



INSECT PEST MANAGEMENT

There are more than twenty common insect pests of field corn. The potential for at least one of them to cause problems makes it worthwhile to scout cornfields for insect damage to determine if control tactics are needed.

Scout cornfields weekly from seedling emergence until the corn is knee-high. Thereafter, scout fields periodically until tasselling, at tasselling, and during ear formation.

How to Scout Corn for Insect Pests

To scout corn, walk across the field in a zigzag or a “U” pattern. Look for any areas where there has been poor emergence, where the seedlings appear to be unhealthy (yellowed, stunted, or deformed plants), where there is evidence of insect chewing, or where plants appear to have been cut off at ground levels. Look for patterns in the field. For example, perhaps poor emergence occurs in a regular pattern, such as in low spots where growing conditions are poor, at the end of each row, or in every eighth row. Maybe the damage occurs only on the edges of the field.

Insect damage tends to occur in patches. Use a shovel or trowel to dig in the affected area and at the margins of the patch. Look for the insects themselves or for damaged plants. When the corn is small, insects cause injury by eating out seeds, pruning roots, and feeding on the growing point, causing plant death or deformation. As the plants grow, look for insects and insect damage in the leaf whorl, at the base of the leaf sheath, on the tassels, silks, and the developing ear, and in the stalk. “Identifying Caterpillars in Field, Forage, and Horticultural Crops,” ANR-1121, may be useful in identifying insect pests.

Insects to Look for

Corn insect pests can be divided into five categories related to the corn plant's growth stage:

- Insects that feed on seedlings, reducing plant stand and health in the first few weeks;
- Insects that feed in the whorl;
- Insects that feed on tassels and silks, interfering with pollination;
- Insects that feed on ears and individual kernels; and
- Insects that tunnel in the stalk, causing lodging and ear loss.

Insects That Feed on Seedlings

Seedlings are the most easily damaged corn plant stage. Protecting them from insect feeding is important because the

farmer must achieve an adequate plant population during this stage to realize full yield potential. When damage has been caused by billbugs, wireworms, sugarcane beetles, or white grubs, there is little that can be done in the current year. For fields with a history of damage by these insects, plant seed treated with higher rates of insecticide seed treatment or apply a broad spectrum at-planting insecticide. See *When to Use At-Planting Treatments* further in this discussion.

Billbugs are robust, reddish-brown or black beetles with long, curved snouts. They are about 0.5 inch long and often covered with mud. They attack corn at the base of the stalk or just below the soil's surface. Billbugs feeding on unfurled leaves result in rows of circular to elliptical holes across the leaf when it expands. Billbugs are worse in no-till systems. They usually cause economic damage in corn following corn (not rotated), corn in fields adjacent to the past year's corn, or in fields seriously infested with nutsedges and crabgrass. Rotation is an effective management tool for billbugs because the insect has only one generation per year, moves by crawling, and has a limited host range. Rotation is particularly effective when large blocks are rotated, maximizing isolation. In no-till systems, subsoiling can help enhance the vigor of corn and increase tolerance for billbug infestations. Good fertilization and irrigation can increase the plant's tolerance to billbugs.

Wireworms are yellow-brown, wire-like insects. Their bodies are hard and feel slick. Wireworms vary in size from 0.5 to 2 inches long. They live in the larval stage for several years, depending on the species, and grow up to become click beetles. Wireworms prune roots and burrow in the base of seedlings, causing stunting or death of plants. They also will feed on germinating seed. Wireworms are more common in certain conservation tillage situations.

Wireworms are likely where corn has been double cropped after grain, pasture, or clover, or when it has been planted after weedy fallow. Wireworms can inhabit the soil to a depth of up to 5 feet, and they are very difficult to find. They may be even worse in corn planted early in cold soil. Since the oldest larvae cause the greatest amount of damage, it is possible to scout for these wireworms in the soil before planting. Use bait consisting of 0.5 cup of mixed wheat and corn seed soaked overnight in water. Place the bait in a little hole in the soil; then cover it with soil. Place 10 traps per acre in fields, especially those that have been in grass fallow.

After seeds have germinated, dig out the soil in a 12- x 12-inch soil core surrounding the bait. Examine the soil for wireworms. If one or two traps are infested, use an at-planting insecticide or seed treatment.

White grubs are occasional pests of corn. Plant damage is caused by the grubs' feeding on the roots of the plant. White grubs are the immature feeding stage of May beetles, Japanese beetles, masked chafers, and other scarab beetles. They live one to three years as grubs in the soil, depending on the species.

Green June beetle grubs may appear in fields where organic fertilizer, such as broiler litter, is used. See ANR-991, "Biology and Control of Green June Beetle," <http://www.aces.edu/pubs/docs/A/ANR-0991/>. In September, scout fields where broiler litter has been used and control grubworms in the fall to prevent damage to corn seedlings.

Sugarcane beetle adults are black and about 0.5 inch long; they gouge holes in stalks just below the ground's surface. Infestations are worse in reduced tillage systems following grass, fallow, or small grains. Corn planted into a field that has been in pasture for several years is at risk regardless of tillage practices.

Sugarcane beetle adults are active at the time corn is planted. Certain seed treatments and at-planting insecticides may be useful in controlling this beetle. Fields that are at risk for sugarcane beetle should be scouted frequently (at least twice weekly) from crop emergence until the plants are 8 to 12 inches tall. If sugarcane beetles and/or damaged plants are found, a foliar spray with Lorsban or one of the registered pyrethroids may kill the adult beetles before they cause further damage. Do not replant corn into an infested area while adult beetles are still present.

Cutworms can actually cut small corn plants off at the base. Cutworm damage is largely confined to plants less than the eight-leaf stage. Damage is most likely to occur when seedlings are growing slowly because of adverse environmental conditions. Cutworms can usually be monitored by the damage they do. "Window-pane" feeding is a sign of young cutworms. Larger worms cut plants off near the soil line. If cut plants are found, check the top 2 inches of soil extending 4 inches from both sides of the row where the plants have been cut. Cutworms normally spend the day just under the soil surface or under debris close to their feeding sites. There are several different kinds of cutworms. The mature larva is a plump, smooth, greasy-looking, dark gray, spotted or striped caterpillar.

Consider control measures for cutworms if more than 10 percent of seedlings are cut and the worms are present. Cutworms tend to be associated with no-till corn and/or with fields where there was a substantial cover of green weeds in the previous year or just prior to planting. Burn down cover crops and/or weeds four weeks before planting to reduce problems with cutworms.

Chinch bugs overwinter on the edges of fields in wild grasses like big bluestem and broom sedge. Weather conditions in the winter can cause many chinch bugs to die on the overwintering hosts. In spring, they move into transition hosts like wheat. Later, they may invade corn. Invasion can occur at any time, but corn is most susceptible when it is less than a foot tall.

Chinch bugs congregate at the base of plants and thrive in cracks and crevices that develop as the soil dries. They suck sap from roots, leaves, and stems of plants, causing stunting, deformation, wilting, and plant death. The plants may be purpled at the base. Chinch bug wounds may be invaded by soft rots, causing further damage. Plants with severely damaged roots may lodge.

The adult chinch bug is black with white wing covers. It is about 0.2 inch long. Immature chinch bugs are reddish brown with a white band running horizontally around their bodies. They can be hard to find because they hide in the leaf sheaths, under residue, or in cracks in the soil.

A plant damaged by chinch bugs is often brittle and will break off if it is moved from side to side. Vigorously growing corn can often outgrow potentially damaging insect situations. However, stresses such as cold temperatures, too much or too little water, and herbicide injury will cause the corn to grow less vigorously.

Chinch bugs almost always occur in patches, starting near the edges of a field. They usually congregate on isolated plants and then move out. Chinch bugs tend to be worse in fields with the most surface residue. Therefore, corn in fields with reduced tillage or with grassy weeds is prone to chinch bug damage. Some of the worse damage occurs in heavy clay soil because the soil tends to crack, allowing the bugs to get down to feed on the roots.

If infestations are detected early enough, a corrective insecticide treatment may be applied. At-planting insecticides or seed treatments can protect young plants from chinch bugs, up to about 25 days after emergence (V1-V3). Otherwise, use a directed spray of a foliar insecticide. Treat for chinch bugs when three to five bugs per plant are found in 20 percent of the corn in a field and when the plants are under water stress or are growing slowly due to herbicide stress or cool temperatures. It is important to aim the insecticide at the base of the plant where the bugs congregate. If the chinch bugs are still migrating into a field, a second application of insecticide may be necessary.

Flea beetles are shiny black bugs that jump instantly when they are disturbed. Look for their characteristic feeding "scratch marks." Flea beetles seldom cause economic damage to cornfields in Alabama. Plants are more susceptible when temperatures are cold, causing seedling growth to slow down. However, the growing point stays below ground level until about the time that the fifth leaf emerges, so plants are usually able to recover from flea beetle injury. Consider treatment only when 75 percent of plants are infested or when more than five beetles per plant are found. Beetles are more numerous during cold springs following mild winters.

Thrips are tiny, fast-crawling, yellow or black insects found in the young plant. They cause "sandblasting" on the leaves. The leaf mottling caused by thrips looks silvery in severely damaged plants. Thrips seldom cause economic damage to corn. Consider treatment only if more than 80 percent of the leaf area is affected or if the plants are severely deformed.

Leafhoppers are small, wedge-shaped, green or brownish bugs that suck sap from buds and leaves of corn. Damage by this insect is seldom great enough to justify control. However, two leafhopper species are responsible for spreading corn stunt virus disease. This disease can cause severe stunting and a subsequent reduction in yield. Try to plant virus-resistant corn

to minimize the impact of this virus. If corn that is susceptible to corn stunt virus is to be planted, an at-planting systemic insecticide or seed treatment will help control the leafhopper vectors and, hence, the disease.

Southern corn rootworms can make a circular tunnel through the young seedling, causing severe damage if the growing point is eaten. Damage from this pest is most likely when a legume cover crop has been planted. If such a cover crop is planted, be sure to kill it with herbicides four weeks before planting. Southern corn rootworms overwinter as adults. Eggs are laid in the spring and the larvae attack seedling corn.

Stink bugs are major pests of young corn, particularly in South Alabama. Three species—southern green stink bug, brown stink bug, and green stink bug—occur in Alabama. The brown stink bug is generally hardest to control with insecticides. Stink bugs overwinter as adults under plant residue, tree bark, or culverts in drainage areas. At least two generations occur each year. Parasites and predators, including fire ants, contribute to stink bug control. Certain conditions predispose a cornfield to stink bug problems, including excessive weeds in winter or spring prior to planting, double cropping, and conservation tillage. Corn planted near wheat fields may also be more likely to have problems with stink bugs. Stink bugs have a wide host range, including wheat, corn, cotton, and soybeans. Stink bugs will move from one field to another during the season. Plants on field borders may be more severely affected than those further into the field. Stink bug infestations are very clumped and are hard to scout for.

Stink bugs have sucking mouthparts, which they insert into the plant in order to feed. On young corn plants, stink bugs feed at the base of the plant and injure the growing point. Extreme feeding leads to the death of plants.

If the growing point is badly damaged, the plant may develop multiple stems. Moderate feeding results in a buggy whip symptom, where one side of the plant grows faster than the other and the tips of the leaves are entangled in the whorl. If more than 10 percent of plants show a buggy whip symptom, or if there are more than one or two stink bugs per plant, an insecticide treatment may be justified. As the corn gets older, stink bugs can damage the developing ears. See stink bug section later in this publication.

Insects That Feed in the Whorl

Fall armyworms, corn earworms, European corn borers, cereal leaf beetle adults, and grasshoppers can feed on corn leaves, particularly in the whorl stage. Use Table 1 to determine if the potential amount of damage from these leaf-feeding insects justifies using a corrective treatment.

Fall armyworms, corn earworms, southwestern corn borers, and European corn borers cause damage in more than one category. They are general feeders that feed in the whorl and attack the corn ear as well. Also, corn borers can cause plant lodging by boring into the cornstalks. Each of these insects has alternate hosts and each one has several generations per year. It may be economically feasible to use an insecticide to control these pests if they are causing excessive damage in the whorl stage. But, it is not usually economically feasible to control them in the ear stage with insecticides. See

Bt corn section and Table 3 for a discussion of this method for controlling whorl-feeding caterpillars. European corn borers are found in north Alabama. See *Insects That Attack the Stalk* for further discussion of corn borers.

Table 1. Yield Loss Potential in Bushels per Acre

Stage of Growth	Percent Leaf Area Destroyed				
	20	40	60	80	100
7 leaf	0	1	4	6	9
9 leaf	0	2	6	9	13
11 leaf	1	5	9	14	22
13 leaf	1	6	13	22	34
15 leaf	2	9	20	34	51
17 leaf	4	12	27	45	69
Tassel	7	21	42	68	100
Silks Brown	6	18	38	60	90
Blister	5	16	30	50	73
Milk	3	12	24	41	59
Soft Dough	2	8	17	29	41
Dent	0	4	10	17	23

Source: van Duyn, North Carolina State University.

Grasshopper outbreaks are likely to occur during a drought and for the next 1 to 2 years. There are numerous grasshopper species that attack corn. They overwinter as eggs in the soil. Best control is achieved when grasshoppers are still young. It is very difficult to kill nearly mature grasshoppers of most species and almost impossible to kill lubber grasshoppers (black with yellow markings). Infestation of grasshoppers is highest in no-tillage situations, along field margins.

Cereal leaf beetles are pests of wheat, oats, and other small grains. Adults emerge as the grain crop is drying and migrate to other areas, including cornfields, in search of food. Cereal leaf beetles make long, narrow feeding scars between leaf veins. Leaf feeding by these beetles is usually cosmetic. They do not stay very long in cornfields. Therefore, damage is a single, short-term event that rapidly developing corn plants usually outgrow.

Insects That Feed on Tassels and Silks

Japanese beetles, corn earworm larvae, corn rootworm adults, and grasshoppers may all clip corn silks. When these insects feed on the silks and clip them off, the result can be incomplete pollination. Silk clipping has to be severe to affect pollination. Therefore, it is very important to determine when silk clipping is occurring relative to the pollination process. Pollination occurs 3 to 8 days after full tasselling, and it takes 12 to 24 hours for a pollen grain to move down the silk. Poor pollination results in ears that are only partially filled, ears that are smaller than normal, and barren stalks. An insecticide treatment to protect the silks may be justified if (1) less than 75 percent of the ears have silks; AND (2) there are five or more rootworm beetles or two or more Japanese beetles on each ear, or there are corn earworm larvae on each ear; AND (3) silks are being clipped to within 0.5 inch of the ear tip.

Corn leaf aphids are small, blue-green, soft-bodied insects with dark blue “tail pipes.” They usually colonize the upper

leaves and tassels of corn plants. Numerous white cast skins are usually seen on the plant and on the ground around the plant. Aphids excrete a sticky substance that may coat nearby plant parts. Microorganisms use this “honeydew” as a food source, resulting in a blackened condition called “sooty mold.” High populations on the tassels and silks can interfere with pollination. Treatment may be justified when there are 50 or more aphids on 50 percent or more of the plants when plants are tasselling.

Insects That Feed on Ears

Stink bugs feed on all plant parts but prefer the high liquid content in developing grain. Ears moderately damaged by stink bugs will typically crook away from the plant stem. Kernels are aborted at and near the feeding site.

Stink bug feeding on young ears, prior to pollination, often results in the destruction of those ears. Best results are obtained if corn is treated while the ear is forming (less than 1 inch long), around the V15 growth stage. At that time, two stink bugs per plant can reduce yields by 40 percent. At this stage, treat if 5 percent of plants have stink bugs. At kernel fill, treat if 10 percent of the plants have stink bugs. At the V18 stage, ears approximately 2 inches long, through the R1 stage, stink bug feeding can also result in reduced yields. Therefore, continue to protect corn plants from stink bugs through the silking stage. After silking, losses due to stink bugs are usually not as significant.

Corn earworm caterpillars (second generation) feed on corn ears. Feeding is usually confined to the tip end of the ear. When corn earworms feed on kernels, they open the husks and provide an entry for disease and bird feeding. The female lays her eggs one at a time, usually on the developing silks. Small larvae feed on the silks and then enter the tip of the ear where they will feed on developing kernels. Corn earworm larvae will reach 1.5 inches in length in about 14 to 21 days. Because the larvae are cannibalistic, there will usually be only one earworm larva per ear.

Ear feeding is common in most cornfields, with 60 to 100 percent of the ears having a single caterpillar in years of high populations. Also, secondary ears may be infested. Yield loss in typical field corn, though, is usually not more than 3 percent. Since chemical control requires multiple applications, spraying to reduce ear infestation is seldom economically justified in field corn.

Fall armyworm larvae also feed on developing kernels. The caterpillar generally enters the ear from the sides as well as from the tip of the ear. When populations are heavy, it is not unusual to find several worms within a single ear. It is difficult to control the ear-attacking phase of the fall armyworm. Early-planted corn is less likely to be damaged.

European corn borer larvae (also see below) bore into kernels and cobs. If the corn borer damages the ear shank, the entire ear can fall to the ground. Early-planted, early-maturing corn is recommended in order to escape the heavier pest populations that occur as the weather becomes warmer. Chemical control is effective only when the timing of the application kills the larvae before they enter the ear. See Bt corn section for more information.

Insects That Attack the Stalk

Stalk borers are best managed using Bt corn that is active on stalk borers. Refuge requirements prevent the use of this corn on all the acreage. To control stalk borers in the refuge corn, see the list of insecticides that can control stalk borers before they enter the corn plant in Table 6.

European corn borers (second generation) usually infest corn during the silking stage. Silks make the field more attractive to the female corn borer moths. Average grain loss from the second generation corn borer is about 6 percent per tunnel per plant, but actual losses may be higher or lower. European corn borers also may interact with stalk rot organisms to enhance the effect of these plant pathogens. European corn borers are an occasional problem in north Alabama.

Common stalk borers are easily recognized by the transverse purple band occurring near the legs. They migrate out of field edges and waterways. Look for severe plant damage and feeding deep in the whorl. Later, they move inside the stalk.

Southwestern corn borers have several generations per year; the most serious is that which enters the stalk a few inches above the ground and girdles the inside of each stalk until it topples over. Recently this has been a severe pest in north Alabama.

Overall losses from serious infestation of southwestern corn borers can be considerable (i.e., 25 to 50 percent) if yield potential of the crop is high. They are difficult to manage because there are few cultural control options. Also, the second generation is hard to scout for, and insecticide treatments are effective only against small caterpillars before they bore into the stalk. Bt corn for corn borer is the most effective way to manage this pest. See Table 3.

Southern corn stalk borer is a similar insect, but it does not girdle the stem.

Insects That Attack the Roots

Corn rootworms (several species). Southern corn rootworm is most likely to be a problem in fields that were weedy before spring planting. Adults are attracted to lay eggs in the weedy areas. Southern corn rootworm overwinters as adults, and the larvae attack corn early in the season, causing the young plants to die.

Recently, western corn rootworms moved into Alabama. They are now found in the northern part of Alabama. Western corn rootworm larvae can destroy most of a plant's root system, causing the plant to fall over. The plant may straighten as it recovers, giving it a goosenecked appearance. Western corn rootworm larvae hatch in May and continue to occur through late June. Injury will not appear until mid to late season, if western corn rootworm is the problem.

In summer western corn rootworms lay their eggs in the soil of cornfields. The eggs overwinter and hatch the following May. Because the eggs overwinter in the soil and the larvae feed on corn but not other major crops, this pest can be controlled by rotation with soybeans or some other crop.

Rootworms can be controlled with insecticides. The insecticides must be applied in or incorporated into the soil at planting or shortly thereafter as a cultivation treatment. Seed treatments may also be effective. See Table 2.

Bt corn is available for control of western corn rootworms but not for southern corn rootworms. Several brands of rootworm active Bt corn are available. See Table 3.

The adults of both species—southern corn rootworm and western corn rootworm—can feed on the silks and reduce pollination.

Effects of Weather on Corn Pest Incidence

Cool temperatures delay seed germination and early-season growth. This increases the risk of insect damage because the young corn plants are exposed to a longer feeding period by insects. Fall armyworms, chinch bugs, and lesser cornstalk borers are usually more abundant in dry years.

When to Use At-Planting Treatments

The advent of seed treatments such as Poncho and Cruiser have changed the way we manage early season insects. However, there is still a place for at-planting soil insecticides in fields that are at high risk from cutworms or other soil insects.

A field's history should help determine whether to use an at-planting insecticide or a high rate of insecticide seed treatment. Rotated, conventionally tilled corn has the least problems with early-season insects. Cornfields following pasture, in non-rotated corn, and in conservation tillage or no-till corn are at the greatest risk from early season soil insects.

Bt Corn for Corn Borers

Corn has been genetically engineered to produce Bt toxins that are effective against caterpillar insects such as European corn borer, Southwestern corn borer, and lesser cornstalk borer. Bt corn can also help protect corn against attack by corn earworm and fall armyworm. It is marketed under various names. See Table 3.

Results from tests in Alabama show that Bt corn for corn borers is most likely to pay off in two situations:

- (1) in North Alabama, in areas where there are chronic problems with stalk borers such as the Southwestern corn borer (Yields of Bt corn were approximately 9 bushels per acre greater than yields of non-Bt corn in 2004); and
- (2) in years when corn must be planted after recommended planting dates (Tests in Baldwin County indicated that fall armyworm pressure is sufficiently high for Bt corn to be most profitable when planted in March) .

Bt corn for corn borers can be planted on up to 50 percent of the total corn acreage. There must be a 50 percent non-Bt corn refuge. In 2010, there may be some corn requiring only a 20 percent refuge. See Table 3.

Bt Corn for Other Caterpillar Pests

Some of the newer types of Bt corn are effective against other caterpillars, such as fall armyworm and corn earworm. See Table 3 for more information and refuge requirements.

Bt Corn for Rootworms

Corn has been genetically engineered to produce Bt toxins that are effective against the root-feeding larvae of certain beetles called corn rootworms, particularly the western corn rootworm. It is marketed under various trade names. See Table 3.

The genes in this genetically engineered corn are different from those conferring resistance to corn borers and other caterpillar pests. Sometimes the two types of genes are stacked in a hybrid—like in Herculex Xtra or YieldGard Plus, for example—in order to give the plant resistance to rootworms and caterpillars such as corn borer.

Western corn rootworm is a pest of continuous corn in the northern half of Alabama. This is where planting a hybrid with a rootworm Bt gene will be most likely to pay off. Bt corn for rootworms is not effective against southern corn rootworm.

When to Plant or Replant Corn

When planting corn, follow the recommended planting dates for your area of the state. Planting date recommendations are available at the Alabama Cooperative Extension System office in your county.

Damage from early-season soil insect pests, cutworms, and armyworms may look drastic. However, if the cutting damage by these insects occurs above the growing point and there is no additional feeding by these insects, the plants should recover.

Recommended plant stands for Alabama are from 16,000 to 24,000 plants per acre.

Before replanting corn, consider the time the damage occurs. Oftentimes, insect damage occurs too late to replant. If 50 percent of a stand is lost during the first four weeks after the first recommended planting date in your area, immediate replanting should result in yields of 85 to 90 percent of the original estimates. However, if 50 percent or more of the stand is lost after the fourth week, replanting is not profitable. At this point, more is lost due to the late replanting date than because of the poor stand. However, a 50-percent stand reduction will usually result in severe yield reduction and is not likely to return production costs. Also, weed problems in the thinned stand will likely be severe.

Considerations for Late-Planted Corn

Certain pest insects and pathogens reach high levels in late July and August and may severely infest late-maturing corn. Late-planted corn is vulnerable to attack by the lesser cornstalk borers, fall armyworms, and the European corn borers. Also, late-planted corn is attractive to adult rootworm beetles and may have excessive silk clipping.

Table 2. Corn Seed Treatments and Their Relative Efficacy for Control of Seedling Insect Pests in Field Corn

Insecticide Common names, rate	Relative Efficacy of the Seed Treatment ¹												
	Corn Billbug	White Grubs	Wire- worms	Seedcorn Maggot	Cutworm ²	Sugarcane Beetle	Southern Green Stink bug	Brown Stink bug	Chinch Bug	Southern Corn Rootworm ²	Western Corn Rootworm	Lesser Cornstalk Borer	
PONCHO 250 clothianidin, 0.25 mg a.i./kernel	NL	F	G	E	P	F	F	NL	G	E, NL	NL	G, NL	
PONCHO 500 clothianidin, 0.50 mg a.i./kernel)	F	G	G	E	P	G	F	NL	G	E	P	G, NL	
PONCHO 1250 clothianidin, 1.25 mg a.i./kernel	G	E	E	E	F	G	G	G, NL	E	E	F	E, NL	
CRUISER EXTREME 250 thiamethoxam, 0.25 mg a.i./kernel (plus fungicides ³)	NL	F	G	E	P	F	P	NL	F	E, NL	NL	G, NL	
CRUISER EXTREME 500 thiamethoxam, 0.5 mg a.i./kernel (plus fungicides ³)	NL	G	G	E	P	F	F	NL	F	E	NL	G, NL	
CRUISER EXTREME 1250 thiamethoxam, 1.25 mg a.i./kernel (plus fungicides ³)	G	E	E	E	F	G	G	NL	E	E	P	E, NL	
GAUCHO 600, IMIDA E-AG 5 FST, SENATOR, IMIDACLOPRID 5 imidacloprid, 0.60 mg a.i./kernel ⁴	NL	G	G	E	NL	NL	NL	NL	F	G, NL	NL	NL	
LATITUDE imidacloprid plus carboxin and metalaxyl fungicides, 3.5 oz./ hundredweight	NL	F, NL	G	G	NL	NL	NL	NL	F, NL	G, NL	NL	NL	
CONCUR imidacloprid plus metalaxl fungicide, 1.5 oz./42 lb. seed	NL	F	G	G	NL	NL	NL	NL	F, NL	G, NL	NL	NL	
KICKSTART diazinon and lindane plus carboxin fungicide, 1.5 oz./42 lb. seed	NL	F, NL	P?	F	NL	NL	NL	NL	NL	P?, NL	NL	NL	
KERNEL GUARD SUPREME KICKSTART VP permethrin plus carboxin fungicide, 1.5 oz./42 lb. seed	NL	F, NL	P?	F	NL	NL	NL	NL	NL	NL	NL	NL	

¹E = highly effective, G = effective, F = inconsistent results, P = not effective, based on trials in the Southeastern U.S.; L = insect is on the label for this product; LS = manufacturer has indicated the insecticide can suppress, but not control, the particular insect; NL = insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is specific knowledge to the contrary about product efficacy in the Southeast.

²In the Southeast, several species of cutworms overwinter as medium to large-sized larvae. They may be capable of cutting considerable numbers of seedlings before they eat a lethal dose of the insecticide. Black cutworm, the cutworm that appears on the label of most of these products, has a different life cycle in which eggs are laid in the spring, so that black cutworm larvae will be small if they have hatched out by the time the corn is planted.

Southern corn rootworm larvae are a seedling pest, not a mid-season pest like western corn rootworm larvae.

³Fludioxonil, mefenoxam, and azoxystrobin

⁴Other rates for this active ingredient are available. See label.

Table 3. Relative Efficacy of Various Bt Corn Products¹

Product Trade Name (Abbreviation)	Corn Earworm (ear)	Fall Armyworm (whorl)	Corn Borers ² (stalk)	Western Corn Rootworm ³ (roots)	Cutworm (seedling)	Lesser Cornstalk Borer ⁴	Refuge Requirement ⁵	Original Target Pests (Bt Protein)	Event(s)
Bt Corn for Controlling Above-Ground Caterpillars (Moths, Lepidoptera)									
Herculex I (BT (HX 1))	Poor-Fair ⁶	Excellent	Excellent	None	Good	Good-Excellent	50%	Corn borer, western bean cutworm, black cutworm and fall armyworm resistance (Cry1F) Liberty (glufosinate) herbicide tolerance	TC1507
Agrisure CB/LL	Fair-Good	Good	Excellent	None	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab) Liberty (glufosinate) herbicide tolerance	Bt11
YieldGard Corn Borer (YGCB)	Fair-Good	Good	Excellent	None	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab)	MON810
YieldGard VT Pro (VTP)	Very Good	Excellent	Excellent	None	Poor	Poor-Fair	20%	Corn borer, fall armyworm, corn earworm protection (Cry1A.105 and Cry2Ab)	MON89034
Bt Corn for Controlling Below-Ground Rootworms (Beetles, Coleoptera)									
Agrisure RW	None	None	None	Very good	None	None	20%	Corn rootworm protection (modified Cry3A)	MIR604
Herculex RW CRW (HXRW)	None	None	None	Excellent	None	None	20%	Corn rootworm resistance (Cry34/35Ab1) Liberty (glufosinate herbicide tolerance)	DAS-59122-7
YieldGard Rootworm (YGRW)	None	None	None	Fair-Good	None	None	20%	Corn rootworm protection (Cry 3Bb)	MON863
YieldGard VT Rootworm/RR2 (VTRR2)	None	None	None	Excellent	None	None	20%	Corn rootworm protection (Cry3Bb) Roundup (glyphosate) herbicide tolerance	MON 88017
Bt Corn for Controlling Above-Ground Caterpillars (Lepidoptera) and Below-Ground Rootworms (Coleoptera)									
YieldGard Plus (YGPL)	Fair-Good	Good	Excellent	Very Good	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab) Corn rootworm protection (Cry3Bb)	MON810 MON863
YieldGard VT Triple (VT3)	Fair-Good	Good	Excellent	Excellent	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab) Corn rootworm protection (Cry3Bb) Roundup (glyphosate) herbicide tolerance	MON 810 MON 88017
Agrisure CB/LL/RW	Fair-Good	Good	Excellent	Very Good	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab) Corn rootworm protection (modified Cry3A) Liberty (glufosinate) herbicide tolerance	Bt11 MIR604

continued

Table 3. Relative Efficacy of Various Bt Corn Products¹

Product Trade Name (Abbreviation)	Corn Earworm (ear)	Fall Armyworm (whorl)	Corn Borers ² (stalk)	Western Corn Rootworm ³ (roots)	Cutworm (seedling)	Lesser Cornstalk Borer ⁴	Refuge Requirement ⁵	Original Target Pests (Bt Protein)	Event(s)
Bt Corn for Controlling Above-Ground Caterpillars (Lepidoptera) and Below-Ground Rootworms (Coleoptera)									
Agrisure 3000 GT	Fair-Good ⁶	Good	Excellent	Very Good	Poor	Poor-Fair	50%	Corn borer protection (Cry1Ab) Corn rootworm protection (modified Cry3A) Roundup (glyphosate) herbicide tolerance Liberty (glufosinate) herbicide tolerance	Bt11 MIR604 SYTGA21
Herculex XTRA (CRW (HXRW) + BT (HX 1))	Poor-Fair	Excellent	Excellent	Excellent	Good	Good-Excellent	50%	Corn borer, fall armyworm, western bean cutworm, black cutworm and resistance (Cry1F) Corn rootworm resistance (Cry34/35Ab1) Liberty (glufosinate) herbicide tolerance	TC1507 DAS 59122-7
Genuity VT Triple PRO (GENVT3P)	Very Good	Excellent	Excellent	Excellent	Poor	Poor-Fair	20%	Corn borer, fall armyworm, corn earworm protection (Cry1A.105 and Cry2Ab) Corn rootworm protection (Cry3Bb) Roundup (glyphosate) herbicide tolerance	MON 89034 MON 88017
Genuity SmartStax (VT3P/HXX)	Very Good	Excellent	Excellent	Excellent	Good	Good-Excellent	20%	Corn borer, fall armyworm, corn earworm, western bean cutworm, black cutworm protection (Cry1A.105, Cry2Ab, Cry1F) Corn rootworm protection (Cry3Bb, Cry34/35Ab1) Roundup (glyphosate) herbicide tolerance Liberty (glufosinate) herbicide tolerance	MON 89034 MON 88017 TC1507 DAS 59122-7
Agrisure Viptera ⁷ stacked with Agrisure 3000 GT or Agrisure CB/LL/RW or Agrisure CB/LL	Excellent	Excellent	Excellent	Very Good if stacked with the RW trait (MIR 604)	Very Good	?	20%	Corn earworm, western bean cutworm, black cutworm, and fall armyworm control (Vip3A) Corn borer protection (Cry1Ab) Liberty (glufosinate) herbicide tolerance depending on stack: Roundup (glyphosate) herbicide tolerance and corn rootworm protection (modified Cry3A)	MIR162 Bt11 depending on stack: SYTGA21 MIR604

¹ Most of these insect resistant products are marketed as stacks with herbicide resistant products.

² Southwestern corn borer, European corn borer, and sugarcane borer.

³ There are several species of corn rootworm in the Southeast. Southern corn rootworm is the most prevalent species. These “rootworm” products are not effective against southern corn rootworm. They are effective against western corn rootworm larvae, which occur in areas such as north Alabama and north Georgia.

⁴ Lepidopteran Bt traits do not specifically list lesser cornstalk borer as a target pest.

⁵ See product Insect Resistance Management (IRM) documentation from the seed companies for more details.

⁶ The exact meaning of these terms is somewhat arbitrary. *Excellent* means better than 95 percent control. *Poor* means about 30 to 50 percent control. Rankings are meant to be relative, not absolute.

⁷ When this document was printed, Viptera was not for sale in the U.S. This product will not be available until all necessary regulatory approvals and authorizations have been granted.

Table 4. Examples of Broad-Spectrum At-Planting Insecticides for Insect Pests of Corn Seeds and Seedlings

Insecticide (Trade Names)	Rates	Pests Controlled Include
chlorpyrifos (Lorsban 15G) ^{1,2}	8-12 oz/1000 row ft.	Seedcorn maggot, Southern corn rootworm, White grubs, Cutworm, Lesser cornstalk borer
chlorpyrifos (Lorsban Advanced) ^{1,2}	2-6 fl. oz./1000 row ft.	Seedcorn maggot, Southern corn rootworm, White grubs, Cutworm
terbufos (Counter CR) ^{1,2}	6 oz/1000 row ft.	Seedcorn maggot, Southern corn rootworm, Wireworms, White grubs
bifenthrin (Capture 2E) ^{1,2}	0.15 - 0.3 oz/1000 row ft.	Seedcorn maggots, Southern corn rootworm, Wireworms, White grubs, Cutworm, Lesser cornstalk borer

See the insecticide label for specific use instructions, including whether product is to be applied in-furrow, as a T-band, or broadcast.

¹ Other trade names available see Table 7.

² Other insecticides are labeled for at-planting control of cutworms or other pests. These include the pyrethroids beta-cyfluthrin (Baythroid XL), cyfluthrin (Tombstone, Defcon 2.1G), esfenvalerate (Asana XL), gamma-cyhalothrin (Declare, other trade names), lambda-cyhalothrin (Karate with Zeon Technology, other trade names), permethrin (Pounce, other trade names), and zeta-cypermethrin (Mustang Max, other trade names). The insecticide mix chlorpyrifos+gamma-cyhalothrin (Cobalt) also can be applied at-planting, as can fipronil (Regent 4SC) and phorate (Thimet 20 G). Please see their labels for specific use instructions.

This table was adapted from a table prepared by Scott Stewart, University of Tennessee.

Table 5. Suggestions for Postemergence Corn Insect Control¹

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient Per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Armyworms, Fall and True					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.0113-0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide. Use highest rate for fall armyworms.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.	0.03-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1-2 qt.	1-2	14 (silage, green) 48 (fodder, grain)	
	chlorpyrifos LORSBAN ADVANCED	1-2 pt.	0.47-0.93	21 (harvest)	Use on true armyworms only. See label for detailed instructions.
	LORSBAN 75WG Other trade names ²	0.67-1.33 lb.	0.5-1	21 (harvest)	Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	13-26 fl.oz.	0.25-0.51 + 0.004-0.009	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide. Use high rate for fall armyworm.
	deltamethrin DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018-0.022	21 (harvest, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.
	esfenvalerate ASANA 0.66 EC Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21	Use on true armyworms. Asana is a RESTRICTED USE pesticide.
	flubendiamide BELT SC	2-3 fl.oz.	0.063-0.094	21 (grain, stover) 1 (green, silage)	
	gamma-cyhalothrin DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.

¹ See Table 6 for approximate relative efficacy of postemergence insecticides for control of corn insects. See Table 7 for a list of insecticides, formulations, restricted entry intervals, and days to grazing or harvest.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Armyworms, Fall and True (cont.)					
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide.
	methomyl LANNATE 2.4LV Other trade names ²	0.75-1.5 pt.	0.22-0.45	21 (grain, fodder) 3 (green)	Lannate is a RESTRICTED USE pesticide.
	methoxyfenozide INTREPID 2F	4-8 fl.oz.	0.06-0.12	21	
	methyl parathion PENNCAP-M 2FM Other trade names ²	2-3 pt.	0.5-0.75	12	PennCap-M is a RESTRICTED USE pesticide. For true armyworms.
	permethrin POUNCE 25 WP Other trade names ²	6.4-9.6 fl.oz.	0.1-0.15	30 (grain, fodder) 0 (green)	Pounce is a RESTRICTED USE pesticide.
	spinetoram RADIANT SC	3-6 fl.oz.	0.023-0.046	28 (grain or straw) 3 (forage, fodder, hay)	Use higher rate for heavier infestations or larger larvae.
	spinosad TRACER Other trade names ²	1-3 fl.oz.	0.031-0.094	28 (harvest) 3 (grazing)	Use higher rates for heavier infestations. Time applications to peak egg hatch.
	spinosad + gamma-cyhalothrin CONSERO	2-3 fl.oz.	0.03-0.046 + 0.01-0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	3.2-4 fl.oz.	0.02-0.025	30 (harvest) 60 (grazing)	Control may be variable. Mustang Max is a RESTRICTED USE pesticide.
Billbugs					
<i>General Comments: Billbug damage often shows up after the insects are through feeding. See Table 2 for suggested seed treatments and Table 4 for at-planting insecticides for control of billbugs.</i>					
	chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ²	2 pt. 1.33 lb.	0.93 1	21 (harvest) 21 (harvest)	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	38-42 fl.oz.	0.74-0.82 + 0.013-0.015	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Billbugs (cont.)					
	terbufos COUNTER 15G	6-8 oz./1000 row ft.	1.3 lb. a.i./A maximum	60 (harvest) 30 (grazing)	Apply in a 7-inch band over the seedling corn plants and lightly incorporate into the soil when billbug damage is observed. Counter is a RESTRICTED USE pesticide.
Chinch Bugs					
<i>General Comments: Apply insecticide as a directed spray to the base of plants in at least 15 to 20 gallons of water per acre. See Table 2 for suggested seed treatments and Table 4 for at-planting insecticides for control of chinch bugs.</i>					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.013-0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.	0.03-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1-2 qt.	1-2	14 (silage, green) 48 (grain, fodder)	
	chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ²	1-2 pt. 0.67-1.33 pt.	0.47-0.93 0.5-1	21 (harvest) 21 (harvest)	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	19-38 fl.oz.	0.37-0.74 + 0.007-0.013	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide.
	deltamethrin DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018-0.022	21 (grain, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Chinch Bugs (cont.)					
	esfenvalerate ASANA XL Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21 (harvest) ---	Asana is a RESTRICTED USE pesticide.
	gamma-cyhalothrin DECLARE Other trade names ²	1.54 fl.oz.	0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.92 fl.oz.	0.03	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide.
	spinosad + gamma-cyhalothrin CONSERO	3 fl.oz.	0.046 + 0.015	28 (harvest, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	3.2-4 fl.oz.	0.02-0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
Corn Earworms					
<i>General Comments: Using postemergent insecticides to prevent this insect from attacking ears is usually not practical. Insecticides listed here are for control of corn earworm in whorl-stage corn. Early planting may reduce damage from this pest. Corn earworm is also known as the bollworm. See Table 3 for suggested Bt corn for corn earworm control.</i>					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.013- 0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.	0.03-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1-2 qt.	1-2	14 (silage, green) 48 (grain, fodder)	Make applications directly onto the plant so that the spray will run onto the whorls.
	chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ²	1.5-2 pt. 1-1.33 pt.	0.71-0.93 0.75-1	21 (harvest) 21 (harvest)	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Corn Earworms (cont.)					
	chlorpyrifos + gamma-cyhalothrin COBALT	19-38 fl.oz.	0.37-0.74 + 0.007- 0.013	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025- 0.044	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide.
	deltamethrin DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018- 0.022	21 (harvest, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.
	esfenvalerate ASANA XL 0.66EC Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21 (harvest)	Use if excessively high numbers occur at silking. First application should be at or before silking. Subsequent applications should be made at 3- to 5-day intervals until silking is complete. Asana is a RESTRICTED USE pesticide.
	flubendiamide BELT SC	2-3 fl.oz.	0.063- 0.094	21 (grain, stover) 1 (green, silage)	
	gamma-cyhalothrin DECLARE Other trade names ²	0.77-1.28 fl.oz.	0.0075- 0.0125	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	0.96-1.6 fl.oz.	0.015- 0.025	21 (grain, fodder) 1 (green)	For control of corn earworm before it has entered the stalk or ear. Karate is a RESTRICTED USE pesticide.
	methomyl LANNATE 2.4LV Other trade names ²	0.75-1.5 pt.	0.22-0.45	21 (grain, fodder) 3 (green)	Apply a minimum of 20 gallons water per acre for best results. Lannate is a RESTRICTED USE pesticide.
	permethrin POUNCE 25 WP Other trade names ²	6.4-9.6 oz.	0.1-0.15	30 (grain, fodder) 0 (green)	Pounce is a RESTRICTED USE pesticide.
	spinetoram RADIANT SC	3-6 fl.oz.	0.023- 0.046	28 (grain or straw) 3 (forage, fodder, hay)	Use higher rate for heavier infestations or larger larvae.
	spinosad TRACER Other trade names ²	2-3 fl.oz.	0.062- 0.094	28 (harvest) 3 (grazing)	Use higher rates for heavier infestations. Time applications to peak egg hatch.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Corn Earworms (cont.)					
	spinosad + gamma-cyhalothrin CONSERO	2-3 fl.oz.	0.03-0.046 + 0.01-0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	1.76-4 fl.oz.	0.011-0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
Cutworms					
<i>See Tables 2 and 4 for suggested seed treatments and broad-spectrum preplant and at-planting insecticides for control of cutworms; see Table 3 for transgenic corn that can control cutworms.</i>					
	beta-cyfluthrin BAYTHROID XL	0.8-1.6 fl.oz.	0.007-0.013	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.fl.oz.	0.033-0.10	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties. May be applied preplant or preplant insertion.
	carbaryl SEVIN XLR PLUS Other trade names ²	2 qt.	2	48 (grain, fodder) 14 (green)	Most effective when applied in a 12-inch band over the row.
	chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ²	1-2 pt. 0.67-1.33 lb.	0.47-0.93 0.5-1	21 (harvest) 21 (harvest)	See label for detailed instructions. Can be applied preplant, at plant, or preemergence. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	13-26 fl.oz.	0.25-0.51 + 0.004-0.009	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide. Can be applied preplant, at plant, or preemergence.
	cyfluthrin TOMBSTONE Other trade names ²	0.8-1.6 fl.oz.	0.013-0.025	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide.
	deltamethrin DELTA GOLD 1.5 EC	0.8-1.5	0.01-0.018	21 (grain, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide. Can be applied pre- or postemergence.
	esfenvalerate ASANA XL 0.66EC Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21	Asana is a RESTRICTED USE pesticide. Can be applied at planting.
	flubendiamide BELT SC	2-3 fl.oz.	0.063-0.094	21 (grain, stover) 1 (green, silage)	

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Cutworms (cont.)					
	gamma-cyhalothrin DECLARE Other trade names ²	0.77-1.28 fl.oz.	0.0075- 0.0125	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide. Can be applied at planting.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	0.64-0.96 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide. Can be applied at planting.
	methomyl LANNATE 2.4LV Other trade names ²	1.5 pt.	0.45	21 (grain, fodder) 3 (green)	Apply for variegated cutworms. Lannate is a RESTRICTED USE pesticide.
	methyl parathion PENNCAP-M 2FM Other trade names ²	4 pt.	1	12	PennCap-M is a RESTRICTED USE pesticide.
	permethrin POUNCE 25 WP Other trade names ²	6.4-9.6 oz.	0.1-0.15	30 (grain, fodder) 0 (green)	Pounce is a RESTRICTED USE pesticide. Can be applied at planting.
	spinosad + gamma-cyhalothrin CONSERO	2-3 fl.oz.	0.03-0.046 + 0.01- 0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	1.28-2.8 fl.oz.	0.008- 0.0175	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide. Can be applied at planting.
European Corn Borers, Southwestern Corn Borers					
<i>See text at beginning for discussion of corn borers. See Table 3 for transgenic corn that can control corn borers.</i>					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.013- 0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.	0.03-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1.5-2 qt.	1.5-2	14 (silage, green) 48 (grain, fodder)	Apply in the whorls in 20 gallons of water per acre for best control.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
European Corn Borers, Southwestern Corn Borers (cont.)					
chlorpyrifos					See label for detailed instructions.
	LORSBAN 75 WG Other trade names ²	1-1.33 lb.	0.75-1	21 (harvest)	
	LORSBAN 15G	3.5-8 oz./ 1000 row ft.	---	21 (harvest)	
	LORSBAN ADVANCED	1.5-2 pt.	0.71-0.93	21 (harvest)	Use 1 to 2 pints for chemigation. See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide.
chlorpyrifos + gamma-cyhalothrin					Cobalt is a RESTRICTED USE pesticide.
	COBALT	19-38 fl.oz.	0.37-0.74 + 0.007- 0.013	21 (grain) 14 (grazing)	
cyfluthrin					Tombstone is a RESTRICTED USE pesticide.
	TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025- 0.044	21 (grain, fodder) 0 (green)	
deltamethrin					Delta Gold is a RESTRICTED USE pesticide.
	DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018- 0.022	21 (grain, fodder) 12 (green)	
esfenvalerate					Apply just before egg hatch (blackhead stage) or before larvae enter the whorls. Asana is a RESTRICTED USE pesticide.
	ASANA XL 0.66EC Other trade names ²	7.8-9.6 fl.oz.	0.04-0.05	21 (harvest)	
flubendiamide					
	BELT SC	2-3 fl.oz.	0.063- 0.094	21 (grain, stover) 1 (green, silage)	
gamma-cyhalothrin					Declare is a RESTRICTED USE pesticide.
	DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	
lambda-cyhalothrin					Apply in whorl before borers have entered stalk or ear. Karate is a RESTRICTED USE pesticide.
	KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 (grain, fodder) 1 (green)	
methoxyfenozide					Apply at first sign of egg hatch or when infestation reaches threshold level.
	INTREPID 2F	4-8 fl.oz.	0.06-0.12	21	
methyl parathion					PennCap-M is a RESTRICTED USE pesticide.
	PENNCAP-M 2FM Other trade names ²	2-4 pt.	0.5-1	12	
permethrin					Apply Pounce 1.5G into the whorl when eggs begin to hatch. Pounce is a RESTRICTED USE pesticide.
	POUNCE 25 WP Other trade names ²	6.4-9.6 oz.	0.1-0.15	30 (grain, fodder) 0 (green)	

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
European Corn Borers, Southwestern Corn Borers (cont.)					
spinetoram					
	RADIANT SC	3-6 fl.oz.	0.023-0.046	28 (grain or straw) 3 (forage, fodder, hay)	Use higher rate for heavier infestations or larger larvae.
spinosad					
	TRACER	1-3 fl.oz.	0.031-0.094	28 (harvest) 3 (grazing)	Use higher rates for heavier infestations. Time applications to peak egg hatch. Apply as a broadcast or a directed spray to whorl stage corn; otherwise, apply as a broadcast spray. Use 2 to 3 fluid ounces for southwestern corn borers.
	Other trade names ²	(European corn borer) 2-3 fl.oz. (Southwestern corn borer)	0.062-0.094		
spinosad + gamma-cyhalothrin					
	CONSERO	2-3 fl.oz.	0.03-0.046 + 0.01-0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
zeta-cypermethrin					
	MUSTANG MAX EC INSECTICIDE	2.72-4 fl.oz.	0.017-0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
	Other trade names ²				
Grasshoppers					
beta-cyfluthrin					
	BAYTHROID XL	2.1-2.8 fl.oz.	0.017-0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
bifenthrin					
	CAPTURE 2EC	2.1-6.4 fl.oz.	0.033-0.10	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	Other trade names ²				
bifenthrin + zeta-cypermethrin					
	HERO	2.6-6.1 fl.oz.	0.025-0.06	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
carbaryl					
	SEVIN XLR PLUS	0.5-1.5 qt.	0.5-1.5	14 (silage, green) 48 (grain, fodder)	Use lower rate of Sevin for young grasshoppers or sparse vegetation; use higher rate for larger grasshoppers or thicker vegetation.
	Other trade names ²				
chlorpyrifos					
	LORSBAN ADVANCED	0.5-1 pt.	0.23-0.47	21	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	LORSBAN 75 WG	0.33-0.67 lb.	0.25-0.5	21	
	Other trade names ²				

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Grasshoppers (cont.)					
	chlorpyrifos + gamma-cyhalothrin COBALT	7-13 fl.oz.	0.14-0.25 + 0.002- 0.004	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	2.1-2.8 fl.oz.	0.033- 0.044	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide.
	deltamethrin DELTA GOLD 1.5 EC Other trade names ²	1.0-1.5 fl.oz.	0.012- 0.018	21 (grain, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.
	esfenvalerate ASANA 0.66 EC Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21	Asana is a RESTRICTED USE pesticide.
	gamma-cyhalothrin DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide.
	methyl parathion PENNCAP-M 2FM Other trade names ²	2-3 pt.	0.5-0.75	12	PennCap-M is a RESTRICTED USE pesticide.
	spinosad + gamma-cyhalothrin CONSERO	3 fl.oz.	0.046 + 0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	2.72-4 fl.oz.	0.017- 0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
Green June Beetle Grubs (in fields where broiler litter has been used)					
	carbaryl SEVIN XLR PLUS Other trade names ²	1-1.5 qt.	1-1.5	14 (silage, green) 48 (grain, fodder)	Treat when there is more than one grub per square foot in the fall prior to planting. Spring treatment when soil temperature is cold is not as effective as an application made in the fall.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Japanese Beetle Adults, Corn Rootworm Adults, Other Silk Feeders, and Flea Beetles					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.013-0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4	0.03-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	carbaryl SEVIN XLR PLUS Other trade names ²	1-2 qt.	1-2	14 (silage, green) 48 (grain, fodder)	Apply when silks first appear and continue until silks dry.
	chlorpyrifos LORSBAN ADVANCED LORSBAN 75 WG Other trade names ²	1-2 pt. 0.67-1.33 lb.	0.47-0.93 0.5-1	21 21	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide. Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	13-42 fl.oz.	0.25-0.82 + 0.004-0.015	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide. Use higher rate for Japanese beetle adults.
	cyfluthrin TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025-0.044	21 (grain, fodder) 0 (green)	Tombstone is a RESTRICTED USE pesticide.
	deltamethrin DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018-0.022	21 (grain, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.
	esfenvalerate ASANA 0.66 EC Other trade names ²	5.8-9.6 fl.oz.	0.03-0.05	21	Asana is a RESTRICTED USE pesticide.
	gamma-cyhalothrin DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Japanese Beetle Adults, Corn Rootworm Adults, Other Silk Feeders, Flea Beetles (cont.)					
	methomyl LANNATE 2.4LV Other trade names ²	0.75-1.5 pt.	0.22-0.45	21 (grain, fodder) 3 (green)	Lannate is a RESTRICTED USE pesticide.
	methyl parathion PENNCAP-M 2FM Other trade names ²	2-4 pt. Japanese beetle 1-2 pt. corn rootworm	0.25-1	12	PennCap-M is a RESTRICTED USE pesticide.
	permethrin POUNCE 25 WP Other trade names ²	6.4-9.6 oz.	0.1-0.15	30 (grain, fodder) 0 (green)	Pounce is a RESTRICTED USE pesticide.
	spinosad + gamma-cyhalothrin CONSERO	3 fl.oz.	0.046 + 0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	2.72-4 fl.oz.	0.017- 0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
Leafhoppers					
	See Comments.				Leafhoppers are vectors of corn stunt and other plant viruses. Plant virus-resistant varieties, if possible. An at-planting soil systemic insecticide may be beneficial if a variety that is susceptible to corn stunt is planted.
Lesser Cornstalk Borers					
<i>See Table 3 for transgenic corn that can control lesser cornstalk borers and Table 4 for at-planting insecticides for control of lesser cornstalk borers.</i>					
	chlorpyrifos LORSBAN ADVANCED	2 pt.	0.93	21	Apply as a broadcast spray. See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide.
	LORSBAN 75WG Other trade names ²	1.33 lb.	1	21	Lorsban 75WG is not.
	chlorpyrifos + gamma-cyhalothrin COBALT	38-42 fl.oz.	0.74-0.82 + 0.013- 0.015	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Lesser Cornstalk Borers (cont.)					
	gamma-cyhalothrin DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 1 (green)	DO NOT apply more than 0.12 pound active ingredient per acre per season. Apply as soon as infestation is detected, before borers have entered the stalk. Warrior is a RESTRICTED USE pesticide.
	spinosad + gamma-cyhalothrin CONSERO	3 fl.oz.	0.046 + 0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
Mites					
	bifenthrin CAPTURE 2EC Other trade names ²	5.12-6.4 fl.oz.	0.08-0.10	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	spiromesifen OBERON 4SC	2.85-8.0 fl.oz.	0.09-0.25	30 (grain, stover) 5 (green, silage)	
Southwestern Corn Borers <i>See European Corn Borers.</i>					
Stink Bugs <i>See discussion of stink bugs in introduction; see Table 2 for suggested seed treatments to control early season stink bugs.</i>					
	beta-cyfluthrin BAYTHROID XL	1.6-2.8 fl.oz.	0.013- 0.022	21 (grain, fodder) 0 (green forage)	Baythroid XL is a RESTRICTED USE pesticide.
	bifenthrin CAPTURE 2EC Other trade names ²	2.1-6.4 fl.oz.	0.033-0.1	30	Capture is a RESTRICTED USE pesticide. Do not use Capture in coastal counties.
	bifenthrin + zeta-cypermethrin HERO	4.0-10.3 fl.oz.	0.04-0.1	30 (grain, fodder, grazing) 60 (harvest for forage)	Hero is a RESTRICTED USE pesticide.
	chlorpyrifos + gamma-cyhalothrin COBALT	19-38 fl.oz.	0.37-0.74 + 0.007- 0.013	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide.
	cyfluthrin TOMBSTONE Other trade names ²	1.6-2.8 fl.oz.	0.025- 0.044	21 (grain, fodder) 1 (green)	Tombstone is a RESTRICTED USE pesticide.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Stink Bugs (cont.)					
	deltamethrin ² DELTA GOLD 1.5 EC	1.5-1.9 fl.oz.	0.018-0.022	21 (grain, fodder) 12 (green)	Delta Gold is a RESTRICTED USE pesticide.
	gamma-cyhalothrin DECLARE Other trade names ²	1.02-1.54 fl.oz.	0.01-0.015	21 (grain, fodder) 1 (green)	Declare is a RESTRICTED USE pesticide.
	lambda-cyhalothrin KARATE with Zeon Technology Other trade names ²	1.28-1.92 fl.oz.	0.02-0.03	21 (grain, fodder) 1 (green)	Karate is a RESTRICTED USE pesticide.
	methyl parathion CHEMINOVA METHYL 4EC PENNCAP-M 2FM	0.5 pt. 1-3 pt.	0.25 0.25-0.75	12 12	All formulations of methyl parathion are RESTRICTED USE pesticides. Do not apply Cheminova Methyl during the pollen shed period. Do not apply Pennncap-M during pollen shed if bees are foraging in the area to be treated.
	spinosad + gamma-cyhalothrin CONSERO	3 fl.oz.	0.046 + 0.015	28 (grain, fodder) 1 (grazing)	Consero is a RESTRICTED USE pesticide. It is a co-pack of two insecticides that must be applied together.
	zeta-cypermethrin MUSTANG MAX EC INSECTICIDE Other trade names ²	2.72-4 fl.oz.	0.017-0.025	30 (harvest) 60 (grazing)	Mustang Max is a RESTRICTED USE pesticide.
Sugarcane Beetles					
<i>See discussion of sugarcane beetles in introduction. See Tables 2 and 4 for suggested seed treatments and at-planting insecticides to control sugarcane beetles.</i>					
Western Corn Rootworm Larvae					
<i>See Tables 2 and 4 for suggested seed treatments or at-planting insecticides to control western corn rootworm larvae; see Table 3 for transgenic corn that can control western corn rootworm larvae.</i>					
	chlorpyrifos + gamma-cyhalothrin COBALT	38-42 fl.oz.	0.74-0.82 + 0.013-0.015	21 (grain) 14 (grazing)	Cobalt is a RESTRICTED USE pesticide. Apply as a cultivation treatment.

² See Table 7 for other trade names.

Insect	Insecticide and Formulation	Amount of Formulation per Acre	Lb. Active Ingredient per Acre	Minimum Days from Last Application to Harvest or Grazing	Comments
Western Corn Rootworm Larvae (cont.)					
chlorpyrifos	LORSBAN 75 WG	1.33 lb.	1	21	Apply granules to base of plants at time of cultivation just ahead of cultivator shovel.
	LORSBAN 15G	8 oz./1000 row ft.	---	21	Apply 75 WG as a water emulsion to base of plants on both sides of the row just ahead of cultivator shovel.
	LORSBAN ADVANCED Other trade names ²	2 pt./A	0.93	21	See label for detailed instructions. Lorsban Advanced is a RESTRICTED USE pesticide.
phorate	THIMET 20G Other trade names ²	4.5-6 oz./ 1000 row ft.	no more than 1.3 lb. a.i./A	30	Apply granules at time of cultivation to base of plants just ahead of cultivator shovels. Phorate is a RESTRICTED USE pesticides.
terbufos	COUNTER 15G	8 oz./1000 row ft.	1.3 lb. a.i./A maximum	60 (harvest) 30 (grazing)	Apply to base of plants just ahead of cultivator shovels. Counter is a RESTRICTED USE pesticide.

White Grubs

See Tables 2 and 4 for suggested seed treatments or at-planting insecticides for control of white grubs.

Wireworms

See Tables 2 and 4 for suggested seed treatments or at-planting insecticides for control of wireworms.

NOTE: Read manufacturer's label carefully for specific information for all product use restrictions and safety instructions.

² See Table 7 for other trade names.

Table 6. Relative Efficacy of Postemergence Insecticides for Control of Aboveground (Seedling, Whorl, Stalk, Ear) Field Corn Insects. See Table 5 for Insecticide Rates

Insecticide	Fall Armyworm (larvae)	True Armyworm (larvae)	Billbug (adults)	Chinch Bug (adults, nymphs)	Corn Earworm (larvae) ¹	Cutworm (larvae)	European Corn Borer (larvae) ²	Southwestern Corn Borer (larvae) ²
Baythroid	3	1-2	NL	3	1-3	1	L	2
Tombstone	3	1-2	NL	2	1-3	1	L	2
Capture	2	1-2	NL	1	1-2	1	L	2
Delta Gold	2	1-2	NL	L	1-2	1	L	2
Asana	3, NL	1-2	NL	4	1-3	1	L	2
Declare	2	1-2	NL	2-3	1-2	1	L	2
Karate	2	1-2	NL	3	1-3	1	L	2
Pounce	L	1-2	NL	NL	1-3	L	L	L
Mustang Max	2	1-2	NL	2-3	1-2	1	L	2
Hero	2	1-2	NL	L	1-2	NL	L	2
Sevin	4	1	NL	5	4	3-4	L	L
Lorsban	2	1	L	2	3	2-3	L	L
Lorsban	2	1	NL	NL	2	NL	L	L
Intrepid	2, NL	L	NL	NL	3, NL	NL	1-2	1-2
PennCap M	4, NL	2	NL	NL	3, NL	5	5	5
Tracer	2	1	NL	NL	2-3	NL	3	3
Consero	2	1	NL		2	1-2	L	L
Radiant	L	L	NL	NL	L	NL	L	L
Cobalt	2	L	L	2	2	L	L	2
Belt	1	1	NL	NL	2	L	1	1-2

continued

Ratings range from 1-5: 1 = very effective; 5 = not effective

"L" means that the insect is on the label for this product. Numerals indicate that additional data on product efficacy in the Southeast is available.

"NL" means the insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is a specific knowledge to the contrary.

¹ Insecticide must be able to reach the target pests. Ratings related to applications made to the target pest before it enters the stalk or ear.² Targeted for second generation larvae before they bore into the stalk or ear.

Table 6. Relative Efficacy of Postemergence Insecticides for Control of Aboveground (Seedling, Whorl, Stalk, Ear) Field Corn Insects. See Table 5 for Insecticide Rates (cont.)

Insecticide	Flea Beetle (adults)	Grass-hopper (nymphs)	Japanese Beetle, Rootworm (adults)	Lesser Cornstalk Borer (larvae)	Southern Green or Green Stink bug	Brown Stink bug
Baythroid	1-2	1-2	1-2	NL	1-2	3
Tombstone	1-2	1-2	1-2	NL	1-2	3
Capture	1-2	1-2	1-2	NL	1-2	3
Delta Gold	1-2	1-2	L	NL	1-2	3
Asana	2	1-2	2	NL	NL	NL
Declare	1-2	1-2	1	NL	1-2	3
Karate	1-2	1-2	1-2	4-5	1-2	3
Pounce		NL		NL	NL	NL
Mustang Max	1-2	1-2	1	NL	1-2	3
Hero	1-2	L	1	NL	1-2	2
Sevin	1-2	L	1	NL	NL	NL
Lorsban	L	1-2	1-2	NL	3, NL	4, NL
Lannate	L	NL	1-2	NL	4, NL	4, NL
Intrepid	NL	NL	NL	NL	5, NL	5, NL
PennCap M	L	5	L	NL	1	1
Tracer	NL	NL	NL	NL	NL	NL
Consero	L	1-2	L	L	2	3-4
Radiant	NL	NL	NL	NL	NL	NL
Cobalt	L	L	1-2	4-5	1-2	2
Belt	NL	NL	NL	NL	NL	NL

Ratings range from 1-5: 1 = very effective; 5 = not effective

“L” means that the insect is on the label for this product. Numerals indicate that additional data on product efficacy in the Southeast is available.

“NL” means the insect is not on the label for this product. In this case it is best to assume that the product is ineffective against that particular pest, unless there is a specific knowledge to the contrary.

¹ Insecticide must be able to reach the target pests. Ratings related to applications made to the target pest before it enters the stalk or ear.

² Targeted for second generation larvae before they bore into the stalk or ear.

Table 7. Insecticides Labeled for Use on Field Corn, Including Worker Protection and Harvest or Grazing Intervals

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing
beta-cyfluthrin				
BAYTHROID XL (Restricted Use)	1 lb./gal.	emulsifiable concentrate	12	21 (grain, fodder) 0 (grazing)
bifenthrin				
BIFENTHRIN 2EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
BIFENTURE EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
BRIGADE 2EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
CAPTURE 2EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
CAPTURE 1.15G (Restricted Use)	0.18 oz./lb.	granular	24 ¹	30
CAPTURE LFR (Restricted Use)	1.5 lb./gal.	liquid fertilizer ready	12	30
DISCIPLINE 2 EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
EMPOWER ² (Restricted Use)	0.18 oz./lb.	granular	12	30
FANFARE 2 EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
SNIPER 2 EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
TUNDRA EC (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	30
bifenthrin + zeta-cypermethrin				
HERO (Restricted Use)	1.24 lb./gal. 11.25% bifenthrin 3.75% zeta- cypermethrin	emulsifiable concentrate	12	30 (grain, fodder, grazing) 60 (harvest for forage)
carbaryl				
SEVIN 4F	4 lb./gal.	liquid suspension	12	48 (grain, fodder) 14 (grazing, silage)
SEVIN XLR PLUS	4 lb./gal.	liquid suspension	12	Same as above
CARBARYL 4L	4 lb./gal.	liquid suspension	12	Same as above
SEVIN 80 SOLUPAK	12.8 oz./lb.	wettable powder	12	Same as above
SEVIN 80WSP	12.8 oz./lb.	water soluble packet	12	Same as above
chlorpyrifos				
LORSBAN 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain)

¹ REI for detassling and roguing is 18 days.

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing
chlorpyrifos (cont.)				
LORSBAN ADVANCED (Restricted Use)	3.755 lb./gal.	water suspension	24	21 (grain)
GOVERN 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain) Do not graze.
HATCHET (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	35 (grain, fodder) 14 (grazing, silage)
CHLORPYRIFOS 4E AG (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain)
NUFOS 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain)
NUFOS 15G	2.4 oz./gal.	granular	24	21 (grain)
YUMA 4E (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain)
WARHAWK (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	21 (grain) 35 (fodder) 14 (grazing, silage)
WHIRLWIND (Restricted Use)	4 lb./gal.	emulsifiable concentrate	24	35 (grain, fodder) 14 (grazing, silage)
LORSBAN 75WG	12 oz./lb.	water dispersable granule	24	21 (grain)
LORSBAN 15G	2.4 oz./lb.	granular	24	21 (grain)
SAURUS 15G	2.4 oz./lb.	granular	24	35 (fodder, grain) 14 (grazing, silage)
chlorpyrifos + gamma-cyhalothrin				
COBALT (Restricted Use)	2.5 lb./gal. + 0.045 lb./gal.	liquid	24	21 (grain) 14 (grazing, silage)
clothianidin				
PONCHO 600	5 lb./gal.	seed treatment	n/a	n/a
cyfluthrin				
DEFCON 2.1G	0.3 oz./lb.	granular	48	Not specified.
TOMBSTONE (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	21 (grain, fodder) 0 (grazing, silage)
TOMBSTONE HELIOS (Restricted Use)	2 lb./gal.	emulsifiable concentrate	12	21 (grain, fodder) 0 (grazing, silage)
deltamethrin				
DELTA GOLD 1.5 EC (Restricted Use)	1.5 lb./gal.	emulsifiable concentrate	12	21 (grain, fodder) 12 (forage, grazing)
diazinon and lindate + carboxin				
KICKSTART	seed treatment	dust	12	Not specified

Corn: Insect, Disease, Nematode, and Weed Control Recommendations for 2010/29

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing
esfenvalerate				
ASANA XL (Restricted Use)	0.66 lb./gal.	emulsifiable concentrate	12	21
ADJOURN (Restricted Use)	0.66 lb./gal.	emulsifiable concentrate	12	21
S-FENVALOSTAR (Restricted Use)	0.66 lb./gal.	emulsifiable concentrate	12	21
fipronil				
REGENT 4SC (Restricted Use)	4 lb./gal.	soluble concentrate	0	90
flubendiamide				
BELT SC	4 lb./gal.	soluble concentrate	12	1 (forage, silage) 28 (grain, stover)
gamma-cyhalothrin				
DECLARE (Restricted Use)	1.25 lb./gal.	emulsifiable concentrate?	24	21 (grain, fodder, silage) 1 (grazing) ²
PROAXIS (Restricted Use)	0.5 lb./gal.	microencapsulated suspension	24	21 (grain, fodder, silage) 1 (grazing) ²
PROLEX (Restricted Use)	1.25 lb./gal.	liquid	24	21 (grain, fodder, silage) 1 (grazing) ²
imidacloprid				
GAUCHO 600F	5 lb./gal.	liquid used as seed treatment	12	Not specified
IMIDA E-AG 5F ST	5 lb./gal.	liquid used as seed treatment	12	Not specified
DYNA-SHIELD IMIDACLOPRID 5	5 lb./gal.	liquid used as seed treatment	12	Not specified
SENATOR 600 FS	5 lb./gal.	liquid used as seed treatment	12	Not specified
imidacloprid + metalaxyl				
CONCUR SEED TREATMENT	--	dust used as seed treatment	24	Not specified
imidacloprid + carboxin and metalaxyl				
LATITUDE	--	dust used as seed treatment	24	Not specified

² For at-planting applications the grazing interval is 21 days.

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing
lambda-cyhalothrin				
TAIGA-Z (Restricted Use)	1 lb./gal.	capsule suspension	24	21 (grain, fodder) 1 (grazing) ²
GRIZZLY Z 1CS (Restricted Use)	1 lb./gal.	capsule suspension	24	Same as above
MYSTIC Z (Restricted Use)	2.08 lb./gal.	capsule suspension	24	Same as above
LAMBDA (Restricted Use)	2.08 lb./gal.	capsule suspension	24	21 (harvest, grazing) 21 (grain, fodder)
LAMBDA-T (Restricted Use)	1 lb./gal.	capsule suspension	24	1 (grazing)
LAMBDASTAR (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	Same as above
LAMBDA-CY 1EC (Restricted Use)	1 lb./gal.	emulsifiable concentrate	24	Same as above
SILENCER (Restricted Use)	1 lb./gal.	liquid	24	Same as above
KARATE with ZEON TECHNOLOGY (Restricted Use)	2.08 lb./gal.	capsule suspension	24	Same as above
KAISO 24WG (Restricted Use)	3.84 oz./lb.	wettable granule	24	Same as above
methomyl				
LANNATE LV (Restricted Use)	2.4 lb./gal.	water soluble liquid	48	21 (grain, fodder) 3 (grazing)
LANNATE SP (Restricted Use)	14.4 oz./lb.	water soluble powder	48	Same as above
methoxyfenozide				
INTREPID 2F	2 lb./gal.	liquid	4	21
methyl parathion				
CHEMINOVA METHYL 4EC (Restricted Use)	4 lb./gal.	emulsifiable concentrate	96	12
PENNCAP M (Restricted Use)	2 lb./gal.	microencapsulated insecticide	31 days	12
permethrin				
ARCTIC 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	30 (grain, fodder) 0 (forage)
PERMETHRIN (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERMETHRIN 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERMASTAR AG (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
PERM-UP 3.2EC (Restricted Use)	3.2 lb./gal.	emulsifiable concentrate	12	Same as above
POUNCE 25 WP (Restricted Use)	4 oz./lb.	wettable powder	12	Same as above

Corn: Insect, Disease, Nematode, and Weed Control Recommendations for 2010/31

Insecticide and Trade Name	A.I./ Formulated Product	Formulation	Restricted Entry Interval (hr)	Minimum Days from Last Application to Harvest or Grazing
permethrin (cont.)				
POUNCE 1.5 G (Restricted Use)	0.24 oz./lb.	granular	12	Same as above
AMBUSH 25W (Restricted Use)	4 oz./lb.	wettable powder	12	Same as above
permethrin + carboxin				
KICKSTART VP	See Table 2.	dust used as seed treatment	12	Not specified
KERNEL GUARD SUPREME	See Table 2.	dust used as seed treatment	12	Not specified
phorate				
PHORATE 20G EZ LOAD (Restricted Use)	3.2 oz./lb.	granular	48	30
THIMET 20-G SMARTBOX OR LOCK 'N LOAD (Restricted Use)	3.2 oz./lb.	granular	48	30
spinetoram				
RADIANT SC	1 lb./gal.	suspension concentrate	4	28 (grain, straw) 3 (forage, fodder, hay)
spinosad				
BLACKHAWK	5.8 oz./lb.	wettable powder	4	28 (grain) 3 (forage, fodder)
ENTRUST	12.8 oz./lb.	wettable powder	4	28 (grain, fodder) 7 (forage)
SUCCESS	2 lb./gal.	liquid	4	Same as above
TRACER	4 lb./gal.	liquid	4	28 (grain) 3 (forage, fodder)
spinosad + gamma-cyhalothrin				
CONSERO (Restricted Use)	4 lb./gal. + 1.25 lb./ gal.	co-pack containing 0.5 gallon of each insecticide	24	28 (grain, fodder, silage) 1 (grazing)
spiromesifen				
OBERON 2SC	2 lb./gal.	liquid	12	30 (grain, stover) 5 (forage, silage)
OBERON 4SC	4 lb./gal.	liquid	12	30 (grain, stover) 5 (forage, silage)
terbufos				
COUNTER 15G LOCK 'N LOAD OR SMARTBOX (Restricted Use)	2.4 oz./lb.	granular	48	30
thiamethoxam				
CRUISER 5FS	5 lb./gal.	seed treatment	12	n/a
zeta-cypermethrin				
MUSTANG MAX EC INSECTICIDE (Restricted Use)	0.8 lb./gal.	emulsifiable concentrate	12	30 (grain, fodder) 60 (forage)
RESPECT (Restricted Use)	0.8 lb./gal.	emulsifiable concentrate	12	Same as above

Other products may be available. Always read the label to make sure the specific crop is listed and to determine what rate to use.

Table 8. Properties of Insecticides Used on Corn That May Affect Water Quality¹

Common Name	Soluble Runoff Potential	Adsorbed Runoff Potential ²	Leaching Potential ³
beta-cyfluthrin	Low	Intermediate	Very Low
bifenthrin	Low	Intermediate	Very Low
carbaryl	Intermediate	Low	Low
chlorpyrifos	Low	Intermediate	Low
clothianidin	High	Intermediate	High
cyfluthrin	Low	Intermediate	Very Low
deltamethrin	Low	High	Very Low
esfenvalerate	Intermediate	Intermediate	Low
fipronil	High	Intermediate	Intermediate
flubendiamide	N/A	N/A	N/A
gamma-cyhalothrin	Low	Intermediate	Very Low
lambda-cyhalothrin	Low	Intermediate	Very Low
methomyl	Intermediate	Low	High
methoxyfenozide	High	Intermediate	High
methyl parathion	Intermediate	Intermediate	Low
permethrin	Low	Intermediate	Very Low
phorate	High	High	Low
spinosad	Low	Low	Low
spiromesifen	N/A	N/A	N/A
terbufos	Intermediate	Low	Low
thiamethoxan	High	Intermediate	High
zeta-cypermethrin	Low	Intermediate	Very Low

¹ Read manufacturer's label carefully for specific information for all product use restrictions and safety.

² The adsorbed runoff potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

NA = information not available.

NOTE: Differences in formulation, application mode (e.g., bare ground versus crop canopy), and soil type will affect how these ratings are used.

SOURCE: Ratings are based primarily on information obtained from The ARS Pesticide Properties Database, www.ars.usda.gov/services/docshtm?docid=14199

DISEASE AND NEMATODE CONTROL

In general, diseases cause minimal damage to corn most years. Rusts, ear rots, and storage rots are the most widespread and important diseases of corn. Mycotoxin contamination, primarily aflatoxin on rotted grain, is of particular concern to farmers. Stalk rots and viruses may also cause significant losses on limited acreage across the state. Common smut, southern corn leaf blight, and crazy top are reported every year but are of little economic importance. For a more detailed description of corn diseases, see Extension Circular ANR-601, "Corn Diseases."

Most corn diseases can be controlled through the use of good management practices.

- Plant recommended varieties with resistance to viruses and diseases common to your region.
- Select high-quality seed treated with a fungicide.
- Plant only on well-drained and well-prepared seedbeds. Avoid arid or poorly drained soils.
- Maintain balanced fertility levels. Nitrogen and potassium imbalances can increase leaf diseases and stalk rot and cause lodging.
- Rotate corn with non-grass crops. Rotating crops will reduce diseases and nematodes that attack corn.
- Plant early to avoid buildup of aphids and other virus-transmitting insects as well as southern rust.
- Maintain plant populations at recommended levels to reduce stalk rots and lodging.

Fungicides (see Table 10) may partially control fungal leaf blights and rust, but in most cases they are not economical. Fungicide applications to field corn should only be considered when crop prices are good, yield potential is high (more than 120 bushels per acre), and weather conditions at tasseling favor rapid disease development. The need for protective fungicide treatments can often be avoided by planting disease resistant corn hybrids. Southern rust is the most destructive disease on corn. The later corn is planted, the higher the risk of a destructive rust outbreak.

Several species of plant-parasitic nematodes can reduce corn yields sufficiently to cause economic losses. Sting, stubby root, and lesion nematodes are known to be the most damaging species on corn. Southern or cotton root-knot nematodes also attack, damage, and reproduce on all field corn hybrids. Problems with root-knot nematodes occur where corn is rotated with cotton. Crop rotation with non-host crops will prevent the buildup of nematode populations to damaging levels. Corn is immune to the reniform nematode.

Although nematicides are effective against nematodes that attack corn, they are too expensive to use on field corn in most situations. Consequently, they are not recommended for general use in nematode-infested cornfields. Only in rare cases where soil insects and nematodes are a problem would nematicides/insecticides be cost effective.

Table 9. Properties of Nematicides Used on Corn That May Affect Water Quality

Common Name	Trade Name	Surface-Loss Potential ¹	Leaching Potential ²
Ethoprop	Mocap	Medium	Large
Terbufos	Counter	Medium	Small

¹The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

²The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

Table 10. Fungicides Labeled for Controlling Helminthosporium Leaf Spots, Gray Leaf Spot, and Rust

Chemical Name	Rate per Acre	Comments
azoxystrobin QUADRIIS FLOWABLE	6.2-9.0 fl.oz.	For control of common rust, northern corn leaf blight, southern corn leaf blight, gray leaf spot, and anthracnose on field corn. Apply when symptoms first appear on lower leaves and repeat 7 to 14 days later as needed. Do not make more than two consecutive applications of Quadris.
azoxystrobin + propiconazole QUILT	7-14 fl.oz. 10.5-14 fl.oz.	For control of northern and southern corn leaf blight. Apply when disease first appears on leaves and make a second application 7 to 14 days later as needed to control disease. For control of southern rust, gray leaf spot, and eyespot. Apply when disease appears on leaves. If conditions favoring disease persist, make a second application 14 days later. See label for use restrictions and resistance management instructions.
mancozeb DITHANE DF DITHANE F-45 DITHANE M-45 MANZATE PRO STICK PENNZOZEB 80W PENNZOZEB 4F	1.2 qt. 1.2 qt. 1.5 lb. 1.5 lb. 1.5 lb. 0.8-1.2 qt.	For control of common rust, gray leaf spot, and leaf blight diseases of corn. Begin applications when disease first appears. Use with a spray adjuvant. DO NOT exceed 12 pounds active ingredient mancozeb or maneb-related product per acre per season.
propiconazole BUMPER 41.8 EC PROPIMAX TILT 3.6E	2-4 fl.oz. 2-4 fl.oz. 2-4 fl.oz.	For controlling diseases listed above. Apply when disease first appears. Continue at 7- to 14-day intervals. DO NOT exceed 16 fluid ounces per acre per season. DO NOT harvest corn for forage or grain within 30 days of application. Refer to label for recommended treatment rate for each disease.
propiconazole + trifloxystrobin STRATEGO 250EC	10-12 fl.oz.	For control of northern and southern corn leaf blight, eyespot, southern rust, and gray leaf spot on field corn. Apply at silking or milk stage and repeat 7 to 14 days later when conditions favor further disease development. DO NOT apply to corn grown for seed. DO NOT harvest corn for forage or silage within 30 days of application.
pyraclostrobin HEADLINE 2.09E	6-12 fl.oz.	For control of anthracnose, northern and southern corn leaf blight, yellow leaf spot, southern rust, and gray leaf spot, apply when conditions favor disease and repeat application 7 to 14 days later as needed to control disease. Apply at higher rate and shorter intervals when weather patterns favor disease. Make no more than two consecutive applications of Headline. See label for application and resistance management instructions.
pyraclostrobin + metconazole HEADLINE AMP	10-14 fl.oz.	For control of anthracnose, northern and southern corn leaf blight, Physoderma brown spot, southern and common rust, and gray leaf spot, apply prior to disease development and repeat at 7- to 14-day intervals as needed. Use higher rate at shorter interval when conditions favor disease. DO NOT make more than two consecutive applications of Headline AMP. Maximum product per acre per season is 57.6 fluid ounces.

Chemical Name	Rate per Acre	Comments
tebuconazole MONSOON ORIOUS 3.6F TEBUZOL 3.6F TEBUSTAR 3.6F	4-6 fl.oz.	For control of rust, southern corn leaf blight, northern corn leaf blight, and gray leafspot. Apply as protective treatment when conditions favor disease or when symptoms first appear. Repeat applications at 7- to 14-day intervals. A maximum of 24 fluid ounces may be applied per year. See label for additional instructions.

Table 11. Corn Nematode Control

Nematicide	Amount of Formulation		Comments
	Per 1000 Ft. Row	Per Acre	
abamectin + thiamethoxam AVICTA DOU CORN	--	See label.	FIELD, POPCORN, AND SWEET CORN: Apply with commercial seed treatment equipment. For early season suppression of nematodes.
ethoprop MOCAP 15G LOCK'N LOAD	12-16 oz.	See label.	FIELD AND SWEET CORN: Apply at planting on 6- to 7-inch band <i>over seed furrow</i> and lightly incorporate. Rate depends on row spacing. See label for applicator settings and application instructions.
terbufos COUNTER LOCK'N LOAD 15G	6-8 oz.	---	FIELD, SWEET, AND POPCORN: Apply on 7-inch band directly behind planter shoe and in front of press wheel. Incorporate with drag chains or tines. See label for other use restrictions.
	6-8 oz.	---	Place in <i>seed furrow</i> behind the planter shoe.

WEED CONTROL

Table 12. Corn Weed Control

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preplant Incorporated		
ERADICANE 6.7E (4.75 pt.)	EPTC (4 lb.) + safener + extender	Gives good control of annual grasses. It should be incorporated according to label directions immediately after application. Failure to do so will result in loss of the chemical by volatilization. Provides good control of annual grasses and nutsedge. It is weak on many broadleaf weeds. Risk of corn injury on coarse soils is greater where heavy rainfall and cold weather follow treatment. May be mixed with fertilizers (see label) for simultaneous application. DO NOT use on hybrid corn grown for seed. <i>See johnsongrass control section for rates to control nutsedge, wild cane, Texas panicum (buffalograss), bermudagrass, and johnsongrass.</i>
Preemergence		
AATREX/ATRAZINE 4L (1.6-2 qt.) or AATREX/ATRAZINE 90WDG (1.8-2.2 lb.)	atrazine (1.6-2 lb.)	Controls many annual broadleaf weeds and few grasses. Atrazine does not provide adequate control of panicum, signalgrass, some species of crabgrass, and certain other annual grasses. It may be applied to the soil surface immediately after planting or delayed for up to 3 weeks after planting but before weeds are 1.5 inches tall. Corn has excellent tolerance to atrazine. It may be mixed with liquid fertilizer for simultaneous application. DO NOT apply atrazine combined with liquid fertilizer if corn has emerged. Use the low rate on highly erodible soils (as classed by NRCS) if conservation tillage is not utilized. Use the high rate on highly erodible soils where conservation tillage practices are utilized (more than 30-percent plant residue) or on soils that are not highly erodible. DO NOT exceed 2 pounds active ingredient per acre as a preemergence treatment. DO NOT apply within 50 feet of any well, pond, stream, or sinkhole. Wear protective clothing, boots, and rubber gloves when mixing or loading herbicide. Atrazine is a RESTRICTED USE pesticide.
DUAL II MAGNUM 7.64 DUAL MAGNUM 7.62 CINCH 7.64E (1-1.67 pt.)	s-metolachlor (0.95-1.59 lb.)	Controls many annual grasses but is weak on broadleaf weeds. Herbicide is very similar to Micro-Tech for control of most weeds but is more effective on yellow nutsedge. Best results are obtained when rainfall occurs within 4 to 6 days after application.
HARNESS 7EC (1.5-3 pt.)	acetochlor (1.3-2.6 lb.) + safener	Controls most annual grasses and some broadleaf weeds in corn. It can be applied preplant incorporated or preemergence, but before corn emerges. Apply in a minimum of 10 gallons of spray mix per acre, using a spray pressure of 15 to 40 psi. Use the low rate on coarse-textured soils that are low in organic matter and the high rate on fine-textured soils with organic matter less than 3 percent. To control large-seeded broadleaf weeds such as sicklepod, morningglories, and cocklebur, atrazine should be added to the spray mix. See label for rotational crop restrictions. Harness is a RESTRICTED USE pesticide.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preemergence (cont.)		
MICRO-TECH 4ME (2-2.75 qt.)	alachlor (2-2.75 lb.)	Controls most annual grasses including fall panicum and some small-seeded broadleaf weeds. It does not effectively control Texas panicum, common cocklebur, or morningglory. Apply to the soil surface during or immediately after planting. Best results are obtained when rainfall occurs within 7 days after application. Under dry conditions, shallow cultivation or rotary hoeing may improve control. Corn has good tolerance to alachlor. Use low rate on coarse soils and high rate on medium- to fine-textured soils. Micro-Tech is a RESTRICTED USE pesticide.
OUTLOOK 6L PROPEL 6L (12-18 fl.oz.)	dimethenamid (0.56-0.84 lb.)	Controls most annual grasses and some broadleaf weeds in field corn. It can be applied preplant incorporated, preemergence, or early postemergence, but before weeds emerge. Incorporation should be in the top 1 to 2 inches of soil. Use lower rates on coarse-textured soils, the intermediate rate on medium soils, and higher rates on fine-textured (heavy) soils. See label for use rate for yellow nutsedge control. Can be tank mixed with other herbicides. DO NOT apply more than 21 fluid ounces per acre per season.
PRINCEP 4L SIMAZINE 4L (2 qt.) or PRINCEP CALIPER 90 SIMAZINE 90WDG (2.2 lb.)	simazine (2 lb.)	Controls some annual broadleaf weeds and grasses. It provides adequate control of signalgrass, some species of crabgrass, and certain other annual grasses. It must be applied to the soil surface immediately after planting before weeds emerge. Corn has excellent tolerance to simazine. DO NOT apply within 50 feet of any well, pond, stream, or sinkhole. Wear protective clothing, boots, and rubber gloves when mixing or loading herbicide. Simazine requires more rainfall than atrazine for activation.
PYTHON 80 WG (0.8-1 oz.)	flumetsulam (0.04-0.05 lb.)	Controls a number of broadleaf weeds. Can be tank-mixed with atrazine and other labeled herbicides for use on field corn to increase spectrum of weed control. Due to crop injury, Python cannot be used when Counter or Thimet insecticides are used. All other insecticides should be applied in a T-band or band to avoid potential crop injury. Has lengthy recropping restrictions for certain crops (canola–26 months, cotton–18 months, peanuts–4 months). See label.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preemergence (cont.)		
SURPASS 6.4EC (1.5-2.75 pt.)	acetochlor (1.2-2.2 lb.) + safener	Controls most annual grasses and some broadleaf weeds in corn. It can be applied preplant, preplant incorporated, preemergence, or early postemergence, but before weeds emerge. Apply in a minimum of 10 gallons of spray mix per acre, using a spray pressure of 15 to 40 psi. Use the low rate on coarse-textured soils that are low in organic matter, the intermediate rate on medium soils, and the high rate on fine-textured soils with organic matter less than 3 percent. See label for higher permissible rates in reduced till or no-till corn. To control large-seeded broadleaf weeds such as sicklepod, morningglories, and cocklebur, atrazine should be added to the spray mix. See label for rotational crop restrictions. Surpass is a RESTRICTED USE pesticide.
Postemergence		
2,4-D AMINE (0.5-1 pt.)	2,4-D amine (0.25-0.5 lb.)	Provides excellent control of most annual broadleaf weeds. Broadcast over-the-top when corn is 4 to 8 inches tall and weeds are small. Use the high rate when weeds are larger and weather is cool. After corn is more than 8 inches tall, apply 1 pint per acre on a broadcast basis using drop nozzles to direct spray to base of plants. Corn may be injured by over-the-top applications when it is silking or tasseling. Corn stalks often become brittle after application; therefore, cultivation should be delayed at least 1 week after application. Prevent spray drift from contacting susceptible crops during application. CAUTION: Use ester formulations carefully because vapors may rise in hot weather after application and may drift considerable distances. Certain corn hybrids may be more susceptible to injury than others.
AATREX/ATRAZINE 4L (2 qt.) or AATREX/ATRAZINE 90WDG (2.2 lb.)	atrazine (2 lb.)	Apply before weeds exceed 1.5 inches in height. DO NOT apply atrazine in combination with liquid fertilizer if corn has emerged. DO NOT apply more than 2.5 pounds active ingredient per acre total of Atrazine or Aatrex in one season. Can be applied to corn up to 12 inches tall. Atrazine is a RESTRICTED USE pesticide.
AATREX/ATRAZINE 4L (1.25-2 qt.) or AATREX/ATRAZINE 90WDG (1.4-2.2 lb.) + Crop Oil Concentrate (2 pt.)	atrazine (1.25-2 lb.) + crop oil concentrate	Same as for atrazine, above. Addition of crop oil concentrate to postemergence sprays of atrazine speeds the activity and provides quicker kill of weeds; it also allows the use of lower atrazine rates. Use the low rate where broadleaf weeds are the only problem and high rate where broadleaf weeds and grasses are a problem. The addition of crop oil to atrazine sprays may result in crop damage. To minimize risk of injury, follow special precautions and application methods given on the product label. Atrazine is a RESTRICTED USE pesticide.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (cont.)		
ACCENT 75 WDG (0.67 oz.) or NIC-IT (2 fl.oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix)	nicosulfuron (0.031 lb.) (0.031 lb.) + non-ionic surfactant or crop oil concentrate	Provides postemergence control of some annual grasses, johnsongrass, and some broadleaf weeds. Apply over-the-top of field corn from the two-leaf (V2 stage) to 20 inches in height (but before V6 stage). Apply over-the-top of popcorn or field corn grown for seed up to 20 inches in height. Postemergence directed application can be made to field corn up to 36 inches tall (ten-leaf stage). Weeds should be small and actively growing at time of treatment. Apply in a minimum of 10 gallons of water per acre with a spray pressure of 25 to 40 psi. Avoid overlapping or doubling application at row ends or along field borders. Cultivation 10 to 14 days after application will improve control. DO NOT apply to sweet corn. A repeat treatment 14 to 28 days after treatment can be applied for hard-to-control grasses. DO NOT apply more than 1.3 ounces per acre per year. DO NOT apply to corn previously treated with Counter insecticide. Corn previously treated with a soil-applied organo-phosphate insecticide (Lorsban, Dyfonate, Thimet) may develop temporary corn injury. Severe corn injury may also occur if nicosulfuron application is made within 7 days of a foliar application of 2,4-D, Basagran, Lorsban, malathion, or parathion. There is a 10-month recropping restriction for most crops planted in treated soils with a pH less than 6.5; there is an 18-month restriction for most crops planted in treated soils with a pH greater than 6.5. In johnsongrass-infested fields, apply only to virus-tolerant hybrids. Nicosulfuron does not control crabgrass.
BANVEL 4 (0.5 pt.) or CLARITY 4 (0.5 pt.)	dicamba (0.25 lb.) (0.25 lb.)	Controls most annual broadleaf weeds, including some difficult to control with low rates of 2,4-D. It will not control mustards as well as 2,4-D. Banvel can be applied any time from the corn seedling stage until corn is 36 inches high. Over-the-top sprays are generally more effective when corn is small; drop-nozzle application is better when corn is taller than 8 inches. Clarity can only be used postemergence on corn less than 8 inches tall. DO NOT allow spray drift to contact susceptible plants during application; soybeans and most vegetables are very sensitive to minute amounts of dicamba. DO NOT use crop or petroleum oils with dicamba.
BASAGRAN 4 (1.5-2 pt.)	bentazon (0.75-1 lb.)	Apply early postemergence when corn has one to five leaves for control of certain broadleaf weeds and yellow nutsedge suppression. Corn is tolerant to Basagran at all stages, but larger weeds are not as easy to kill. DO NOT apply to corn which is showing stress from drought, cold weather, or other herbicide injury. A crop oil concentrate may be added to the spray mix at a rate of one quart per acre to control certain weeds. Two applications, 7 to 10 days apart, are required for yellow nutsedge control.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (cont.)		
BEACON 75 WDG (0.75 oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix)	primisulfuron (0.57 oz.) + non-ionic surfactant or crop oil concentrate	Provides postemergence control of johnsongrass and some broadleaf weeds. Apply Beacon over-the-top or semi-directed to corn when plants are 4 to 20 inches tall but before corn reaches 20 inches in height. DO NOT apply Beacon as a band application directly over the corn rows. If a second split application is made to corn, it can be applied up to the tassel emergence stage if the application is directed. DO NOT exceed 0.75 ounce per acre per year. Weeds must be small and actively growing at time of treatment. Application should be made with ground equipment using 10 to 20 gallons of water per acre at 40 psi spray pressure. Always use water as the carrier. DO NOT use a crop oil concentrate or nitrogen solution when applying Beacon with any other postemergence herbicide (such as dicamba or 2,4-D). DO NOT apply Beacon where Counter has been previously applied to corn. When other soil-applied insecticides have been applied to corn, delay Beacon application for 20 days to reduce possibility of corn injury. DO NOT apply Beacon within 10 days after an organo-phosphate insecticide application or with herbicides containing bentazon or 2,4-D. See label for recropping restrictions. Some corn hybrids are sensitive to Beacon; check with company representatives for current list. In johnsongrass-infested fields, apply only to virus-tolerant hybrids.
BUCTRIL 2EC (1-1.5 pt.) or BUCTRIL 4EC (0.5-0.75 pt.)	bromoxynil (0.25-0.375 lb.)	A contact postemergence herbicide that is effective in controlling a number of seedling broadleaf weeds. Use the low rate on susceptible weeds. Apply in a minimum of 20 gallons water per acre and with a minimum spray pressure of 30 psi. Apply over-the-top, beginning when corn is in the four-leaf stage. When corn is 12 inches tall or more, use drop nozzles to direct the spray solution toward the base of the corn plant. DO NOT mix with liquid fertilizer, surfactants, or oils. Observe all precautions.
AIM 2 EC (0.5-1 fl.oz.) + Non-ionic Surfactant or Crop Oil Concentrate	carfentrazone (0.008-0.016 lb.) + non-ionic surfactant or crop oil concentrate	Controls several problem broadleaf weeds including tropical spiderwort. Can be applied over-the-top of corn until the V8 stage of growth. Use directed spray on larger corn up to the 14-leaf-collar growth stage. Apply with either a non-ionic surfactant (1 quart per 100 gallons of spray mix) or crop oil concentrate (1 gallon per 100 gallons of spray mix). Aim will cause injury in the form of leaf speckling or necrosis. Increased injury is observed when crop oil concentrate is used. See label for complete list of approved tank mixes.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (cont.)		
CALLISTRO 4SC (3 fl.oz.) + Crop Oil Concentrate	mesotrione (0.094 lb.) + crop oil concentrate	Controls a number of broadleaf weeds, including small escaped palmer amaranth. Apply to small actively growing weeds and Palmer pigweed smaller than 5 inches in height. Apply with a crop oil concentrate at a rate of 1 gallon per 100 gallons of spray mix. Apply in combination with spray grade UAN (2.5 gallons per 100 gallons of spray mix) or AMS (8.5 pounds per 100 gallons of spray mix). DO NOT use if corn has been treated with soil application of Counter or Lorsban. Corn up to 30 inches tall or up to the eight-leaf growth stage can be treated. See label for possible tank-mix partners.
DISTINCT 70WDG (4-6 oz.) Non-ionic Surfactant	dicamba (0.125-0.189 lb.) + diflufenzopyr (0.05-0.075 lb.) + non-ionic surfactant	Will control many annual broadleaf weeds and will suppress the growth of some annual grasses. Apply 6 ounces per acre when corn is 4 to 10 inches tall and 4 ounces per acre when corn is 10 to 24 inches tall. Must be applied with a non-ionic surfactant (1 quart per 100 gallons of spray mix) and a nitrogen source such as urea ammonium nitrate (UAN) or spray-grade ammonium sulfate (AMS). Use 5 quarts of UAN or 5 pounds of AMS per 100 gallons of spray mix. DO NOT use petroleum-based or methylated seed oils. DO NOT tank mix with Banvel, Clarity, 2,4-D, Poast, Poast Plus, Lorsban, Ambush, or Warrior. Any crop can be planted 120 days after application. DO NOT apply within 15 days of tassel emergence. DO NOT apply more than 10 ounces of Distinct per acre per season.
OPTION 35WDG (1.5-1.75 oz.)	foramsulfuron (0.033-0.038 lb.)	Provides good to excellent control of many annual grasses and johnsongrass. Can be applied over-the-top of corn from emergence to 16 inches tall (V5 stage). Application can be made to corn 16 to 36 inches tall using drop nozzles. Option MUST be applied with a methylated or ethylated seed oil (1.5 pints per acre) and a nitrogen fertilizer (urea ammonium nitrate [UAN]—1.5-2 quarts per acre OR spray-grade ammonium sulfate [AMS]—1.5-3 pounds per acre). DO NOT apply in a nitrogen solution. See label for approved tank mixes. DO NOT use Option if soil insecticide (Counter, Dyfonate, or Thimet) was used previously. Any crop can be planted in treated area after 60 days. DO NOT apply more than 3.5 ounces per acre per year.
PERMIT 75DF (0.66-1.33 oz.) or SANDEA 75DF (0.66-1.33 oz.) + Non-ionic Surfactant (1-2 qt./100 gal.) or Crop Oil Concentrate (1 gal./100 gal.)	halosulfuron (0.032-0.063 lb.) + non-ionic surfactant crop oil concentrate	Controls many annual broadleaf weeds and nutsedge. Use higher rates for nutsedge and larger weeds. Can be applied over-the-top of corn from spike to layby stages. Can be tank mixed with other postemergence herbicides. See label. DO NOT apply more than 2.67 ounces per acre per year. DO NOT plant wheat for 3 months or soybeans for 10 months following application.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (Herbicide-Tolerant Varieties)		
IGNITE 280SL (22-29 fl.oz.)	glufosinate (0.4-0.53 lb.)	USE ONLY ON "LIBERTY-LINK" OR "GLUFOSINATE-RESISTANT" CORN HYBRIDS. APPLYING IGNITE TO NON-TOLERANT VARIETIES WILL RESULT IN SEVERE CROP INJURY OR CROP DEATH! Can be applied from time of emergence until corn has reached 24 inches in height (V-7 with seven developed collars). A broad-spectrum material with limited systemic activity, it has no soil residual activity. Effective on a number of annual grasses and broadleaf weeds. Use rate is dependent on the weeds present and their size. Most annual grasses are controlled by the medium and high use rate. Thorough coverage is essential. DO NOT add a surfactant or crop oil concentrate. Can be tank mixed with atrazine. It is rainfast in 4 hours. Make only two applications per season at least 10 to 14 days apart and DO NOT exceed 44 ounces of Ignite per acre per season. No rotation restrictions exist. DO NOT apply within 70 days of harvesting corn grain or within 60 days of harvesting corn forage. Requires the use of spray grade ammonium sulfate (AMS) at 3 pounds per acre (17 pounds per 100 gallons of spray mix). When temperatures exceed 85°F, the rate of AMS can be reduced to 1.5 pounds per acre (8.5 pounds per gallon of spray mix).
LIGHTNING 70DG (1.28 oz.) + Non-ionic Surfactant (1 pt./100 gal. spray mix)	imazethapyr (0.042 lb.) + imazapyr (0.014 lb.) + non-ionic surfactant	USE ONLY ON "CLEARFIELD" HYBRIDS. APPLYING LIGHTNING TO NON-TOLERANT VARIETIES WILL RESULT IN SEVERE CROP INJURY AND/OR CROP DEATH! Application requires adding a surfactant and liquid fertilizer solution to the spray mix. Liquid fertilizer solution (such as 28% N, 32% N, or 10-34-0) at the rate of 1 to 2 quarts per acre is recommended. Spray-grade ammonium sulfate may be used at the rate of 2.5 pounds per acre instead of the fertilizer solution. Make postemergence application from the spike stage until corn is 12 inches tall (when weeds are less than 3 to 4 inches tall). Can be tank mixed with other herbicides, but observe all size limitations. DO NOT use crop oil concentrates or seed oils with spray mix. Make only one application per season. Application is rainfast within 1 hour. DO NOT apply to "IMI-Corn" hybrids treated with Counter or Thimet insecticides due to severe crop injury or death. DO NOT tank mix with Accent or Beacon. DO NOT feed or harvest for grain for at least 45 days after application. Recropping restrictions can be significant. Consult label before use to determine compatibility with production plans.
ROUNDUP POWERMAX (22 oz.) Others (See label.)	glyphosate (0.94) (See label.)	Apply over-the-top in Roundup Ready (RR) Corn hybrids up to the V8 stage or until corn height reaches 30 inches, whichever comes first. Sequential applications can be made, but DO NOT exceed a total of 2 pounds active ingredient glyphosate per acre per season over-the-top. Sequence is a pre-mix of glyphosate + s-metolachlor. Expert is a pre-mix of glyphosate + s-metolachlor + atrazine. See label for use rates. See label for other tank mixes.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (Herbicide-Tolerant Varieties) (cont.)		
TOUCHDOWN TOTAL (24-35 fl.oz.)	glyphosate (0.78-1.14 lb.)	Apply over-the-top of Roundup Ready (RR) corn hybrids up to V8 stage or until corn height reaches 30 inches, whichever comes first. Sequential applications can be made, but DO NOT exceed a total of 70 fluid ounces per acre per year over-the-top. See label use rate on annual grass control. There is no need for additional surfactant. Avoid application of spray into whorls of corn plants. Allow at least 50 days between treatments or before harvest.
Postemergence Directed		
EVIK 80DF (1.25-2.0 lb.) + Non-ionic Surfactant (1 pt./25 gal. spray mix)	ametryn (1-1.6 lb.) + non-ionic surfactant	Provides excellent control of annual grasses and broadleaf weeds. May temporarily burn back perennials. Evik MUST be applied as a directed spray after corn plants are at least 12 inches tall. DO NOT apply within 3 weeks of tasseling. CAUTION: Over-the-top sprays will kill corn. May be applied in water or liquid nitrogen solutions. Use low rates on small, easily killed weeds and higher rates on larger, hard-to-kill weeds as specified on the product label. Evik is particularly effective on Texas panicum and broadleaf signalgrass. The highest rate will control 6-inch-tall signalgrass.
GRAMOXONE INTEON 2.0 (1-2 pt.) or FIRESTORM 3 (0.75-1.3 pt.) + Non-ionic Surfactant	paraquat (0.25-0.5 lb.) (0.25-0.5 lb.) + non-ionic surfactant	For use as a postemergence directed spray after corn is at least 18 inches tall. Spray no higher than the lower 3 inches on the corn stalk. For control of broadleaf weeds and some grasses less than 4 inches tall, a non-ionic surfactant should be added to the spray mixture at the rate of 1 quart per 100 gallons of spray mix. DO NOT mix with liquid fertilizer. DO NOT spray on windy days. Gramoxone and Firestorm are RESTRICTED USE pesticides.
LINEX 4L (1.25-1.5 pt.) LOROX 50DF (1.25-1.5 lb.) + Non-ionic Surfactant (1 pt./25 gal. spray mix)	linuron (0.6-0.75 lb.) (0.6-0.75 lb.) + non-ionic surfactant	Provides excellent control of annual grasses and broadleaf weeds. May temporarily burn back perennials. Lorox MUST be applied as a directed spray after corn plants are at least 15 inches tall. CAUTION: Over-the-top sprays will kill corn. May be applied in water or non-pressure nitrogen solution. Use low rate on weeds 2 inches or less and on coarse soils low in organic matter. Use high rate for weeds up to 5 inches and on fine-textured soils.
PROWL 3.3EC PENDIMAX 3.3E (1.2-3.6 pt.) or PROWL H ₂ O (1.5-3 pt.) Others (See label.)	pendimethalin (0.5-1.5 lb.) (0.75-1.5 lb.)	Apply as a directed spray after corn is 12 inches tall. Cultivate first with sweep or rolling cultivators to throw at least 1 inch of soil over the base of the corn plants prior to application. Must be incorporated using cultivators or irrigation water. Set cultivators to provide maximum soil mixing; move treated soil into the crop rows. This herbicide is effective on late-emerging problem grasses such as fall panicum and Texas panicum.
TREFLAN HFP (1-2 pt.) Others (See label.)	trifluralin (0.5-1 lb.)	Apply as a directed spray after corn is 12 inches tall and incorporate with a sweep-type or rolling cultivator. Cultivate first to cover the base of the corn plants with soil prior to application. Apply herbicide and then set cultivators to provide maximum soil mixing, to move treated soil into the crop row, and to avoid exposing untreated soil. This herbicide is effective on late-emerging problem grasses such as fall panicum and Texas panicum.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Harvest Aid		
AIM 2EC (1.9 fl.oz.) + Crop Oil Concentrate	carfentrazone-ethyl (0.031 lb.) + crop oil concentrate	Apply after corn is mature and the grain has begun to dry down. Apply as a broadcast spray in sufficient spray volume to give complete coverage of crop and weeds such as morningglories, pigweed, and velvetleaf. Use a crop oil concentrate at rate of 1 gallon per 100 gallons of spray solution. A minimum of 3 days must be allowed between Aim application and grain harvest.
SODIUM CHLORATE (2 gal. of 3-lb. material) or SODIUM CHLORATE (1 gal. of 6-lb. material)	sodium chlorate (6 lb.) sodium chlorate (6 lb.)	Apply after corn is in black layer stage. Apply at least 14 days before anticipated harvest date on a bright, sunny day when temperature is above 75°F. Apply in 5 to 7 gallons of water by air. Grasses (such as johnsongrass) will be desiccated. Broadleaf weeds will probably be only defoliated.
Johnsongrass Control		
Johnsongrass causes yield reductions in corn by competing with the crop for plant nutrients. In addition, johnsongrass serves as an alternate host to virus diseases.		The diseases are then transmitted to the corn by insects. Control of johnsongrass in fields and along field borders is essential for optimum production.
ACCENT 75 WDG (0.67 oz.) or NIC-IT (2 fl.oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix)	nicosulfuron (0.031 lb.) (0.031 lb.) + non-ionic surfactant crop oil concentrate	Same as Comments for nicosulfuron in the Postemergence section. Apply over-the-top of corn when rhizome johnsongrass is 8 to 12 inches tall and seedling johnsongrass is 4 to 10 inches tall. A second application can be made 14 to 28 days later when johnsongrass regrowth is 8 to 10 inches tall. DO NOT apply later than the ten-leaf stage of corn. DO NOT apply more than 1.33 ounces of WDG or 4 fluid ounces of 2 pounds per gallon liquid per acre per year.
BEACON 75 WDG (0.75 oz.) + Non-ionic Surfactant (1 qt./100 gal. spray mix) or Crop Oil Concentrate (1 qt./25 gal. spray mix)	primisulfuron (0.57 oz.) + non-ionic surfactant crop oil concentrate	Same as Comments for Beacon in the Postemergence section. Seedling johnsongrass should be 4 to 12 inches tall, and rhizome johnsongrass should be 8 to 16 inches tall at time of first application. Two applications at half the labeled rate are permitted to control johnsongrass and subsequent regrowth. The second application should be made 10 to 20 days after the first application. DO NOT apply more than 0.75 ounce of Beacon per acre per year. DO NOT use a crop oil concentrate or nitrogen solution when applying Beacon with any other postemergence herbicide (such as dicamba or 2,4-D).
ROUNDUP POWERMAX (1.4-2 qt.) or Generics (See label.)	glyphosate (1.9-2.75 lb.)	Apply as a foliar treatment after harvest while johnsongrass is still growing and has produced at least 12 inches of regrowth (after mowing or plowing). Apply in 10 to 30 gallons of water per acre. Allow at least 7 days after application before tillage. Additional fall tillage will increase control: it chops rhizomes into small pieces. Use preplant or preemergence herbicide application in following year's crop to control seedling johnsongrass. See label for non-ionic surfactant use rate.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Johnsongrass Control (cont.)		
TOUCHDOWN TOTAL (1.4-2.2 qt.)	glyphosate (1.46-2.3 lb.)	Apply as a foliar spray after harvest when johnsongrass is at boot to head stage and in the fall prior to harvest. There is no need for surfactant addition. See Powermax comments for further control strategies. DO NOT exceed total of 5.75 quarts of Touchdown Total from all applications per year.

Table 13. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama and Properties That May Affect Water Quality¹

WEEDS	HERBICIDES						
	AAtrex, Atrazine (PRE)	Dual (PRE)	Micro- Tech (PRE)	Outlook (PRE)	Princep (PRE)	Surpass, Harness (PRE)	Python (PRE)
GRASSES							
Broadleaf Signalgrass	2	8	8	8	6	8	2
Crabgrass	8	9	9	9	8	9	4
Crowfootgrass	7	9	9	9	8	9	2
Fall Panicum	3	8	8	9	8	9	2
Goosegrass	8	9	9	9	8	9	2
Johnsongrass (rhizomes)	0	0	0	0	0	0	0
Johnsongrass (seedlings)	4	5	5	5	5	6	2
Texas Panicum	0	4	4	5	2	4	2
SEDGES							
Purple Nutsedge	0	1	1	0	0	1	0
Yellow Nutsedge	0	7	5	7	0	7	0
BROADLEAF WEEDS							
Bristly Starbur	7	0	0	0	8	0	8
Cocklebur	7	0	0	0	7	0	9
Florida Beggarweed	8	6	6	5	9	5	7-8
Florida Pusley	8	9	9	9	9	9	8
Morningglory	7	0	0	0	7	0	7-8
Pigweed	8	8	9	9	9	9	8
Prickly Sida	9	6	6	4	9	7	9
Sicklepod	7	5	7	5	8-9	4	7
Surface-Loss Potential²	M	M	M	--	M	M	--
Leaching Potential³	M	M	M	--	M	M	--

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama. Leaching and surface-loss potential ratings are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

PRE = Preemergence.

M = Medium. -- = Information not available.

Table 13. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama and Properties That May Affect Water Quality¹ (cont.)

WEEDS	HERBICIDES							
	2,4-D amine (POST)	AAtrex, Atrazine (POST)	NIC-IT Accent (POST)	Banvel/ Clarity (POST)	Basagran (POST)	Aim (POST)	Beacon (POST)	Callistro (POST)
GRASSES								
Broadleaf Signalgrass	0	2	8-9	0	0	0	0	0
Crabgrass	0	7	6	0	0	0	0	7
Crowfootgrass	0	6	8	0	0	0	0	0
Fall Panicum	0	4	8	0	0	0	7	0
Goosegrass	0	5	9	0	0	0	0	0
Johnsongrass (rhizomes)	0	0	8	0	0	0	8	0
Johnsongrass (seedlings)	0	2	9	0	0	0	8	0
Texas Panicum	0	0	7	0	0	0	0	0
SEDGES								
Purple Nutsedge	0	0	0	0	0	0	0	6
Yellow Nutsedge	0	0	0	0	7	0	0	6
BROADLEAF WEEDS								
Bristly Starbur	7	7	0	8	9	0	0	0
Cocklebur	9	9	6	9	9-10	8	4	8-9
Florida Beggarweed	7	7	7	8	0	7	8	0
Florida Pusley	8	8	5	7	0	7	7	0
Morningglory	9	9	7	9	4	8-9	7	7-8
Pigweed	9	8	8	9	4	8	8	8
Prickly Sida	7	7	0	8	7	7	6	5
Sicklepod	8	8	0	9	0	5	6	4
Surface-Loss Potential²	M	M	--	S	S	--	--	--
Leaching Potential³	M	M	--	L	M	--	--	--

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama. Leaching and surface-loss potential ratings are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top.

S = Small; M = Medium; L = Large. -- = Information not available.

Table 13. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama and Properties That May Affect Water Quality¹ (cont.)

WEEDS	HERBICIDES				
	Buctril (POST)	Distinct (POST)	Liberty (POST)	Lightning (POST)	Option (POST)
GRASSES					
Broadleaf Signalgrass	0	3	8	7	8
Crabgrass	0	3	8	8	6
Crowfootgrass	0	--	8	--	0
Fall Panicum	0	3	8	6	8
Goosegrass	0	0	5	3	8
Johnsongrass (rhizomes)	0	0	6	5	8
Johnsongrass (seedlings)	0	3	8	8	8
Texas Panicum	0	0	8	6	7
SEDGES					
Purple Nutsedge	0	3	7	5	0
Yellow Nutsedge	0	3	7	5	0
BROADLEAF WEEDS					
Bristly Starbur	7	0	8	--	0
Cocklebur	9	9	8	9	6
Florida Beggarweed	7	--	9	--	0
Florida Pusley	8	0	7	7	0
Morningglory	7	9	8	8	6
Pigweed	8	--	7	8	8
Prickly Sida	4	9	7	--	0
Sicklepod	0	7	8	6	0
Surface-Loss Potential²	M	--	--	--	--
Leaching Potential³	S	--	--	--	--

continued

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama. Leaching and surface-loss potential ratings are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top.

S = Small; M = Medium. -- = Information not available.

Table 13. Estimated Effectiveness of Recommended Herbicide Treatments for Corn on Common Weeds in Alabama and Properties That May Affect Water Quality¹ (cont.)

WEEDS	HERBICIDES				
	Sandea, Permit (POST)	Evik (PDS)	Firestorm Gramoxone (PDS)	Lorox (PDS)	Aim (HAR)
GRASSES					
Broadleaf Signalgrass	0	8	8	7	0
Crabgrass	0	8	4	8	0
Crowfootgrass	0	8	8	8	0
Fall Panicum	0	8	8	8	0
Goosegrass	0	8	8	8	0
Johnsongrass (rhizomes)	0	0	3	4	0
Johnsongrass (seedlings)	0	8	8	7	0
Texas Panicum	0	7-8	8	7	0
SEDGES					
Purple Nutsedge	7-8	7	4	4	0
Yellow Nutsedge	7-8	7	4	4	0
BROADLEAF WEEDS					
Bristly Starbur	8	8	7	8	0
Cocklebur	9	7	7	9	7
Florida Beggarweed	4	9	8-9	8	6
Florida Pusley	8	8	6	8	7
Morningglory	7	8	6-8	8	9
Pigweed	8	9	8-9	9	8
Prickly Sida	3	9	6	8	6
Sicklepod	2	9	8-9	8	0
Surface-Loss Potential²	--	M	S	L	--
Leaching Potential³	--	M	S	M	--

¹ Effectiveness ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama. Leaching and surface-loss potential ratings are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

POST = Postemergence Over-The-Top; PDS = Postemergence Directed Spray; HAR = Harvest Aid.

S = Small; M = Medium; L = Large. -- = Information not available.

Table 14. Herbicide Classification by Mode of Action

Mode of Action	Herbicide
AMINO ACID SYNTHESIS INHIBITORS	Accent, Beacon, Liberty, Lightning, Option, Permit, Python, Roundup, Sandea, Touchdown
CELL MEMBRANE DISRUPTER	Firestorm, Gramoxone Inteon
GROWTH REGULATORS	2,4-D, Banvel/Clarity, Distinct
PHOTOSYNTHETIC INHIBITORS	Aim, Atrazine/AAtrex, Basagran, Buctril, Evik, Lorox, Princep
ROOT/SHOOT GROWTH INHIBITORS	Dual, Harness, Micro-Tech, Outlook, Prowl/Pendimax, Surpass, Treflan

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For more information, call your county Extension office. It is listed in your telephone directory under your county's name.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

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