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Managing Corn & Grain Sorghum Insect Pests

LSU AgCenter Research & Extension

Insect Pests of Corn

There are numerous insect pests which potentially can infest and damage corn. Most of these problems, especially the late-season pests, usually can be avoided by planting the crop early. Early planting (late February to early April) is a standard recommendation for Louisiana corn production if optimum yield is desired. Early planting not only reduces insect damage and insecticide cost, but it also increases yield potential. A major component of corn insect management is good control of soil insects and other pests which might threaten a healthy, uniform stand.

Soil insect control is preventive in nature, meaning that an insecticide is applied at planting and before an infestation develops. A preventive treatment is justified if the probability of damage is high and rescue treatments are not as effective. The widespread adoption of reduced tillage practices has increased the probability and severity of soil insect problems. Conversely, treatment of other corn pests should be based on actual insect numbers, damage symptoms and/or growth stage of the crop. After the crop emerges, corn should be scouted weekly, and treatment decisions should be based on recommended action thresholds.

Southern Corn Rootworm

The southern corn rootworm adult is a yellow beetle with black spots on its back or wing covers. It is more commonly known by its other common name, the 12-spotted cucumber beetle. The beetles themselves cause little damage to corn, but the larval or worm stage is very destructive. The larvae, or "rootworms," are about 1/2 inch long and dirty white to yellow with a black head and dark brown spot on the end of the body. Rootworms develop in the early spring from eggs deposited in the soil by the beetles. When corn seed are planted, the rootworms feed on the roots of seedling plants.

Damage from the southern corn rootworm first appears as wilted seedlings. The youngest, most recently emerged leaf in the whorl is the first to wilt, followed by the other leaves on the seedling. After one warm day, a young seedling 3 to 4 inches tall will be severely wilted and, for all practical purposes, will be dead.

If a seedling is dug up when wilting is first noticed, a rootworm will often be found burrowing into the crown of the plant just below the soil surface, or a neatly eaten, round hole will indicate that a larva has recently fed upon the plant. Two to three days after it is first damaged, the plant will turn brown and begin to die.

A single rootworm can attack several plants in a row. Fields heavily damaged by rootworms will have reduced stands and, in severe cases, almost all of the corn plants will be eliminated in areas of the fields. Plants which do not die may eventually lodge later in the season because of damaged and reduced root systems. The rootworm can be easily controlled by applying one of the recommended soil insecticides or seed treatments at planting.

Other Soil Insects

Wireworms and white grubs are the larval stages of click beetles and june beetles, respectively. In non-cultivated areas, they feed on the roots of wild grasses. They most often attack corn that has been planted in fields just taken out of pasture and occasionally in fields one to two years out of pasture. However, the sand wireworm, an exception to the rule, can be a regular problem in the sandy bottom lands in the Red River Valley. Damage from these insects is similar to that of the southern corn rootworm in that they attack the young seedlings, causing the injured plant to wilt and die. Damage from these two pests can be reduced by planting a non-grass crop on land recently put into row crop production. Most of the soil insecticides recommended for corn rootworm control are also labeled for control or supression of these two insects. Check labels for specifics.

Cutworms are the caterpillar stage of several species of moths, of which the black cutworm is the most common. Cutworms attack corn in the early spring when it is from 1 to 10 inches tall. In cool weather they will "cut" the plant off just above the soil surface by chewing through its stem. Damage of this type will look as though someone clipped the plants off with a pair of scissors.

In warm weather, cutworms stay beneath the soil surface. From here, they bore into the heart of the plants, causing wilting and death. This form of cutworm damage usually occurs in larger plants and/or late-planted fields. Cutworms can be controlled with at-planting soil insecticide treatments or postemergence foliar treatments. However, the cutworm infestation must be detected early if postemergence applications are to prevent excessive stand loss.

The seed corn maggot is the larval stage of a fly which resembles the common housefly but is somewhat smaller. This fly prefers to deposit its eggs in wet-natured soils with high organic matter. The maggots attack the seed during the germination process, resulting in reduced stands or stunted, unhealthy plants. Damage from this pest can be prevented by

using one of the recommended soil insecticides or seed treatments.

The sugarcane beetle is an occasional early-season pest of corn that can cause severe stand loss. Adult beetles migrate into corn fields after emergence and burrow into the soil at the base of plants and feed on the crowns. Control of this pest with soil insecticides has been very inconsistent.

Although the true armyworm is not really a soil insect, it can be an occasional early-season pest. Excessive feeding on small corn seedlings can result in stand loss and thus require treatment. However, true armyworm foliage feeding in the whorls of larger plants usually does not result in economic damage.

Chinch Bugs

The chinch bug is a small insect about 1/4 inch long and 1/16 inch wide. It is mostly black with white markings on its back. Chinch bugs overwinter in clumps of wild grasses and in the spring move into corn and sorghum where they feed on the young plants.

Young chinch bugs or nymphs can cause damage by piercing plants with their beaks and feeding on plant fluids. Chinch bugs are found around the base of the plants, behind the leaf sheaths or occasionally in the whorls of small plants. In hot, dry weather, they can also be found beneath the soil surface on the plant roots. This is especially true in heavier soils which tend to be cloddy and cracked under dry conditions.

Feeding by large numbers of chinch bugs causes wilting of seedlings and can result in death of young plants. A reddish discoloration will appear at areas of the plant where feeding is intense. Plants that survive the seedling damage will be stunted and slow to develop. In corn, five or more chinch bugs per plant on seedlings less than 6 inches tall may cause wilting and stunting; 10 or more bugs per plant may cause death.

If you suspect chinch bugs in your field, inspect the base of the plants and behind the lower leaf sheaths. If conditions are dry, also look on the roots and underground stem. Scout for chinch bugs by sampling plants in different areas of the field. Field margins should be carefully observed because migratory chinch bugs will infest these areas first before spreading inward.

Stink Bugs

Southern green stink bugs and brown stink bugs are often observed feeding on corn. Research has shown that the bugs must feed when the developing ears are 1/2 inch to 3/4 inch long or less for significant damage to occur. The ears enter the susceptible period about two weeks before silking. The stink bugs pierce the plant with their beaks and inject a saliva while simultaneously feeding on plant sap. When the ears are small, this feeding can result in the loss of the entire ear.

Stink bugs are often seen feeding on older ears. In some cases, these larger ears may be seriously malformed, but this damage actually resulted from earlier feeding. Research indicates that as many as six stink bugs per ear feeding at the silking stage or beyond do not cause detectable damage.

Fields should be checked for stink bugs before the ear shoots have fully emerged. Scout for stink bugs by making counts in several areas of a field, but pay careful attention to field margins because this is where they normally infest first.

Growth and development of young corn plants can be affected by stink bug feeding. Treat corn less than 2 feet tall when 10% of plants have one or more stink bugs. Research has shown that seed treatment with Poncho 1250 will control stink bugs from plant emergence up until the V2-V3 growth stage.

Silk Feeding Beetles

The grape colaspis and 12-spotted cucumber beetle occasionally feed on the fresh silks of corn. Large numbers of these beetles can eat the silks off faster than they can grow, disrupting pollination. The colaspis is a tan beetle about 1/4 inch long. The 12-spotted cucumber beetle is 3/8 inch long and yellow with black spots on its wing covers. Control may be justified when counts for the entire field average five or more beetles per ear during peak pollination.

Stalk Borers

The sugarcane borer and southwestern corn borer are the two species most likely to be encountered in Louisiana. They are dirty white with brown spots and are the larval or caterpillar stage of small, cream-colored moths. The moths lay their eggs on the leaves of corn and sorghum where the young larvae feed for a few days after hatching, causing small streaks on the leaves. They then move down the leaf to its base and bore into the stalk. Here they continue to feed and mature, tunneling up and down the stalk of the plant. The entrance hole in the stalk can be recognized by the frass pushed out by the feeding caterpillar. Damage from stalk borers can cause the plants to break off and fall over under the weight of the ear. It also interferes with the translocation of nutrients through the plant.

The European corn borer has been found infesting corn in north Louisiana as recent as 2003, but it is normally not a major borer problem. It's damage and habits are similar to the other two borer species.

Early planting will reduce stalk borer damage in most years by allowing the crop to mature before the insect populations build to damaging levels. If leaf feeding scars indicate the need for insecticide treatment, it is important to apply before the larvae move from the leaves into the stalk. Destruction of crop residue soon after harvest will help destroy the insects as well as their overwintering sites. In Louisiana, borer larvae can overwinter in stubble of corn, sorghum and rice.

Moodna bisinuella

M. bisinuella is native to Mexico where it is an occasional pest of corn, and potentially could become a threat to field corn and grain sorghum in Louisiana. In field observations larvae appear to feed between rows of corn kernels. The first economically important infestation of this pest in Louisiana was in a producer corn field near Cheneyville in Rapides Parish during the summer of 2004. Afterwards, a four-year (2004-2007) field survey indicated that this insect is widely distributed in Louisiana corn fields. Larval color ranges from pale red to dark green with most heads being dark brown. Mature larvae are about 0.6 inch long. Pupae are cylindrical and about 0.35 inch in length. Young pupae are green and become reddish-brown prior to adult moth emergence. Moths have a wing span of about 0.7 inch. The forewings are dark brown with an obscure line lying across the wing. Hind-wings are cream-colored with a smoky colored area at the tip of the wing. Management strategies for M. bisinuella have been developed. Early planting and Bt corn with YieldGard and Herculex technology will reduce the insect population significantly.

Bt Corn Hybrids

LSU AgCenter research has shown that Bt hybrids with the Yieldgard and Herculex technology will provide effective control of the southwestern corn borer, sugarcane borer and European corn borer.

The Yieldgard technology is not highley effective on the corn earworm and fall armyworm, but it will suppress these pests and reduce their damage. The Yieldgard Bt technology will not provide satisfactory control of cutworms. Herculex corn, another Bt technology, has recently become available in Louisiana. Herculex Bt technology also suppresses corn earworm, but it will give effective control of fall armyworm and black cutworm. The economic benefits of Bt corn can best be realized in Louisiana when the crop is planted late, because the probability of insect damage is higher. Producers should plant only those Bt varieties that are recommended in their area based on yield data.

Management of corn borer resistance to Bt corn is very important to ensure the long-term success of this technology in Louisiana. Producers who grow Yieldgard Bt corn are required to follow an insect resistance management plan. In Louisiana, a 50% non-Bt refuge must be planted within 1/2 mile of the Bt corn (1/4 mile or closer preferred). Insecticides for the control of corn borers may be applied to the refuge only if the action threshold is reached. Planting pyramided Bt corn hybrids such as Vt Triple Pro or Viptera can reduce that refuge to 20%. Microbial Bt insecticides may not be applied to the refuge.

Insect Pests of Grain Sorghum

In Louisiana, the major insect pests of grain sorghum include the sorghum midge and a headworm complex which consists of the corn earworm, fall armyworm and sorghum webworm. All are late-season pests which attack the developing grain head. The probability of economic damage from these pests can be reduced by planting the crop early and uniformly. The major early-season pest is the chinch bug which can seriously damage seedling grain sorghum when heavy infestations occur. Fire ants can also be a threat to stand establishment in certain situations.

Grain sorghum should be scouted weekly from seedling emergence until the crop is in the boot stage. Economic damage from insects is not likely during this stage of crop development, but occasional problems do occur. After head emergence, grain sorghum should be scouted twice weekly during flowering and at least weekly afterward until grain maturity. In all cases, treatment with an insecticide should be based on insect numbers, damage symptoms and/or crop maturity.

Chinch Bugs

The chinch bug is an occasional pest of grain sorghum, but in some years it can be very damaging. This is especially true if heavy populations infest seedling sorghum under droughty conditions.

Treat for chinch bugs when two or more adults are found on 20% of the seedling plants less than 6 inches tall. Treatment of larger plants may be required in some instances, but this involves a judgment decision based on chinch bug numbers, size and maturity of the crop, growing conditions (crop vigor) and damage symptoms.

Grain sorghum fields treated at planting with recommended soil insecticides and seed treatments have tolerated chinch bugs in years of heavy infestations. The treatment should provide about three weeks of protection.

Chinch bugs infest and damage grain sorghum in a manner similar to that for corn. For further information, refer to page 3.

Aphids

Aphids, or plant lice, are very small, soft-bodied insects which feed on plant sap and secrete a honeydew. The corn leaf aphid, the greenbug and the yellow sugarcane aphid are three species that infest grain sorghum. The corn leaf aphid is blue to grayish-green with black cornicles (twin exhaust pipes at the rear of the body). The greenbug has a bright lime-green body with a darker green stripe running down the middle of the back. Also, the cornicles of the greenbug are black only at the tips. Corn leaf aphid colonies are usually found in the whorls, whereas greenbugs normally concentrate on the underside of expanded leaves. The yellow sugarcane aphid has a lemon yellow body covered with small spines and has two double rows of dark spots down the back.

The corn leaf aphid commonly occurs on and off throughout the growing season. Large populations may develop in the whorls of larger plants, but their effect on yield or crop development is negligible. Control of the corn leaf aphid is not recommended as a general practice because it is seldom an economic pest. Exceptions do occur where the use of an insecticide is warranted, but these are rare. Also, heavy infestations will sometimes develop in the seed head, but their effect, if any, on yield has not been determined.

Yellow sugarcane aphids occasionally infest grain sorghum and can be a problem since they inject a toxin. Areas of intense feeding result in a purplish discoloration on seedling plants and a yellowish or cholortic discoloration on older plants. Yield losses are more likely to result from seedling infestations.

Greenbug infestations are rare in Louisiana, but damaging numbers have occurred in the northern part of the state on late-planted sorghum. This aphid is a serious threat to production because it will inject a toxin while feeding. Heavy infestations are quite capable of reducing yields and, in some cases, they may kill whole plants.

If a greenbug population does develop, also consider the size of plants, maturity of the crop, general growing conditions and the presence and potential effect of beneficial insects when determining the need for an insecticide.

Plant Size	When to Treat
Emergence to about 6 inches tall	Visible damage, plants beginning to yellow and die, with greenbug colonies present.
Larger plant to preboot stage	Greenbug colonies numerous enough to cause red spotting or yellowing of leaves but before any leaves die.
Pre-boot to maturity	When greenbugs cause the death of more than two of the lowest, normal-sized leaves.

Headworms

The corn earworm, fall armyworm and sorghum webworm are three different types of headworms which can infest Louisiana grain sorghum. Yield losses may occur when populations of any one or a combination of the three infest the developing grain head. The corn earworm and fall armyworm also infest preheaded sorghum, but this vegetative feeding is rarely yield limiting. Because of differences in worm size and grain consumption, these three headworms are divided into two separate categories with separate recommendations.

Headworm problems can normally be avoided by planting the crop early. This practice will increase the chances that the crop will be mature before heavy moth flights occur. Also, growing open-headed varieties tends to reduce the occurrence of headworm infestations and improves control if insecticides are required.

Corn Earworm and Fall Armyworm

The corn earworm and fall armyworm are two caterpillars that are very similar in the way they damage grain sorghum. They are also similar in appearance. Both worms will reach a maximum length of about 1.5 inches, and both have four pairs of abdominal prolegs. They cannot be easily separated by general appearance because color patterns may vary. However, the corn earworm tends to have more hairs or spines on its body; the fall armyworm has a prominent inverted Y on its head capsule.

Pre-headed grain sorghum is commonly infested with either or both of these worms. This is especially true when the crop is planted late. Eggs are laid on the plant, and the newly hatched worms will move into the whorls where they feed on the developing leaves. As new leaves expand and emerge from the whorl, they appear ragged or somewhat shredded. This is unsightly and may be worrisome, but the worms seldom reach the growing point of the plant or the developing grain head. Damage is confined to the leaves. This normally has no effect on crop development or yield.

Exceptions do occur, but these are rare. For example, high worm populations, especially fall armyworm, could possibly overwhelm a field when plants are small, thus threatening the stand. Also, sorghum grown for silage or other forms of feed may need protection to avoid excessive foliage loss. The effectiveness of such applications cannot be assured, however, because worms in the whorls are hard to reach with an insecticide.

Fall armyworm and corn earworm infestations become much more critical when these worms attack the developing grain after heads emerge. To prevent economic yield loss, treat for either or both of these headworms when an average of one half-grown worm is found per head. Damage will be minimal after the crop reaches the hard dough stage.

Worm populations can be measured by sampling 10 to 20 heads in several areas of a field. The larger worms can be detected simply by looking at the heads in the field. However, this method is not nearly as accurate as shaking out the heads to determine the number of worms, large or small. This can be accomplished by cutting heads in the field and beating them on a flat surface, or by bending the stalk over and shaking the heads into a bucket. Always select heads at random so as not to bias the sample.

Applications for newly hatched worms should be postponed for a few days. These small worms cause very little damage and may eventually be controlled by beneficial insects, unless the field was previously treated for midge. On the other hand, the application should not be delayed until worms are large. The bigger worms are harder to kill and may have already caused most of their damage. Fields heavily infested with larger worms will often have white droppings (worm frass) on the upper surfaces of the upper leaves.

Sorghum Webworm

The sorghum webworm is a smaller headworm which measures about 0.5 inch when fully grown. These worms appear fuzzy from the dense covering of spines and hairs on their body. They are somewhat flattened in shape with four longitudinal reddish to black stripes. Historically, the sorghum webworm was more of a problem in south Louisiana, but infestations now occur statewide. In recent years producers have experienced poor control of this pest with pyrethroid insecticides in northeast Louisiana.

Control with an insecticide is justified when four or more larvae are found per head in maturing sorghum. Damage will be minimal after the crop reaches the hard dough stage. This pest reduces yields by eating circular holes in the developing grain and eating out the starchy content.

Sorghum Midge

The sorghum midge is not only a destructive pest of grain sorghum, but it is also a key pest. Our ability to manage the sorghum midge through cultural practices will greatly influence the need for insecticide in late season.

The adult sorghum midge is a tiny, orange fly which measures about 1/12 inch in length. Grain damage occurs when the adult lays its eggs (50-200) in the florets

(flowers) while the grain head is blooming. These eggs hatch into small grubs which feed on the inner contents of the developing grain. Grain sorghum is susceptible to midge damage only when it is in the bloom stage.

The adult is the only stage of the life cycle that can be scouted for and controlled with insecticide when necessary. Fields should be scouted from the time heads emerge until the field has completed blooming. If midge are present, they will be on the grain heads or swarming around them. Midge are more easily observed during late morning and mid-afternoon. Midge populations can be determined by thorough, visual inspection of 10 or more blooming heads in several areas of the field. This should be done without handling or brushing against the plant. Another method involves the use of a clear plastic bag which is quickly slipped over the entire grain head with minimal disturbance. Adult midge are then counted as they light on the inside surface of the bag.

An insecticide should be applied if midge counts average one or more adults per head and at least 20% to 30% of the plants in the field are blooming. Since migrating midge will frequently reinfest a field and all parts of a field rarely bloom at the same time, a second application may be required five to seven days later if the field is still blooming.

Midge problems can sometimes be avoided by planting the crop early. Midge populations are light and seldom require treatment when the early planted fields begin to bloom. Populations will increase rapidly from that point on because the life cycle of the pest requires only about two weeks. Growers should plant their crops as uniformly as possible and not make successive plantings in the same general vicinity. Growers should also use cultural practices which promote uniform crop emergence and crop development within a field. It is important that a field bloom as uniformly as possible so as to reduce the period of midge susceptibility.

Fire Ants

Fire ants are an occasional pest that forages sorghum seed and seedlings soon after planting. The problem is most severe in reduced tillage fields, especially heavy clay soils under dry conditions. It is more difficult to maintain a closed seed furrow in this type of field, and this allows fire ants easy access to seeds and seedlings. Also, the lack of tillage results in a favorable field environment for fire ant colonies to develop. Adequate moisture at planting to promote rapid seed germination or rainfall soon after planting to seal the seed furrow will both reduce fire ant damage. Since weather conditions cannot be predicted, seed treatments provide effective control in high risk fields.

Stalk Borers

The southwestern corn borer and sugarcane borer are two species that infest grain sorghum. Heavy infestations are more likely to occur in late planted fields. Stalk boring damage can result in dead heart plants, reduced plant height, stem lodging and blank heads. Economic thresholds for grain sorghum have not been well defined, but treatments must be made before larvae bore into the stalk in order to be effective. The recommended materials will only suppress populations of borers.

Other Insect Pests

The wireworm, white grub, southern corn rootworm and cutworm are four soil insects which can attack grain sorghum. Problems with the wireworm and white grub are more likely in fields which were recently in pasture or sod. The incidence of all soil insects can be reduced by cultural practices and recommended herbicide use which reduces crop residue and provides for weed-free fields in the early spring before planting. Rotation with tap-rooted crops is also helpful in reducing some soil insects.

A soil insecticide is not recommended as a general practice as in the case of corn, but fields should be planted with a recommended seed treatment.

High risk fields could develop where treatment for specific soil insects is justified. Lorsban 15G and Furadan 4F are labeled for soil insect control in grain sorghum. Gaucho and Cruiser seed treatments are labeled for wireworm and seed corn maggot control. Poncho seed treatment is labeled for wireworm and white grub control. Also, there are foliar insecticides recommended for postemergence cutworm control.

Headed-out grain sorghum is occasionally attacked by several types of true bugs which are collectively termed panicle-feeding bugs. This pest group includes the rice stink bug, southern green stink bug, brown stink bug, conchuela stink bug, red-shouldered stink bug, leaf-footed bug and false chinch bug. Of these, the rice stink bug and southern green stink bug are more likely to be a problem in Louisiana grain sorghum. These bugs will affect yield by reducing grain weight, quality and seed germination. Damage tends to be greater when heads are infested early in grain development, that is, in milk and soft dough stages. Treatment of developing grain sorghum should probably be considered when fields average four to five stink bugs per head. Karate Z, Mustang Max, Baythroid and Prolex are labeled for stink bug control in grain sorghum.

Summary of Insecticide Precautions and Limitations

(Refer to insecticide labels for complete information.)

Asana XL - Toxic to bees, fish and aquatic invertebrates. Do not apply directly to water or when weather conditions favor drift from treated areas. Do not apply more than 0.25 lb AI per acre per season to corn or 0.15 lb AI per acre per season to grain sorghum. Pre-harvest treatment interval: 21 days for corn and 21 days for grain sorghum. Reentry interval: 12 hours.

Baythroid XL - Highly toxic to fish, aquatic invertebrates and bees. Maximum AI/acre per season: corn, 0.088 lb.; grain sorghum 0.066 lb. Pre-harvest interval: corn, 21 days; grain sorghum 14 days. Reentry interval: 12 hours.

Capture/Bifenthrin - This product is toxic to bees, fish and aquatic invertebrates. Do not apply more than 0.3 lb AI per acre per season. Do not apply within 30 days of harvest. Do not graze or cut for feed within 30 days of last application. Reentry interval: 12 hours.

Cyfluthrin- Same as Baythroid except maximum AI/acre per season: corn, 0.175 lb; grain sorghum, 0.131 lb.

Counter - Toxic to birds, fish and other wildlife. Keep out of any body of water. Follow handling and storage instructions on the label. Reentry interval: 48 hours.

Cruiser - This product is toxic to wildlife and highly toxic to aquatic invertebrates. Do not apply directly to water. Do not allow drift or runoff from treated areas. Reentry interval: 12 hours.

Declare- Same as Karate, except do not apply more than 0.04 lb AI per acre per season.

Dimethoate - Toxic to bees, wildlife and aquatic organisms. Do not apply after heading. Pre-harvest treatment interval: 28 days. Make no more than three applications per season. Reentry interval: 48 hours.

Force - Highly toxic to fish and other aquatic organisms. Do not apply directly to water or wetlands, or within 20 yards of water. Rotational crops can be planted no sooner than 30 days after application. Reentry interval: 0 hours.

Gaucho 480/600 - Highly toxic to birds and aquatic invertebrates. Do not graze or feed livestock on treated seed areas for 45 days after planting. ***For use in commercial seed treaters only.*** Reentry interval: 12 hours.

Intrepid - Drift and runoff may be toxic to sensitive aquatic vertebrates. Do not apply by air within 150 feet or by ground within 25 feet of surface water. On corn, do not apply within 21 days of harvest. Reentry interval: 4 hours.

Karate - Extremely toxic to fish, aquatic organisms, and bees. Do not graze livestock on treated areas or harvest for fodder, silage or hay to feed livestock. On grain sorghum, do not apply more than 0.08 lb AI per acre per season. Pre-harvest treatment interval: 30 days. Reentry interval: 24 hours.

Lannate - Toxic to fish, birds, bees, aquatic invertebrates and small mammals. Keep out of any body of water. Pre-harvest treatment interval: 14 days for grain and 14 days for feed or grazing. Reentry interval: 48 hours.

Lorsban - Toxic to bees, birds, fish and other wildlife. Keep out of any body of water. Do not apply where runoff is likely or when weather conditions favor drift. On corn, do not harvest for grain within 35 days of last application. On corn, do not graze or harvest for silage within 14 days of last treatment. Do not apply more than 3 lb AI per acre per season to corn. On grain sorghum, do not apply more than 1.5 lb AI per acre. On grain sorghum, do not harvest for grain, forage, fodder, hay or silage within 30 days of last application if 1 pint per acre is applied or within 60 days if more than 1 pint is applied. Reentry interval: 24 hours (15G), 24 hours (4E).

Methyl Parathion - Toxic to aquatic invertebrates and other wildlife. Keep out of any body of water. Follow special handling instructions on the label. Pre-harvest treatment interval: 12 days. Reentry interval: 4 days.

Mustang Max/Respect - High toxic to bees, fish and aquatic vertebrates. Do not apply more than 0.125 lb AI per acre per season on grain sorghum or 0.10 lb AI per acre per season on corn. Pre-harvest treatment interval: 30 days for corn and 14 days for grain sorghum. Reentry interval: 12 hours.

Poncho – Toxic to invertebrates. Do not use treated seed for feed or food. See label for replant restrictions. **For use in commercial seed treaters only.**

Regent - Do not get on skin, breathe the spray mist or get in eyes. Toxic to birds and aquatic life. Keep out of water and avoid run-off. Refer to label for crop rotation restrictions. Reentry interval: 24 hours.

Sevin - This product is toxic to bees and aquatic and estuarine invertebrates. Pre-harvest treatment interval: 48 days for corn, 21 days for grain sorghum grown for grain, and 14 days for corn and grain sorghum grown for forage. Reentry interval: 12 hours.

Tracer – Highly toxic to bees exposed to direct treatment and mollusks. Do not apply directly to water. Do not apply more than 14.4 oz of product per acre per year. Pre-harvest treatment interval: 7 days for grain or fodder and 14 days for forage. Reentry interval: 4 hours.

Warrior - Extremely toxic to fish, aquatic organisms and bees. Do not graze livestock on treated areas, or harvest for fodder, silage or hay to feed livestock. Do not apply more than 0.12 lb AI per acre per season. Pre-harvest treatment interval: 21 days for grain, fodder or silage. Reentry interval: 24 hours.

Application of Granular Insecticides for Corn and Grain Sorghum

Numerous soil insecticides are labeled for use in corn and grain sorghum. Granular formulations of soil insecticides are recommended since they are generally safer and more convenient to use, but liquid formulations are also available for some of these materials.

Insecticide use rates are commonly expressed as pounds of active insecticide per acre. This allows for one standard recommendation that remains constant for those insecticides with more than one formulation. This method of expressing use rates is very accurate for broadcast applications or in-furrow and banded applications on crops with a standard row width.

However, row widths in corn and grain sorghum are quite variable.

In these crops, soil insecticides are applied either in-furrow or in a narrow band on top of the row, but seldom are they broadcast. The standard rate per acre recommendations are based on a 40-inch row spacing. If row width is narrower, more active insecticide will be required per acre because there are more linear or row feet in an acre of land.

It is more applicable and less confusing to express soil insecticide use rates in terms of ounces of product (granules) per 1000 linear (row) feet. These use rates will remain constant regardless of row width.

The tables will help determine the amount of insecticide required per acre as determined by row spacing.

20G Formulation 6 Ounces Per 1000 Row Feet						
Row Width	40"	38"	36"	32"	30"	20"
Lb. Granules per Acre	4.9	5.2	5.4	6.1	6.5	9.8
15G Formulation 8 Ounces Per 1000 Row Feet						
Row Width	40"	38"	36"	32"	30"	20"
Lb. Granules per Acre	6.5	6.9	7.3	8.2	8.7	13.1
Force 3G Formulation 4 Ounces Per 1000 Row Feet						
Row Width	40"	38"	36"	32"	30"	20"
Lb. Granules per Acre	3.3	3.4	3.6	4.1	4.4	6.6
Regent 4SC Formulation 0.24 Fluid Ounces Per 1000 Row Feet						
Row Width	40"	38"	36"	32"	30"	
Fluid Ounces per Acre	3.1	3.3	3.5	3.9	4.2	
Capture 2EC Formulation 0.3 Fluid Ounces Per 1000 Row Feet						
Row Width	40"	38"	36"	30"	20"	
Fluid Ounces per Acre	3.9	4.1	4.4	5.1	7.8	

Soil insecticides should be applied according to label instructions. Some insecticides can be applied directly in the seed furrow. Others can be applied only in a band on top of the row. Some insecticides can affect seed germination if they are allowed to come in direct contact with the seed.

Application of Corn Soil Insecticide

	Can be Applied		
Insecticide	In-Furrow	Band	T-Band
Counter 15G	Yes	Yes	No
Lorsban 15G	Yes	No	Yes
Force 3G	Yes	Yes	Yes
Regent 4SC	Yes	No	No
Capture 2EC	No	No	Yes

Insecticide Interaction With Corn Herbicides

Beacon and Accent were the first ALS-inhibiting herbicides labelled to use on corn. Since then many other ALS-inhibiting herbicides and ALS-inhibiting herbicide formulation mixes have become available. These products include Accent Gold, Basis Gold, Steadfast, Hornet, Celebrity, Northstar, Peak, Resolve and Spirit. ALS-inhibiting herbicides can interact with certain corn insecticides to cause serious crop injury. The most common restriction among this group prohibits herbicide application if corn was previously treated with Counter 15G at planting. Some of these herbicides may also cause crop injury if applied to corn treated at planting with other organophosphate soil insecticides such as Lorsban and Thimet. Some of these herbicides can cause crop injury if applied too soon either before or after the application of an organophosphate foliar spray. Producers who anticipate the need for an ALS inhibiting herbicide should select a soil insecticide that will not result in future crop damage. Always read the insecticide and herbicide labels because restrictions vary among these products.

Louisiana Corn Insecticide Guide – 2011

Insect	Insecticide[2]	Pounds Active Ingredient Per Acre	Concentrate Per Acre	Acres Treated Per Gallon	When to Treat Economic Threshold
Corn Rootworm[1]					
At Planting	Lorsban (chlorpyrifos) 15G[6]	1.0	6.7 lb		Treatment is preventive. Apply at planting. ***Recommended rates are based on 40- inch row spacing.*** Refer to pages 9-10 for further instructions on application of granular insecticides.
	Force 3G	0.1	3.3 lb		
	Counter 15G[6]	1.0	6.7 lb		
	Regent 4SC[8]	0.1	3.1 oz		
	Capture/bifenthrin (2)	0.06	3.9 oz		
	Poncho 1250		Pre-treated seed		
	Cruiser 5F5		1.25 mg. ai/kernel		
Chinch Bugs					
At Planting	Counter 15G[6]	1.0	6.7 lb		
	Lorsban (chlorpyrifos) 15G[4,6]	1.0	6.7 lb		
	Regent 4SC[8]	0.1	3.1 oz		
	Poncho 500/1250		Pre-treated seed		
	Cruiser 5FS		0.5-0.8 mg ai/ Kernel		
Foliar Sprays	Baythroid XL (1)	0.02	2.6 oz	50	Treat when 5 or more adults are found on 20% of seedling plants (less than 6 inches tall). Control is more effective when insecticides are applied with high volume ground equipment.
	Mustang Max/Respect (0.8)	0.02-0.025	3.2 - 4.0 oz	40-32	
	Cyfluthrin (2)	0.03	1.9 oz	67	
	Sevin/carbaryl (4)	1.5-2.0	1.5 - 2 qt	2.6-2	
	Lorsban/ chlorpyrifos (4)[6]	0.5-1.0	1 - 2 pt	8-4	
	Warrior T/ lambda-cyhalothrin (1)	0.03	3.8 oz	33.3	
	Capture / bifenthrin(2)	0.033-0.10	2.1 - 6.4 oz	61-20	
Cutworms					
At Planting	Lorsban (chlorpyrifos) 15G[4,6]	1.0	6.7 lbs		Treatment is preventive. Apply at planting. ***Recommended rates are based on a 40- inch row spacing.***
	Force 3G	0.1	3.3 lbs		
	(Foliar sprays applied in a band.)				
Foliar Sprays	Baythroid XL (1)	0.007-0.012	0.8-1.6 oz	154-80	Treat when seedling plants show 6% to 8% stand damage from above-ground cutting or 2% to 4% from below ground. In reduced tillage fields, foliar sprays can be applied at planting (in a band behind the planter).
	Capture/bifenthrin (2)	0.033-0.10	2.1 - 6.4 oz	61-20	
	Lorsban/ chlorpyrifos (4)[4,6]	0.5-1.0	1 - 2 pt	8-4	
	Asana XL (0.66)	0.03-0.05	5.8 - 9.6 oz	22-13	
	Warrior T/ lambda-cyhalothrin (1)	0.015-0.025	2.0 - 3.2 oz	67-40	
	Mustang Max/Respect (0.8)	0.008-0.0175	1.3-2.8 oz	100- 46	
	Cyfluthrin (2)	0.013-0.025	0.8-1.6 oz	154-80	
Corn Earworms/Armyworm (Whorl Stage)					
	Cyfluthrin (2)	0.025-0.044	1.6-2.8 oz	80-45	Treatment for worms in whorl is rarely needed except under extreme infestations. Treatment for worms in the ear is not recommended.
	Sevin/carbaryl (4)	1.5-2.0	1.5 - 2 qt	2.6- 2	
	Asana XL (0.66)[3]	0.03-0.05	5.8 - 9.6 oz.	22-13.2	
	Warrior T/ lambda-cyhalothrin (1)	0.02-0.025	2.6 - 3.2 oz	50-40	
	Mustang Max/Respect (0.8)	0.011-0.025	1.8-4.0 oz	73-32	
	Capture/ bifenthrin (2)	0.033-0.10	2.1-6.4 oz	61-20	
	Baythroid XL (1)	0.012-0.022	1.6-2.8 oz	80-45	

Louisiana Corn Insecticide Guide – 2011					
Insect	Insecticide[2]	Pounds Active Ingredient Per Acre	Concentrate Per Acre	Acres Treated Per Gallon	When to Treat Economic Threshold
Stink Bugs					
	Methyl Parathion (4)[6]	0.25-0.5	1/2 - 1 pt	16-8	For plants less than 2 feet tall, treat when 10% have 1 or more stink bugs. For ear protection, treat when 5% of plants have stink bugs at or shortly before the time ear shoots appear.
	Warrior T/ lambda-cyhalothrin (1)[7]	0.02-0.03	2.6 - 3.8 oz	50-33	
	Capture/bifenthrin (2)	0.033-0.1	2.1 - 6.4 oz	61-20	
	Mustang Max/Respect (0.8)[7]	0.017-0.025	2.7-4.0 oz	47-32	
	Cyfluthrin (2)[7]	0.025-0.044	1.6-2.8 oz	80-45	
	Baythroid XL (1)[7]	0.012-0.022	1.6-2.8 oz	80-45	
Grape Colaspis, Spotted Cucumber Beetle					
	Methyl Parathion (4)[6]	0.25	1/2 pt	16	Treat when 5 or more beetles are found per ear, feeding on the silks during pollination.
Stalk Borers					
	Baythroid XL (1)	0.012-0.022	1.6-2.8 oz	80-45	Before tassel, treat when 25% of plants have larvae in the whorl. After tassel, treat when10% of plants have larvae that have not yet bored into the stalk. See discussion of Bt hybrids on page 4. Plant recommended varieties for your area.
	Asana XL (0.66)	0.03-0.05	5.8 - 9.6 oz	22-13.2	
	Permethrin (3.2)	0.1-0.2	1/4 - 1/2 pt	32-16	
	Warrior T/ lambda-cyhalothrin (1)	0.02-0.03	2.6 - 3.8 oz	50-33	
	Intrepid (2F)	0.06-0.12	4 - 8 oz	33-17	
	Mustang Max/Respect (0.8)	0.017-0.025	2.7-4.0 ozs	47-32	
	Cyfluthrin (2)	0.025-0.044	1.6-2.8 oz	80- 45	
	Capture/ bifenthrin (2)	0.033- 0.10	2.1- 6.4 oz	61- 20	
	Bt Hybrids (Yieldgard, Herculex, Vt Triple Pro and Viptera)				

[1] See page 2, under Other Soil Insects, for suggestions for wireworms, grub and seed corn maggot control.
[2] Pounds of active ingredient per gallon of concentrate indicated in parentheses. Granular formulations are indicated with a G.
[3] Not recommended for fall armyworm.
[4] Lorsban 15G is more effective against chinch bugs and cutworms when applied in a T-band.
[6] See discussion of herbicide interaction on page 10.
[7] Will not give satisfactory control of brown stink bugs. Cyfluthrin, Baythroid and Mustang Max will give satisfactory control at the highest recommended rates.
[8] At-planting treatment controls first generation stalk borers.

Louisiana Grain Sorghum Insecticide Guide – 2011

Insect	Insecticide[1]	Pounds Active Ingredient Per Acre	Concentrate Per Acre	Acres Treated Per Gallon	When to Treat Economic Threshold
Chinch Bugs					
	Lorsban (chlorpyrifos) 15G[3,4]	1.0	6.7 lb		
	Gaucho 480/600	8/6.4 fl. oz. per cwt. seed			
	Cruiser 5F	5.1 fl. oz./ cwt. seed			
	Poncho 600	5.1-6.4 oz./ cwt. seed			
Foliar Sprays[2]	Baythroid XL (1)	0.02	2.6 oz	50	Treat when 2 or more adults are found on 20% of seedling plants (less than 6 inches tall). Control is more effective when insecticides are applied with high volume ground equipment.
	Lorsban/ chlorpyrifos (4)	0.5-1.0	1 - 2 pt	8-4	
	Sevin/carbaryl (4)	1.5-2.0	1 1/2 - 2 qt	2.7- 2	
	Karate Z/ lambda-cyhalothrin (2)	0.03	1.9 oz	67	
	Cyfluthrin (2)	0.04	2.6 oz	50	
	Mustang Max/Respect (0.8)	0.02-0.025	3.2-4.0 oz	40-32	
	Declare (1.25)	0.015	1.5 oz	83	
Cutworms					
	Baythroid XL (1)	0.008-0.01	1-1.3 oz	125-100	Treat before damage reduces plant stand below optimum plant population.
	Lorsban (4)	0.5-1.0	1-2 pt	8-4	
	Asana (0.66)	0.03-0.05	5.8-9.6 oz	22-13	
	Mustang Max/Respect (0.8)	0.008-0.025	1.3-4.0 oz	100-32	
	Cyfluthrin (2)	0.016-0.02	1-1.3 oz	125-100	
	Karate Z/ lambda-cyhalothrin (2)	0.015-0.02	1-1.3 oz	133-100	
	Declare (1.25)	0.0075-0.01	0.8-1.0 oz	166-125	
Fire Ants					
At Planting	Lorsban/chlorpyrifos 15G[3,4]	1.0	6.7 lbs		Recommended rate is based on a 40 inch row spacing. *Gaucho is for use in commercial seed treaters only.*
	Gaucho 480/600	8/6.4 fl. oz. per cwt. seed			
	Cruiser 5F	5.1 fl. oz./ cwt. seed			
Aphids					
	Dimethoate (2.67)	0.25-0.5	3/4 - 1 1/2 pt	10.7-5.3	Treatment of aphids is rarely needed. See discussion on page 5.
	Lorsban/ chlorpyrifos (4)	0.25-0.5	1/2 - 1 pt	16-8	
Sorghum Midge					
	Lorsban/chlorpyrifos (4)	0.25 - 0.5	1/2 - 1 pt	16-8	Treat when blooming fields average 1 adult midge per grain head, and have at least 20-30% blooming plants.
	Lannate (2.4)	0.225 - 0.45	3/4 - 1 1/2 pt	10.7 - 5.3	
	Karate Z / lambda-cyhalothrin (2)	0.02	1.3 oz	100	
	Cyfluthrin (2)	0.02	1.3 oz	100	
	Asana XL (0.66)	0.03	5.8 oz	22	
	Mustang Max/Respect (0.8)	0.025	4.0 oz	32	
	Declare (1.25)	0.01	1.0 oz.	125	
	Baythroid XL (1)	0.01	1.3 oz	100	

Louisiana Grain Sorghum Insecticide Guide – 2011

Insect	Insecticide[1]	Pounds Active Ingredient Per Acre	Concentrate Per Acre	Acres Treated Per Gallon	When to Treat Economic Threshold
Corn Earworm / Fall Armyworm					
	Tracer (4)	0.047 - 0.094	1.5 - 3.0 oz	85 - 43	Treat seed heads when sorghum averages 1 half-grown worm per grain head. (Treatment for worms in the whorl stage is rarely needed. See discussion on page 6.)
	Lannate (2.4)	0.33 - 0.45	1- 1 1/2 pt	7.3 - 5.3	
	Sevin/carbaryl (4)	1.5 - 2.0	1 1/2 - 2 qt	2.7 - 2	
	Karate Z/ lambda-cyhalothrin (2)	0.02 - 0.03	1.3 - 1.9 oz	100 - 67	
	Cyfluthrin (2)	0.02 - 0.044	1.3 - 2.8 oz	100 - 45	
	Asana XL (0.66)[5]	0.03 - 0.05	5.8 - 9.6 oz	22 -13	
	Mustang Max/Respect (0.8)	0.011 - 0.025	1.7 - 4.0 oz	73 - 32	
	Declare (1.25)	0.01 - 0.015	1.0 - 1.5 oz	125 - 83	
	Baythroid XL (1)	0.01 - 0.022	1.3 - 2.8 oz	100 - 45	
Sorghum Webworm					
	Lorsban/chlorpyrifos (4)	0.5	1 pt	8	Treat when sorghum averages 4 worms per grain head.
	Lannate (2.4)	0.45	1 1/2 pt	5.3	
	Sevin/carbaryl (4)	1.5 - 2.0	1 1/2 - 2 qt	2.7- 2	
	Tracer (4)	0.047 - 0.094	1.5 - 3.0 oz	85 - 43	
Stalk Borers *(suppression only)* [6]					
	Baythroid XL (1)	0.01 - 0.022	1.3 - 2.8 oz	100 - 46	Treat before larvae bore into plant.
	Declare (1.25)	0.01 - 0.015	1.0 - 1.5 oz	125 - 83	
	Cyfluthrin (2)	0.02 - 0.044	1.3 - 2.8 oz	100 - 46	
	Karate Z / lambda-cyhalothrin (2)	0.02 - 0.03	1.3 - 1.9 oz	100 - 67	
	Mustang Max/Respect (0.8)	0.011 – 0.025	1. 7- 4.0 ozs	73 - 32	

[1] Pounds of active ingredient per gallon of concentrate indicated in parentheses.

[2] Apply recommended rates in a band. (Do not interpret as broadcast rates that can be reduced to a band.)

[3] Apply in a T-Band. Do not apply in-furrow.

[4] Recommended rates are based on a 40-inch row spacing.

[5] Not recommended for fall armyworm.

[6] Must be applied before larvae bore into stalk.

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