pests in Corn

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Arthropod pests of corn are varied, and often difficult to manage. Many corn pest problems can be avoided by implementing an Integrated Pest Management (IPM) plan that includes preventive pest management practices, such as selecting varieties adapted to Oklahoma growing conditions, planting at an optimal date, proper fertilization and irrigation, and using crop rotations. The application of insecticides, while sometimes necessary, should not be used as a substitute for good agronomic practices or as "preventative insurance" because it is rarely economically or environmentally justifiable.

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.

Pesticide recommendations in this publication were correct as of the "Modified Date" but always check the label that came with the purchased insecticide for the most current rates and restrictions.

The first name listed is the trade name of a product registered for use in corn for the listed pest. The name in

(parentheses) listed below the trade name is the name of the active ingredient. The active ingredient name is provided because in many cases, there are other registered products containing the same active ingredient that may cost less, so producers should compare prices.

The number [in brackets] following a product is its Mode of Action number [MOA]. The more frequently insecticides with the same MOA are used, the more likely resistance will occur. This number provides an easy way to select different modes of action to avoid selecting for pests that are resistant to a certain mode of action.

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

- AGEC-203 Estimating Yield and Economic Returns from Replanting Corn
- CR-2105 National Corn Handbook: Aflatoxins and other Mycotoxins
- EPP-7160 Field Key to Larvae in Corn
- EPP-7196 Grasshopper Management in Rangeland, Pastures, and Crops

## Management of Insect and Mite Pests in Corn

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Armyworm</b> 1 to 1.5 inches. Dark green or brown caterpillar with five stripes along a smooth body. Head with honeycomb-like markings.	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period.
	<i>Bacillus thuringiensis</i> [11] (Biobit, Condor, Dipel, Lepinox, Javelin, Xentari)	See product label for specific rates.	Check label for waiting periods.
Damage: Armyworms present throughout growing season, but natural enemies have large impact on them.	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day wait for grain or fodder, 0 day for green forage.
	Besiege[28,3] (chlorantraniliprole + lambda cyhalothrin)	6.0 to 10.0 fl oz/A	21-day waiting period.
Threshold: Treat if 30% of plants (seedling to 6 extended leaves) are infested, or when 75% of plants are infested with one or more larvae on larger plants.	Blackhawk [5] (spinosad)	1.67 to 3.3 fl oz (0.038 to 0.075 lb ai/A)	7-day wait for forage, 28 days for grain or fodder.
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day wait for grazing or harvest.
	Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	21-day wait for harvest.
	Coragen [28] (chlorantraniliprole)	3.5 to 7.5 fl oz (0.045 to 0.098 lb ai/A)	14-day waiting period for harvest 1 day for forage, silage, stover.
	Delta Gold [3] (deltamethrin)	1.5 to 1.9 fl oz (0.018 to 0.022 lb ai/A)	21-day wait for harvest, 12 days for grazing or silage.
	Fastac [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.020 to 0.025 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Hero [3] (zeta-cypermethrin + (bifenthrin)	4.0 to 10.3 fl oz	30-day PHI for grain and stover, 60 days for forage.
	Intrepid 2F [18] (methoxyfenozide)	4 to 16 fl oz (0.06 to 0.25 lb ai/A)	21-day waiting period.
	Lannate LV [1A] (methomyl)	0.75 to 1.5 pt (0.225 to 0.45 lb ai/A)	21-day PHI for harvest, 3 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1.0 lb ai/A)	21-day wait for grain or harvest.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day waiting for harvest.
	Mustang MAXX EC [3] (zeta-cypermethrin)	3.2 to 4.0 fl oz (0.02 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Pounce 25WP [3] (permethrin)	6.4 to 9.6 oz (0.1 to 0.2 lb ai/A)	30-day PHI period.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	2.56 to 3.84 fl oz (0.01 to 0.015 lb ai/A)	21-day wait for harvest or grazing.
	Radiant SC [5] (spinetoram)	3.0 to 6.0 fl oz (0.023 to 0.047 lb ai/A)	28-day wait for harvest, 3 days for forage or fodder.
	Sevin XLR [1A] (carbaryl)	1 to 2 qt (1.5 to 2 lb ai/A)	48-days for grain, 14 days for forage or silage.
	Stallion [1B,3] (chlorpyrifos + zeta-cypermethrin)	9.25 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21-days for harvest. Check label for grazing re strictions.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Chinch bug</b>			
Nymphs are bright red with white band across back. Adults ½ inches, black with white "hour glass" shape on back	<b>Seed Treatments:</b> Cruiser 5FS [4A] (thiamethoxam)	1.13 to 3.61 fl oz / 80,000 seed	Do not feed treated seed. Generally must order through a seed dealer.
Damage: Adults may fly into field, early (March-April) or adults and nymphs move in to corn from maturing wheat fields (April-May). Remove plant juices, cause stunting, wilting, and reddening of leaves.	Gaucho 600 [4A] (imidacloprid)	2.7 to 6.0 fl oz/ 80,000 seed	Do not feed treated seed. See label for mixing and handling instructions. Follow all label restrictions.
	Poncho 600 [4A] (clothianidin)	1.13 to 2.26 fl oz/ 80,000 seed	Do not feed treated seed. See label for mixing and handling instructions. Follow all label restrictions.
<b>Planting Time Applications</b>			
Threshold: Plants are less than 6 inches: 2 or more chinch bugs on 20% of plants.	Force CS [3] (tefluthrin)	0.46 to 0.57 fl oz/ 1000 ft row	T-band application. Read label carefully for restrictions.
<b>Post-emergence Sprays</b>			
Plants are 6-18 inches: 10 or more chinch bugs on 75% of plants.			Border sprays (30-60 feet) are often effective. Best control is obtained when insecticide is applied by ground, with nozzles directed at the base of the plants using a minimum of 20-30 gallons of water.
	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period.
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day wait for grain or fodder, 0 day for green forage.
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day waiting period for grain or grazing.
	Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	21-day wait for harvest.
	Delta Gold [3] (deltamethrin)	1.5 to 1.9 fl oz (0.018 to 0.022 lb ai/A)	21-day wait for harvest, 12 days for grazing or silage.
	Fastac [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.02 to 0.025 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Hero [3] (zeta-cypermethrin + (bifenthrin)	4.0 to 10.3 fl oz	30-day PHI for grain and stover, 60 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1.0 lb ai/A)	21-day PHI for harvest.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day wait for grain or harvest.
	Mustang MAXX EC [3] (zeta-cypermethrin)	3.2 to 4.0 fl oz (0.02 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	3.84 fl oz (0.015 lb ai/A)	21-day waiting period.
	Sevin XLR [1A] (carbaryl)	1 to 2 qt (0.5 to 1 lb ai/A)	48-day waiting period for harvest, 14 days for grazing or silage.
	Stallion [1B,3] (chlorpyrifos + zeta-cypermethrin)	9.25 to 11.75 fl oz	30-day wait for harvest, 60 days for grazing or silage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.92 fl oz (0.03 lb ai/A)	21-days for harvest. Check label for grazing restrictions.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Corn Earworm</b> Striped robust caterpillars that range in color from green to pink to brown to black.  Damage: Caterpillars injure ear tips, feed in whorls. Feeding damage may increase potential for aflatoxins in grain.  Threshold: Not practical to control in field corn	Many Bt corn hybrids offer some suppression of corn earworm, but it is not recommended that corn earworm be controlled with insecticides.		NA
<b>Corn rootworm (adults)</b> Small beetle, with black stripes, 12 spots, or green  Damage: Feed on silks. Heavy populations may interfere with pollination.  Threshold: Treat if beetles are abundant (more than five per plant and silks are being severely clipped)	Asana XL [3] (esfenvalerate)  Baythroid XL [3] (beta-cyfluthrin)  Besiege[28,3] (chlorantraniliprole + lambda-cyhalothrin)  Brigade 2EC [3] (bifenthrin)  Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)  Delta Gold [3] (deltamethrin)  Dimethoate 4E [1B]  Fastac [3] (alpha-cypermethrin)  Hero [3] (zeta-cypermethrin + bifenthrin)  Lorsban 4E [1B] (chlorpyrifos)  Match-Up [1B,3] (chlorpyrifos + bifenthrin)  Mustang MAXX EC [3] (zeta-cypermethrin)  Pounce 25WP [3] (permethrin)  Proaxis 0.5 SC [3] (gamma-cyhalothrin)  Sevin XLR [1A] (carbaryl)  Stallion[1B,3] (chlorpyrifos + zeta-cypermethrin)  Warrior II w Zeon [3] (lambda-cyhalothrin)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)  1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)  6.0 to 10 fl oz  2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)  13 to 26 fl oz  1.5 to 1.9 fl oz (0.018 to 0.022 lb ai/A)  0.66 to 1 pt  2.7 to 3.8 fl oz (0.017 to 0.025 lb ai/A)  4.0 to 10.3 fl oz  1 to 2 pt (0.5 to 1 lb ai/A)  5.5 to 16.4 fl oz  3.2 to 4.0 fl oz (0.02 to 0.025 lb ai/A)  6.4 to 9.6 oz (0.1 to 0.15 lb ai/A)  2.56 to 3.84 fl oz (0.01 to 0.015 lb ai/A)  1 to 2 qt (0.5 to 1 lb ai/A)  9.25 to 11.75 fl oz  1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21-day waiting period.  21-day wait for grain or fodder, 0 day for green forage.  21-day wait for harvest.  30-day wait for grazing or harvest.  21-day wait for harvest, 14 days for grazing or silage.  21-day wait for harvest, 12 days for grazing or silage.  14-day waiting period.  30-day wait for grain, 60 days for silage.  30-day PHI for grain and stover, 60 days for forage.  21-day waiting period.  30-day wait for grain.  7-day waiting period for harvest.  30-day waiting period.  21-day waiting period for harvest or grazing.  48-day waiting period for harvest, 14 day for grazing.  30-day waiting period for grain, 60 days for forage.  21 days for harvest. Check label for grazing restrictions.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Corn rootworm (larvae)</b>  Thin, white worm-like larva that lives in soil. Damage is likely to occur in early part of growing season (before June 15).  Damage: Feed on roots, causing lodged plants and plants that “gooseneck.” Root tissue and brace roots are often chewed back to the base of the stalk.  Threshold: Consider a planting-time insecticide, or a seed variety that contains transgenic “rootworm” protection if planting continuous corn.	<b>Seed Treatments</b> Rootworm resistant varieties	*Transgenic seed	*Follow company’s guidelines for providing, refugia crop rotations and other resistance management strategies.
	Cruiser 5FS [4A] (thiamethoxam)	**5.6 fl oz/80,000 seed	**Do not use treated seed for feed, food, or oil processing. See label for mixing and handling instructions. Follow all label restrictions.
	Gaucho 600 [4A]	**6.0 fl oz/80,000 seed	
	Poncho 600 [4A] (clothianidin)	**5.64 fl oz/80,000 seed	
	Force ST [3] (tefluthrin)	3 to 4 oz/cwt seed	Do not use treated seed for feed, food, or oil processing. Do not apply Force 3G if Force ST was used.
	<b>Planting Time</b>		
	Aztec 2.1 G [1B,3] (tebupirromphos + cyfluthrin)	6.7 fl oz/1000 ft-row	Follow manufactures’ guidelines for rates, application methods grazing and crop rotation restrictions. Rotation of insecticides during successive years is suggested. Do not make a foliar application if planting time application was made.
	Capture LFR [3] (bifenthrin)	0.39 to 0.98 fl oz/ 1000 ft-row	
	Counter 15G [1B] (terbufos)	6 to 8 oz/1000 ft-row	
	Force 3G [3] Force CS [3] (tefluthrin)	4 to 5 oz/1000 ft-row 0.46 to 0.57 fl oz/ 1000 ft row	T-band or in-furrow. T-band or in-furrow.
	Lorsban 15 G [1B] (chlorpyrifos)	2.5 fl oz/1000 ft-row	T-band or in-furrow.
	Proaxis 0.5 CS [3] (gamma cyhalothrin)	8 oz/1000 ft-row	
	Thimet 20G [1B] (phorate)	0.24 oz/1000 ft-row	
	<b>Post Seedling-Emergence Application</b>		
	Counter 15G [1B] (terbufos)	8 oz/1000 ft-row	Follow label directions for at-cultivation applications. Do not make application if planting time application was made.
	Cobalt [1B,3] (chlorpyrifos+ lambda-cyhalothrin)	38 to 42 fl oz	
	Force 3G [3] (tefluthrin)	4 to 5 oz/1000 ft-row	
	Lorsban 15 G [1B] (chlorpyrifos)	8 oz/1000 ft-row	
	Thimet 20G [1B]	4.5 to 6 oz/1000 ft row	

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Cutworms (black, granulate, sandhill)</b> Striped or solid colored, robust caterpillars that “roll” up when disturbed, and prefer to live underground.	<b>Seed Treatments</b> Resistant varieties	Transgenic seed	Follow company’s guidelines for providing refugia, crop rotation and other resistance management strategies.
	<b>Pre-Plant/Planting Time</b>		
Damage: Cutworms generally feed at night, and live under the soil during the day. Plant will be cut at or slightly above the soil level, causing stand reductions.	Aztec 2.1 G [1B, 3] (tebupirromphos + cyfluthrin)	6.7 fl oz/1000 ft-row	Follow manufactures’ guidelines for rates, application methods grazing and crop rotation restrictions.
	Capture 2EC [3] (bifenthrin)	0.15 to 0.3 fl oz/1000 ft-row	
Threshold: Scout fields at seedling emergence. Treat when worms are less than ½ inch long, and skips are noticed.	Counter 15G [1B] (terbufos)	6 to 8 oz/1000 ft-row	
	Force 3G [3] Force CS [3] (tefluthrin)	4 to 5 oz.1000 ft-row 0.46 to 0.57 fl oz/ 1000 ft row	T band or In-furrow. T band or In-furrow.
	Lorsban 15 G [1B] (chlorpyrifos)	8 oz/1000 ft-row	T band or In-furrow.
	Proaxis 0.5 CS [3] (gamma cyhalothrin)	0.66 oz/1000 ft-row	
	Pounce 1.5 G [3] (permethrin)	8 oz/1000 ft-row	
	<b>Post-emergence Sprays</b>		
	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	
	Baythroid XL [3] (beta-cyfluthrin)	0.8 to 1.6 fl oz (0.007 to 0.013 lb ai/A)	21-day wait for grain or fodder, 0 days for green forage.
	Besiege[28,3] (chlorantraniliprole + lambda-cyhalothrin)	5.0 to 10 fl oz	21-day waiting period.
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day wait for harvest or grazing.
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	21-day wait for harvest.
	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai/A)	21-day wait for harvest, 12 days for grazing or silage.
	Fastac [3] (alpha-cypermethrin)	1.3 to 2.8 fl oz (0.008 to 0.018 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Hero [3] (zeta-cypermethrin + bifenthrin)	2.6 to 6.1 fl oz	30-day PHI for grain and stover, 60 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1.0 lb ai/A)	21-day wait for grain or harvest.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day waiting period for grain and silage, 60 day for grazing.
	Mustang MAXX EC [3] (zeta-cypermethrin)	1.28 to 2.8 fl oz (0.008 to 0.0175 lb ai/A)	21-day waiting period.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	1.92 to 3.2 fl oz (0.0075 to 0.0125 lb ai/A)	21-day waiting period for harvest or grazing.
	Pounce 25W [3] (permethrin)	6.4 to 9.6 oz (0.1 to 0.2 lb ai/A)	30-day waiting period.
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<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Cutworms (black, granulate, sandhill) (cont'd)</b>	Stallion [1B,3] (chlorpyrifos + zeta cypermethrin)	3.75 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 fl oz (0.015 to 0.025 lb ai/A)	21 days for harvest. Check label for grazing restriction.
<b>Fall armyworm</b> Large, striped, non-bristled worm up to 1.5 inches. Has a light colored, inverted "Y" on head. June-August	<b>Seed Treatments</b>  Resistant varieties	Transgenic seed	Follow company's guidelines for providing refugia, crop rotation and other resistance management strategies.
Damage: Larvae cut holes in leaves at whorl stage, heaviest damage occurs on late corn when caterpillars tunnel into ear or ear shank.	<b>Post-emergence Sprays</b>  Baythroid XL [3] (beta-cyfluthrin)	2.8 fl oz (0.022 lb ai/A)	21-day wait for grain or fodder, 0 days for green forage.
Threshold: Treat if 75% of plants are infested during whorl stage.	Besiege[28,3] (chlorantraniliprole + lambda-cyhalothrin)	6.0 to 10 fl oz	21-day waiting period.
	Blackhawk [5] (spinosad)	1.67 to 3.3 fl oz (0.038 to 0.075 lb ai/A)	7-day wait for forage, 28 days for grain or fodder.
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day wait for grazing or harvest.
	Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	21-day waiting period for harvest, 14 days for grazing or silage.
	Coragen [28] (chlorantraniliprole)	3.5 to 7.5 fl oz (0.045 to 0.098 lb ai/A)	14-day waiting period for harvest, 1 day for forage, silage, stover.
	Delta Gold [3] (deltamethrin)	1.5 to 1.9 fl oz (0.018-0.022 lb ai/A)	21-day wait for harvest, 12 days for grazing or silage.
	Fastac [3] (alpha-cypermethrin)	3.2 to 3.8 fl oz (0.020 to 0.025 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Hero [3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	30-day PHI for grain and stover, 60 days for forage.
	Lannate LV [1A] (methomyl)	0.75 to 1.5 pt 0.225 to 0.45 lb	21-day PHI for harvest, 3 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1.0 lb ai/A)	21-day waiting period.
	Match-Up [1b,3] (chlorpyrifos + bifenthrin)		30-day wait for grain.
	Mustang MAXX EC [3] (zeta-cypermethrin)	3.2 to 4.0 fl oz (0.02 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Pounce 25 WP [3] (permethrin)	6.4 to 9.6 fl oz (0.1 to 0.15 lb ai/A)	30-day waiting period.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	2.56 to 3.84 fl oz (0.01 to 0.015 lb ai/A)	21-day waiting period.
	Stallion[1B, 3] (chlorpyrifos + zeta cypermethrin)	9.25 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21-day waiting period. Check label for grazing restrictions.



<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Flea beetles</b> Shiny, black beetle about 1/16 inches that jumps when disturbed.  Damage: Early spring-summer. Plant tissue is scraped from leaf, giving it a drought stress appearance. Can cause delayed development is cool growing conditions  Threshold: Apply to small plants when beetles first appear and some plants are being killed.	Asana XL [3] (esfenvalerate)	5.8 to 9.6 fl oz (0.03 to 0.05 lb ai/A)	21-day waiting period.
	Baythroid XL [3] (beta-cyfluthrin)	0.8 to 1.6 fl oz (0.007 to 0.013 lb ai/A)	21-day wait for grain or fodder, 0 days for green forage.
	Besiege[28,3] (chlorantraniliprole + lambda cyhalothrin)	6.0 to 10 fl oz	21-day waiting period.
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day wait for grazing or harvest.
	Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	21-day waiting period for harvest.
	Delta Gold [3] (deltamethrin)	1.0 to 1.5 fl oz (0.012 to 0.018 lb ai/A)	21-day wait for harvest, 12 days for grazing or silage.
	Fastac [3] (alpha-cypermethrin)	2.7 to 3.8 fl oz (0.017 to 0.025 lb ai/A)	30-day wait for grain, 60 days for silage.
	Hero [3] (zeta-cypermethrin + bifenthrin)	2.6 to 6.1 fl oz	30-day wait for grain and silage, 60 days for grazing.
	Lannate LV [1A] (methomyl)	0.75 to 1.5 pt 0.225 to 0.45 lb	21-day PHI for harvest, 3 days for forage.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1.0 lb ai/A)	21-day waiting period.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day wait for grain or harvest.
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.72 to 4.0 fl oz (0.017 to 0.025 lb ai/A)	30-day wait for grain and silage, 60 days for grazing.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	2.56 to 3.84 fl oz (0.01 to 0.015 lb ai/A)	21-day waiting period.
	Pounce 25WP [3] (permethrin)	6.4 to 9.6 oz (0.1 to 0.2 lb ai/A)	30-day waiting period.
	Sevin XLR [1A] (carbaryl)	1 to 2 qt (0.5 to 1 lb ai/A)	48 days for grain, 14 days for forage or silage.
<b>Grasshopper</b> 1-2 inches, outer wings leathery, inner wings clear or colored. Enlarged hind legs designed for jumping. Damage: Chew leaves, leaving ragged edges, or completely chewing leaf blade. Damage emerging seed heads, causing yield loss.  Consider treating if numbers reach 8-14 in the field, or 20-40 in field margins.	Warrior II w Zeon [3] (lambda-cyhalothrin)	9.25 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Asana XL [3] (esfenvalerate)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21 days for harvest. Check label for grazing restriction.
	Asana XL [3] (esfenvalerate)	2.9 to 5.8 fl oz (0.015 to 0.03 lb ai/A)	21-day waiting period.
	Baythroid XL [3] (beta-cyfluthrin)	2.1 to 2.8 fl oz (0.017 to 0.022 lb ai/A)	21-day wait for grain or fodder, 0 day for green
	Brigade 2EC [3] (bifenthrin)	2.1 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	21-day wait for grain or fodder, 0 day for green
	Cobalt [1B, 3] Threshold: gamma-cyhalothrin	7 to 13 fl oz (chlorpyrifos + gamma-cyhalothrin)	21-day wait for grain or fodder, 0 day for green



<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Grasshopper (cont'd)</b> See F-7196, Grasshopper Management in Rangeland, Pastures, and Crops for more information.	Coragen [28] (chlorantraniliprole)	2.0 to 5.0 fl oz (0.026 to 0.065 lb ai/A)	14-day waiting period for harvest 1 day for forage, silage, stover.
	Delta Gold [3] (deltamethrin)	1 to 1.5 fl oz (0.012-0.018 lb ai/A)	21-day wait for harvest; 12 days for grazing or forage.
	Fastac [3] (alpha-cypermethrin)	2.7 to 3.8 fl oz (0.017 to 0.025 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Hero [3] (zeta-cypermethrin + bifenthrin)	2.6 to 6.1 fl oz	30-day PHI for grain and stover, 60 days for forage.
	Karate w Zeon [3] (lambda-cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21-day waiting period.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1 lb ai/A)	21-day waiting period.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day wait for harvest or grazing.
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.72 to 4.0 fl oz (0.017 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	1.92 to 3.2 fl oz (0.0075 to 0.0125 lb ai/A)	21-day waiting period.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21 days for harvest. Check label for grazing restriction.
<b>Mites</b> Small, less than 1/100 inches. Causes brown stippling of leaves. Banks grass and two spotted spidermites are most common pests.  Damage: Causes stippling of leaves, severe infestations can kill leaves. Infestations generally start at lower leaves and move upward.  Threshold: Treat when there is visible damage on the lower third of the plant and small colonies are visible on the middle third of the plant, and the corn has not yet reached the hard dough stage.	Capture 2EC [3] (bifenthrin)	5.12 to 6.4 fl oz (0.08 to 0.1 lb ai/A)	30-day waiting period.
	Comite II [20] (propargite)	36 to 54 fl oz/Acre	30-day waiting period. Apply when mite colonies first form, when leaves are dry.
	Dimethoate 4E [1B]	0.66 to 1 pt	14-day waiting period.
	Hero [3] (zeta cypermethrin + bifenthrin)	10.3 fl oz	30-day wait for grain, 60 days for silage.
	Oberon 2 SC [23] (spiromesifen)	2.85 to 8.0 fl oz	5-day PHI for green forage and silage, 30 days for grain or stover.
	Onager [10A] (hexythiazox)	10 to 24 fl oz	30-day waiting period.
	Portal [21A] (fenpyroximate)	2 pints 0.1 lb ai/A)	14-day waiting period.
	Zeal WDG [10B] (etoxazole)	1.0 to 3.0 oz (0.045 to 0.135 lb ai/A)	* for seed production only, 21-day waiting period.
			NOTE: Treatments at hard-dough stage or later are not cost effective. When heavy infestations occur, erratic control will usually be the rule. Thorough coverage is important, higher volumes (2-3 gallons or more per acre) when applied by aircraft increase the effectiveness of the spray.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Seedcorn maggot, Seed corn beetle</b> Maggots are yellowish-white, tapered larvae about 1/4 inches. Beetles are about 3/8 inches, with two black stripes on brown wing covers.  Damage: Damage occurs in spring, especially if soils are cool and moist and seeds are not germinating rapidly. Damage is noticed as skips in plant stands. Seed will be hollowed out.  Threshold: Replanting is the only recourse if damage has already occurred. Use a planting-time treatment if fields have a history. No-till fields may be more vulnerable to attack.	<b>Seed Treatments</b>		Follow manufactures' guidelines for rates, application methods grazing and crop rotation restrictions. Rotation of insecticides during successive years is suggested.
	Cruiser 5FS [4A] (thiamethoxam)	0.56 to 3.61 fl oz / 80,000 seed	
	Poncho 600 [4A] (clothianidin)	1.13 to 2.26 fl oz/ 80,000 seed	
	Force ST [3] (tefluthrin)	3 to 4 oz/cwt seed	
	<b>Planting Time</b>		
	Aztec 2.1 G [1B,3] (tebupirromphos, cyfluthrin)	6.7 fl oz/1000 ft-row	
	Capture LFR [3] (bifenthrin)	0.2 to 0.78 fl oz/1000 ft-row	
	Counter 15G [1B] (terbufos)	6 to 8 oz/1000 ft-row	
	Lorsban 15G [1B] (chlorpyrifos)	8 to 12 oz/1000 ft-row	
	Force 3G [3] (tefluthrin)	4 to 5 oz/1000 ft-row	
<b>Southwestern corn borer</b> Full grown caterpillars are white with prominent dark spots on body. Eggs are laid in masses of 12-30. They overlap like egg scales. Eggs are white when first laid, then red bands appear before they hatch.  Damage: First generation causes "dead heart" in plants. Second generation tunnels throughout stalk. May girdle mature stalks causing lodging.  Threshold: Threshold based on egg masses. Treat if 25% of plants have egg masses or newly hatched larvae. A repeat application may be needed in 7-10 days.	<b>Seed Treatments</b>	Transgenic seed	Follow company's guidelines for providing refugia, crop rotation and other resistance management strategies.  21-day wait for grain or fodder, 0 days for green forage.  21-day waiting period.  7-day wait for forage, 28 days for grain or fodder.  30-day waiting period for grazing or harvest.  21-day waiting period for harvest.  21-day wait for harvest; 12 days for forage or grazing.  30-day wait for grain, 60 days for silage.  21-day waiting period.  35-day waiting period.  30-day PHI for grain and stover, 60 days for forage.
	Resistant varieties		
	<b>Post-emergence Sprays</b>		
	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	
	Besiege[28,3] (chlorantraniliprole + lambda-cyhalothrin)	6.0 to 10 fl oz	
	Blackhawk [5] (spinosad)	2.2 to 3.3 fl oz (0.05 to 0.075 lb ai/A)	
	Brigade 2EC [3] (bifenthrin)	2.6 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	
	Cobalt [1B,3] (chlorpyrifos + gamma-cyhalothrin)	19 to 38 fl oz	
	Delta Gold [3] (deltamethrin)	1.5 to 1.9 fl oz (0.018 to 0.022 lb ai/A)	
	Fastac [3] (alpha-cypermethrin)	2.7 to 3.8 fl oz (0.017 to 0.025 lb ai/A)	
	Intrepid 2F [18] (methoxyfenozide)	4 to 16 fl oz (0.06 to 0.25 lb ai/A)	
	Karate w Zeon (lambda cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	
	Hero [3] (zeta-cypermethrin + bifenthrin)	4.0 to 10.3 fl oz	

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Southwestern corn borer (cont'd)</b>	Lorsban 4E [1B] (chlorpyrifos)	1.5 to 2 pt (0.75 to 1 lb ai/A)	21-day PHI for harvest.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day wait for grain or harvest.
	Mustang MAXX EC [3] (zeta-cypermethrin)	2.72 to 4.0 fl oz (0.017 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Prevathon[28] (chlorantraniliprole)	14 to 20 fl oz (0.047 to 0.067 lb ai/A)	14-day waiting period for harvest 1 day for forage, silage, stover.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	2.56 to 3.84 fl oz (0.01 to 0.015 lb ai/A)	21-day waiting period.
	Radiant SC [5] (spinetoram)	3.0 to 6.0 fl oz (0.023 to 0.047 lb ai/A)	28-day wait for harvest, 3 days for forage or fodder.
	Stallion [1B,3] (chlorpyrifos + zeta cypermethrin)	9.25 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	1.28 to 1.92 fl oz (0.02 to 0.03 lb ai/A)	21 days for harvest. Check label for grazing restriction.
<b>Western bean cutworm</b> Larvae are dark brown with faint diamond-shaped markings on their backs. Measures 1.5 inches.	<b>Seed Treatments</b>  Resistant varieties	Transgenic seed	Follow company's guidelines for providing refugia, crop rotation and other resistance management strategies.
Eggs are deposited in masses of 4-200 on upper surface of leaves.	<b>Post-emergence Sprays</b>  Asana XL [3] (esfenvalerate)	2.9 to 5.8 fl oz (0.015 to 0.03 lb ai/A)	21-day waiting period.
Damage: Larvae feed on developing tassel, or silk. They feed on developing kernels once the ear has formed.	Baythroid XL [3] (beta-cyfluthrin)	1.6 to 2.8 fl oz (0.013 to 0.022 lb ai/A)	21-day waiting period for grain or fodder, 0 days for green forage.
Threshold: Treat of eight percent or more of the plants have egg masses or small larvae in the tassels and the crop is 95% tasseled.	Besiege[28,3] (chlorantraniliprole + lambda-cyhalothrin)	5.0 to 10 fl oz	21-day wait for harvest.
	Blackhawk [5] (spinosad)	2.2 to 3.3 fl oz (0.05 to 0.075 lb ai/A)	7-day wait for forage, 28 days for grain or fodder.
	Brigade 2EC [3] (bifenthrin)	2.6 to 6.4 fl oz (0.033 to 0.1 lb ai/A)	30-day wait for grazing or harvest.
	Cobalt [1B, 3] (chlorpyrifos + gamma-cyhalothrin)	13 to 26 fl oz	21-day wait for harvest, 14 days for grazing or silage.
	Coragen [28] (chlorantraniloprole)	3.5 to 7.5 fl oz (0.045 to 0.098 lb ai/A)	14-day waiting period for harvest 1 day for forage, silage, stover.
	Fastac [3] (alpha-cypermethrin)	1.8 to 3.8 fl oz (0.011 to 0.025 lb ai/A)	30-day wait for harvest, 60 days for grazing.
	Intrepid 2F [18] (methoxyfenozide)	4 to 16 fl oz (0.06 to 0.25 lb ai/A)	21-day wait for harvest.
	Karate w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 fl oz (0.015 to 0.025 lb ai/A)	21-day wait for harvest or grazing.
	Lorsban 4E [1B] (chlorpyrifos)	1 to 2 pt (0.5 to 1 lb ai/A)	21-day wait for harvest.
	Match-Up [1B,3] (chlorpyrifos + bifenthrin)	5.5 to 16.4 fl oz	30-day wait for harvest or grazing.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Western bean cutworm (cont'd)</b>	Mustang MAXX EC [3] (zeta-cypermethrin)	1.76 to 4.0 fl oz (0.011 to 0.025 lb ai/A)	7-day waiting period for harvest.
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	1.92 to 3.2 fl oz (0.0075 to 0.0125 lb ai/A)	21-day waiting period.
	Pounce 25 WP (permethrin)	3.2 to 6.4 oz (0.5 to 0.1 lb ai/A)	30-day waiting period.
	Radiant SC [5] (spinetoram)	3.0 to 6.0 fl oz (0.023 to 0.047 lb ai/A)	28-day wait for harvest, 3 days for forage or fodder.
	Sevin XLR [1A] (carbaryl)	2 qt (1 lb ai/A)	48 days for grain, 14 days for forage or silage.
	Stallion [1B,3] (chlorpyrifos + zeta-cypermethrin)	5.0 to 11.75 fl oz	30-day waiting period for grain, 60 days for forage.
	Warrior II w Zeon [3] (lambda-cyhalothrin)	0.96 to 1.60 fl oz (0.015 to 0.025 lb ai/A)	21 days for harvest. Check label for grazing restriction.
<b>White grub</b> Large, "C" shaped grub with a white body and a brown head.  Damage: Feed on developing roots, cause slow growth, stunting, and stand loss.  Threshold: No reliable thresholds are available. Consider using an at-planting treatment for "suppression" if field has a history of grub problems.	<b>Seed Treatments</b>  Cruiser 5FS [4A] (thiamethoxam)  Poncho 600 [4A] (clothianidin)  Force ST [3]	  0.56 to 3.61 fl oz / 80,000 seed  1.13 fl oz/80,000 seed  3 to 4 oz/cwt seed	  Do not use treated seed for feed, food, or oil processing.  Do not use treated seed for feed, food, or oil processing.  Do not use Force 3G if Force ST was used.  Do not use treated seed for feed, food, or oil processing.
	<b>Planting Time</b>  Aztec 2.1 G [1B,3] (tebupirromphos, cyfluthrin)  Ballista LFC [3] (lambda-cyhalothrin)  Counter 15G [1B] (terbufos)  Force 3G [3] (tebupirromphos, cyfluthrin)  Fortress 5G [1B] (chlorethxyfos)  Proaxis 0.5 SC [3] (gamma-cyhalothrin)	  6.7 fl oz/1000 ft-row  0.66 fl oz/1000 ft-row  6 to 8 oz/1000 ft-row  4 to 5 oz/1000 ft-row  3.0 to 3.75 oz/1000 ft-row  0.66 fl oz/1000 ft-row	  Follow manufactures' guidelines for rates, application methods grazing and crop rotation restrictions. Rotation of insecticides during successive years is suggested.      T-band or in-furrow.  T-band or in-furrow.

<i>Pest, Damage and Treatment Threshold</i>	<i>Insecticide Formulation and [Group]* and (active ingredient)</i>	<i>Rate of Product per Acre or 1,000 ft-row</i>	<i>Comments</i>
<b>Wireworm</b> Hard-shelled, smooth, cylindrical, yellowish to brown worms. Two to six year life cycle. More common in corn planted into a sod or grass pasture.  Damage: Feed on seed, seedling. Cause stunting and stand loss.  Threshold: No reliable thresholds are available. Treat if field has a history of problems. Wireworms may be more of a problem in no-till or minimum till fields.	<b>Seed Treatments</b>		
	Cruiser 5FS [4A] (thiamethoxam)	0.56 to 3.61 fl oz / 80,000 seed	Do not use treated seed for feed, food, or oil processing.
	Poncho 600 [4A] (clothianidin)	1.13-2.36 fl oz/ 80,000 seed	Do not use treated seed for feed, food, or oil processing.
	Force ST [3] (tebupirromphos, cyfluthrin)	3 to 4 oz/cwt seed	Do not use Force 3G if Force ST was used. Do not use treated seed for feed, food, or oil processing.
	<b>Planting Time</b>		
	Aztec 2.1 G [1B,3] (tebupirromphos, cyfluthrin)	6.7 fl oz/1000 ft-row	Follow manufactures' guidelines for rates, application methods grazing and crop rotation restrictions. Rotation of insecticides during successive years is suggested.
	Ballista LFC [3] (lambda-cyhalothrin)	0.66 fl oz/1000 ft-row	
	Capture 1.5 G [3]	3.2 to 8 oz/1000 ft-row	
	Counter 15G [1B] (terbufos)	6 to 8 oz/1000 ft-row	T-band or in-furrow.
	Force 3G [3] (tebupirromphos, cyfluthrin)	4 to 5 oz/1000 ft-row	T-band or in-furrow.
	Fortress 5G [1B] (chlorethxyfos)	3.0 to 3.75 oz/1000 ft-row	
	Lorsban 15 G [1B] (chlorpyrifos)	8 oz/1000 ft-row	
	Proaxis 0.5 SC [3] (gamma-cyhalothrin)	0.66 fl oz/1000 ft-row	

## Pre-harvest Intervals and grazing restrictions

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Asana XL	21-day PHI for harvest or grazing
Aztec 2.1G	Do not exceed 7.3 lb. per acre per crop season
Baythroid XL	21-day waiting period for grain or fodder, 0 days for green forage
Besiege	21-day waiting period
Blackhawk	7-day wait for forage, 28 days for grain or fodder
Brigade 2EC	30-day PHI for harvest or grazing
Cobalt	21-day waiting period for harvest
Comite II	Apply in a minimum of 20 gal of water/acre ground, 3 gal by air
Counter 15G	Check label for precautions regarding application of Counter 15G and its interaction with ALS inhibiting herbicides.
Cruiser 5FS	No grazing restriction
Delta Gold	21-day PHI for harvest, 12 days for forage or grazing
Dimethoate	Apply by aircraft. 14 day PHI for harvest or grazing
Fastac	30-day PHI for harvest, 60 days for grazing
Force 3G	30-day crop rotation restriction
Hero	30-day PHI for grain and stover, 60 days for forage
Intrepid	21-day PHI for harvest
Lannate	21-day PHI for harvest, 3 days for forage
Lorsban 4E	21-day PHI for harvest,
Match-Up	30 day PHI for harvest or grazing
Mustang MAXX	7-day PHI for harvest
Oberon	5-day PHI for green forage and silage, 30 days for grain or stover
Onager	30-day PHI for harvest or grazing
Poncho	45-day PHI for harvest or grazing
Portal	14-day PHI
Pounce	30-day PHI for grazing or harvest
Prevathon	14-day PHI for harvest, 1 day for forage, silage, fodder
Proaxis	21-day PHI for harvest or grazing
Radiant	28-day PHI for harvest, 3 days for fodder or forage
Sevin XLR	14-day PHI for grazing, 48 days for harvest
Stallion	30-day PHI for grain, 60 days for forage
Warrior II w Zeon	21-day PHI for harvest
Zeal	21-day PHI

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\*MOA group numbers in brackets [#] following 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). 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**

## **WE ARE OKLAHOMA**

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 co-operatively 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.

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