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Insect Management

Methods of Preventing Insect Pest Infestations

Managing insect and mite pests of sorghum involves actions that prevent pests from increasing to high enough numbers to cause economic damage. These practices help avoid pests, reduce their abundance, slow their rate of increase, lengthen the time it takes them to reach damaging levels, and/or increase the plant's tolerance to the insect pest. These actions include:

- Crop rotation
- Destroying the previous crop (helpful in reducing southern corn rootworm, sorghum midge, etc.), volunteer, and alternate plant hosts (e.g., Johnsongrass)
- Hybrid selection, seedbed preparation, and seed treatment
- Planting time
- Fertilizer and irrigation
- Biological management methods, including protecting beneficials

Sampling and Determining Economic Injury Levels

Because sorghum insect pest levels can change quickly, it is beneficial to scout insects once a week, unless otherwise noted. The major exception is sorghum midge, which may require scouting daily during flowering so as not to miss a sudden increase in their number in the field. The full Texas AgriLife Extension sorghum insect guide contains further details on scouting and sampling techniques.

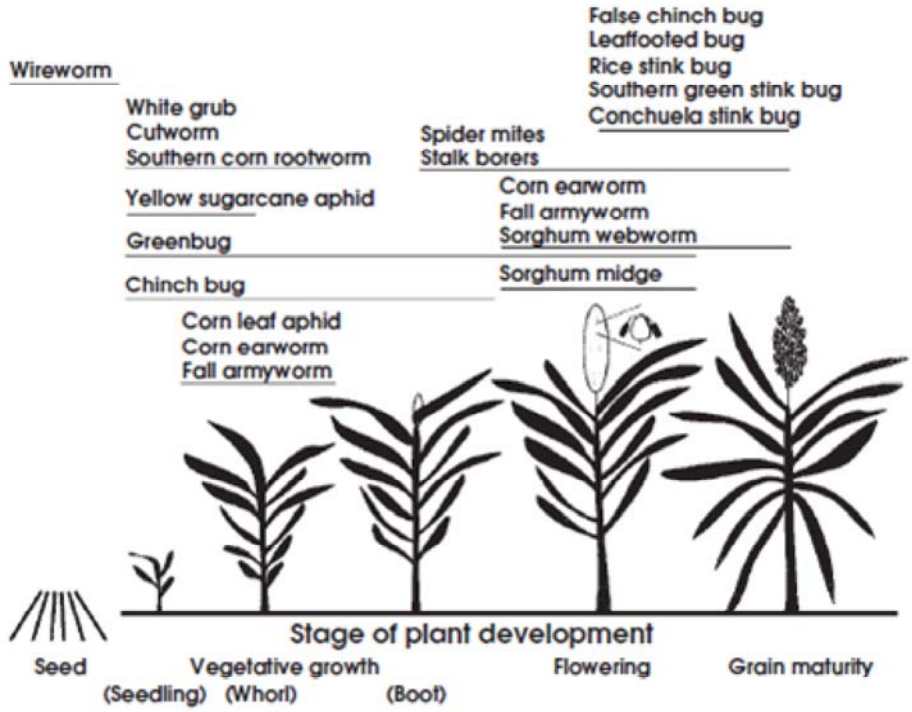
Economic injury levels will vary based on the projected or contracted price of the grain as well as insecticide and application costs. Economic injury levels, however, should be regarded as in making decisions about pest insect control.

Seed Treatments

Seed treated with Gaucho® (imidacloprid), Poncho® (clothianidin), or Cruiser® (thiamethoxam) can be purchased to manage southern corn rootworm, greenbug, yellow sugarcane aphid, chinch bug, stink bug, wireworms, false wireworms, and grubs. Recently Extension has suggested the efficacy of these treatments may extend to about 45 days from planting. Texas AgriLife trials with many of these seed treatment products has produced varied results in part depending greatly on the insect and a particular region in Texas.

Bottom Line: Consult your local IPM agents of regional Extension staff for trial results and observations in your area. Many of these insecticide active ingredients are now often

packaged with seed fungicides as well (e.g., CruiserMaxx). See the hybrid selection section for comments about price considerations when purchased on your planting seed.



Major Pests	High Plains Rolling Plains Concho Valley	Central Texas Coastal Bend South Texas
Southern corn rootworm	No	Yes
Greenbugs	Yes	Yes
Yellow sugarcane aphid	Yes	Yes
Corn leaf aphid	Minor	Common, not severe
Spider mites	Yes	?
Sorghum headworms corn earworm and fall army worm	Yes	Yes
Rice stink bug	No	Yes
Sorghum midge	Yes	Yes

Major Soil Insect Pests of Texas Grain Sorghum

Wireworms and False Wireworms

Description: True and false wireworms are immature stages of click and darkling beetles. Wireworms generally are shiny, slender, cylindrical, and hard-bodied. Color ranges from yellow to brown.

Time of attack: Primarily planting to a few days after germination.

Damage: Wireworms feed on planted sorghum seed, preventing germination.To a lesser degree, they feed on seedling plant roots.

Sampling: Two to three weeks before planting. Sift soil for wireworms or set up bait stations for examination before planting.

Economic threshold: One wireworm larva per square foot (four inches deep) or two or more larvae per bait trap.

Major suggested insecticides: Seed treatments - imidacloprid, clothianidin, thiamethoxam; at planting - terbufos.

Southern Corn Rootworm

Description: Southern corn rootworm is the larval stage of the spotted cucumber beetle. Rootworms are small, brown-headed and creamy white with wrinkled skin.

Time of attack: Planting to mid-vegetative stage prior to boot.

Damage: Larvae burrow into germinating seeds, roots and crowns of sorghum plants. Symptoms of rootworm damage include reduced stands, lower plant vigor, and the occurrence of "dead heart" in young plants. Plants may be more susceptible to lodging later in the season. Damage by southern corn rootworm is most likely to occur in the Texas Coastal Bend area.

Major suggested insecticides: Seed treatment-clothianidin, thiamethoxam; at planting-chlorpyrifos, terbufos.

Yellow Sugarcane Aphid

Description: Usually lemon-yellow, but under some conditions are pale green. They are covered with small spines and have two double rows of dark spots on the back. Both winged and wingless forms live in the colony. They often feed on nearby Johnsongrass or dallisgrass.

Time of attack: Seedlings and older plants to near whorl stage in Southern Texas. Yellow sugarcane aphid tends to be a later season pest on the High Plains; high numbers on seedling and whorl stage plants are seldom observed.

Damage: Yellow sugarcane aphids feed on sorghum and inject toxin into leaves of seedlings and older plants. Aphids feeding on seedling plants turn the leaves purple and

stunt growth. On more mature plants, leaves turn yellow. By the time discoloration symptoms are visible, plants have been injured significantly. Damage often leads to delayed maturity and plant lodging that may be worsened by associated stalk rots.

Sampling: Determine presence soon after sorghum plants emerge. Purple-colored seedling plants are an indication of infestation. Scout sorghum by inspecting plants beginning the first week of plant emergence, then twice weekly until plants have at least five true leaves. As plants grow larger, they become more tolerant of aphid feeding. Very small seedling sorghum plants (one to three true leaves) often are significantly damaged after being infested for a week or less. Discoloration symptoms may be useful in assessing yield losses, and may be used in a decision to replant.

Economic threshold: See Texas AgriLife sorghum insect guide for tables. Decision is based on the percentage of yellow sugarcane aphid-infested plants at 1, 2, or 3 true-leaf stage. There are no established thresholds for later infestations.

Major suggested insecticides: Seed treatment-clothianidin, imidacloprid, thiamethoxam; foliar-dimethoate.

Corn Leaf Aphid

Description: This dark bluish-green aphid is oval-shaped, with black legs, cornicles and antennae. There are winged and wingless forms. Corn leaf aphids are found most frequently deep in the whorl of the middle leaf of pre-boot sorghum, but also found on the undersides of leaves, on stems or in grain heads.

Time of attack: Most likely active from pre-boot sorghum to head exsertion.

Damage: This insect rarely causes economic loss to sorghum and in fact may be considered helpful as they attract beneficial arthropods to grain sorghum, many of which feed on greenbugs and yellow sugarcane aphids. Corn leaf aphids often infest the whorl and undersides of sorghum leaves in great numbers. When feeding, corn leaf aphids suck plant juices but do not inject toxin as do greenbugs and yellow sugarcane aphids. These aphids are common, but their presence does not necessarily mean significant damage is expected. The most apparent feeding damage is yellow mottling of leaves that unfold from the whorl.

Sampling: No procedure.

Economic threshold: None. Often present, but rarely a pest.

Major suggested insecticides: Rarely justified. Seed treatment-imidacloprid, thiamethoxam; at planting-phorate, terbufos; post-emerge/foliar rescue, several products.

Greenbug

Description: Adult greenbugs are light green, approximately 1/16" long, with a characteristic darker green stripe down the back. Usually, the tips of the cornicles and leg segments farthest from the body are black. Winged and wingless forms may be present in the same colony. Females produce living young (nymphs) without mating. Under optimum conditions, the life cycle is completed in 7 days. Each female produces about 80 offspring during a 25-day period.

Time of attack: Greenbugs are active throughout the life of the plant. The greenbug may be a pest during the seedling, the boot, and the heading stages.

Damage: The greenbug is an aphid that sucks plant juices and injects toxin into sorghum plants. Greenbugs usually feed in colonies on the undersides of leaves and produce honeydew. Infestations may be detected by the appearance of reddish leaf spots caused by the toxin greenbugs inject into the plant. The reddened areas enlarge as the number of greenbugs and injury increase. Damaged leaves begin to die, turning yellow then brown. Damage at the seedling stage may result in stand loss. Larger sorghum plants tolerate more greenbugs. Yield reductions during boot, flowering and grain-development stages depend on greenbug numbers, length of time greenbugs have infested the plants, and general plant health

Sampling: Scout seedling sorghum, examining the entire plant and the soil around the base of the plant. Note the presence or absence of greenbugs and any damage to plants (yellowing, death of tissue). Usually only the undersides of lower leaves need to be examined, although in some cases greenbug colonies may be found first on the undersides of upper leaves. Greenbugs in a field can increase 20-fold per week, but the seasonal average is a 5- to 6-fold increase each week. Examine a minimum of 40 randomly selected plants per field each week. Greenbugs are seldomly distributed evenly in a field, so examine plants from all parts of the field; avoid examining only field borders. In fields larger than 80 acres, or if making a control decision is difficult, examine more than 40 plants.

Economic threshold: When deciding whether to control greenbugs, consider the amount of leaf damage, number of greenbugs per plant, percentage of parasitized greenbugs (mummies), numbers of greenbug predators (lady beetles) per plant, moisture conditions, plant size, stage of plant growth and overall condition of the crop. It is important to know from week to week whether greenbug numbers are increasing or decreasing. Insecticide treatment is not justified if the recommended treatment level (based on leaf damage) has been reached but greenbug numbers have declined substantially from previous observations. See table below.

Major suggested insecticides: Seed treatment-clothianidin, imidacloprid, thiamethoxam; at planting-aldicarb, chlorpyrifos, phorate, terbufos; post-emerge-chlorpyrifos, dimethoate, malathion, phorate.

Plant size	When to treat

Emergence to about 6 inches	20% of plants visibly damaged (beginning to yellow), with greenbugs on plants
Larger plantto boot	Greenbug colonies causing red spotting or yellowing of leaves and before any entire leaves on 20% of plants are killed
Boot to heading	At death of one functional leaf on 20% of plants
Heading	When greenbug numbers are sufficient to cause
Hard Dough	Death of two normal-sized leaves on 20% of plants

Whorlworms and Headworms-Corn Earworm and Fall Armyworm

Description: Corn earworm and fall armyworm comprise the sorghum headworm complex. They infest the whorls and grain heads of sorghum plants. Larvae hatching from eggs laid on sorghum leaves before grain heads are available migrate to and feed on tender, folded leaves in the whorl.

Newly hatched corn earworm larvae are pale in color and only 1/16" long. They grow rapidly and become variously colored, ranging from pink, green or yellow to almost black. Many are conspicuously striped. Down the side is a pale stripe edged above with a dark stripe. Down the middle of the back is a dark stripe divided by a narrow white line that makes the dark stripe appear doubled. Corn earworm larvae have small hairs (microspines) over much of the body. Fall armyworms and true armyworms do not, so the presence of microspines is one way to differentiate between corn earworm and fall armyworm or true armyworm. Fully grown larvae are robust and 1.5 to 2.0 inches long.

Young fall armyworm larvae are greenish and have black heads. Mature larvae vary from greenish to grayish brown and have a light-colored, inverted, Y-shaped suture on the front of the head and dorsal lines lengthwise on the body. An important management tactic is to use sorghum hybrids with loose (open) grain heads.

Time of attack: Whorl stage and then again from flowering into kernel development as late as hard dough. Infestations occur less often in early- than late-planted sorghum.

Damage: Whorl-Damaged leaves unfolding from the whorl are ragged with "shot holes." Although this may look dramatic, leaf damage usually does not reduce yields greatly. The fall armyworm is more likely to cause significant damage since many more are often found on individual plants. Heads-corn earworm and fall armyworm larvae feed on developing grain. Small larvae feed on flowering parts of the grain head at first, then hollow out kernels. Larger larvae consume more kernels and cause the most damage. The last two larval stages cause ~80 percent of the damage.

Sampling: Whorl stage-Pull the whorl leaf from the plant and unfold it. Frass, or larval excrement, is present where larvae feed within the whorl. Heads-Begin sampling for headworms soon after the field finishes flowering and continue at 5-day intervals until the hard dough stage. Scouting should also determine the percentage of corn earworm larvae

separately from the percentage of fall armyworm larvae. Fall armyworms are often more difficult to kill with pyrethroid insecticides, and a treatable population that is mostly fall armyworm might require a different insecticide than one which is predominately corn earworm. This may be especially important if control is to be directed at a population that is composed of larger larvae.

Economic threshold: Whorl-Larvae within the whorl are somewhat protected from insecticide. Control of larvae during the whorl stage is seldom economically justified, but insecticide application may be necessary if larval feeding reduces leaf area by more than 30 percent or is damaging the developing grain head or growing point within the whorl. It is very difficult to achieve good control of caterpillars in whorl stage sorghum because the larvae are sheltered from the insecticide while in the whorl. If control is needed, chemigation will provide better results than ground application, which in turn will provide better results than aerial application. Head-Determining the threshold will depend on the number of larvae per head and the size of the larvae. Consult the Texas AgriLife grain sorghum pest guide for instructions, calculations, and tables to help determine spray thresholds.

Major suggested insecticides: Carbaryl, cyfluthrin, cyhalothrin, esfenvalerate, methomyl, zeta-cypermethrin. (Note: It is more difficult to kill fall armyworms with the pyrethroid class of insecticides.)

Banks Grass Mite

Description: Large numbers of Banks grass sometime occur on sorghum, especially in more arid areas of Texas. After feeding, these very small mites turn deep green, except for the mouthparts and first two pairs of legs that remain light salmon colored. Eggs, laid in webbing on the undersides of sorghum leaves, are pearly white, spherical, one-fourth the size of the adults, and hatch in three to four days. The life cycle requires about 11 days under favorable conditions.

Hot, dry weather may lead to a rapid increase in mites. Also, mites in sorghum may respond as induced (secondary) pests after an insecticide application for a key insect pest such as greenbug. A rapid increase in spider mites after insecticide application may be due to tolerance of mites to some insecticides, the destruction of beneficial insects, and the dispersal of mites from colonies. Spider mites increase more rapidly on moisture stressed plants. Irrigation reduces the potential of mite population reaching damaging levels, but once mites are present, resuming irrigation will not diminish the injury potential from the mites.

Time of attack: Present at low to moderate levels, but worst potential damage occurs after heading to early grain fill.

Damage: Spider mites suck juices from the undersides of sorghum leaves, initially along the midribs of the lower leaves. Infested areas become pale yellow and reddish on the top

surface, and the leaf may turn brown. As spider mites increase on lower leaves, infestation spreads upward through the plant. The undersides of heavily infested leaves may have a dense deposit of fine webbing. Increases in spider mite abundance generally occur after sorghum grain heads emerge. Large numbers of spider mites occurring early in kernel development can reduce the ability of sorghum plants to make and fill grain. After kernels reach hard dough, grain is not affected.

Sampling: Inspect the undersides of lower leaves carefully. Mites occur in colonies, first along midribs of leaves. Later, they spread away from the midrib and up the plant to higher leaves. Webbing indicates the presence of mites. Mite infestations commonly begin along field borders and may spread quickly throughout a field.

Economic threshold: Miticides produce varying degrees of success. Historically, insecticidal control of mites in sorghum has been erratic. Thorough leaf coverage is essential, especially since the mites live on the lower sides of the leaves. Ground application equipment with high gallons of water per acre is preferred. Insecticide application may be justified when 30 percent of the leaf area of most sorghum plants in a field shows some damage symptoms from mite feeding.

Major suggested insecticides: Dimethoate, phorate, propargite.

Sorghum Midge

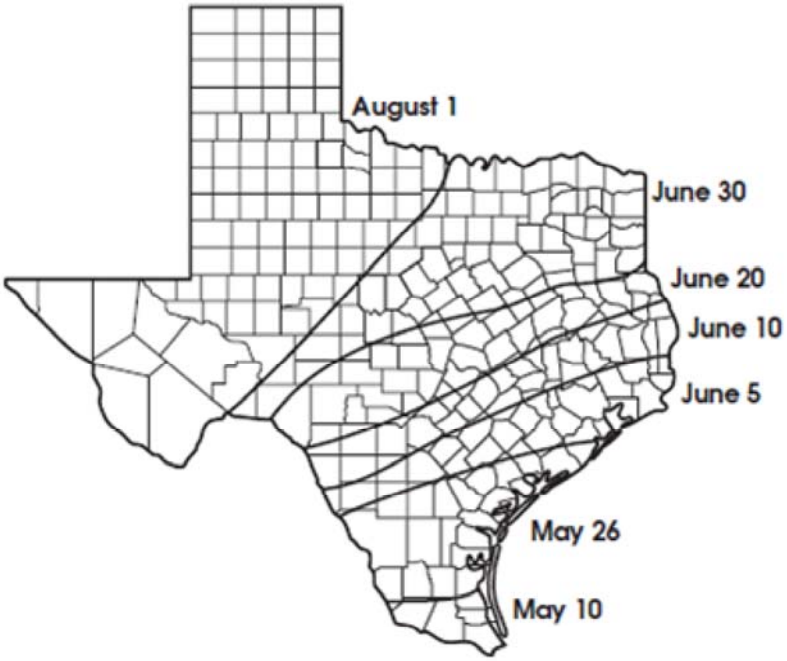
Description: The sorghum midge is one of the most damaging insects to sorghum in Texas, especially in the southern half of the state. The adult sorghum midge is a small, fragile-looking, orange-red fly with a yellow head, brown antennae and legs and gray, membranous wings.

During the single day of adult life, each female lays about 50 yellowish white eggs in flowering spikelets of sorghum. Eggs hatch in two to three days. Larvae are colorless at first, but when fully grown, are dark orange. Larvae complete development in nine to 11 days and pupate between the spikelet glumes. Shortly before adult emergence, the pupa works its way toward the upper tip of the spikelet. After the adult emerges, the clear or white pupal skin remains at the tip of the spikelet.

A generation is completed in 14 to 16 days under favorable conditions. Sorghum midge numbers increase rapidly because of multiple generations during a season and when sorghum flowering times are extended by a range of planting dates or sorghum maturities.

Sorghum midges overwinter as larvae in cocoons in spikelets of sorghum or Johnson grass. When sorghum is shredded, spikelets containing larvae fall to the ground and are disked into the soil. Sorghum midges emerging in spring do so before flowering sorghum is available, and these adults infest johnsongrass. Sorghum midges developing in johnsongrass disperse to fields of sorghum when it flowers.

Time of Attack: Early-season infestations in sorghum are usually below damaging levels. As the season progresses, sorghum midge abundance increases, especially when flowering sorghum is available in the area. Numbers often drop late in the season.



Estimated latest sorghum flowering dates most likely to escape significant damage by sorghum midge.

Damage: A sorghum midge damages sorghum when the larva feeds on a newly fertilized ovary, preventing normal kernel development. Grain loss can be extremely high. Glumes of a sorghum midge-infested spikelet fit tightly together because no kernel develops. Typically, a sorghum grain head infested by sorghum midge has various proportions of normal kernels scattered among non-kernel-bearing spikelets, depending on the degree of damage.

Effective control of sorghum midge requires the integration of several practices that reduce sorghum midge abundance and their potential to cause crop damage. The most effective cultural management method for avoiding damage is early, uniform planting of sorghum in an area so flowering occurs before sorghum midges reach damaging levels. Planting hybrids of uniform maturity early enough to avoid late flowering of grain heads is extremely important. This practice allows sorghum to complete flowering before sorghum midge increases to damaging levels.

Cultural practices that promote uniform heading and flowering in a field are also important in deciding treatment methods and in achieving acceptable levels of insecticidal control. To reduce sorghum midge abundance, use cultivation and/or herbicides to eliminate johnsongrass inside and outside the field. Where practical, disk and deep plow the previous year's sorghum crop to destroy overwintering sorghum midges.

Multiple insecticide applications are used to kill adults before they lay eggs. Sorghum planted and flowering late is especially vulnerable to sorghum midge. To determine whether insecticides are needed, evaluate crop development, yield potential and sorghum midge abundance daily during sorghum flowering. Because sorghum midges lay eggs in flowering sorghum grain heads (yellow anthers exposed on individual spikelets), they can cause damage until the entire grain head or field of sorghum has flowered. The period of susceptibility to sorghum midge may last from seven to nine days (individual grain head) to two to three weeks (individual field), depending on the uniformity of flowering.

Sampling: To determine if adult sorghum midges are in a sorghum field, check at mid-morning when the temperature warms to approximately 85 degrees F. Sorghum midge adults are most abundant then on flowering sorghum grain heads. Because adult sorghum midges live less than one day, each day a new brood of adults emerges. Sampling must be done almost daily during the time sorghum grain heads are flowering. Sorghum midge adults can be seen crawling on or flying about flowering sorghum grain heads.

The simplest and most efficient way to detect and count sorghum midges is to inspect carefully and at close range all sides of randomly selected flowering grain heads. Handle grain heads carefully during inspection to avoid disturbing adult sorghum midges. Other sampling methods can be used, such as placing a clear plastic bag or jar over the sorghum grain head to trap adults.

Because they are relatively weak fliers and rely on wind currents to aid their dispersal, adult sorghum midges usually are most abundant along edges of sorghum fields. For this reason, inspect plants along field borders first, particularly those downwind of earlier flowering sorghum or johnsongrass. If few sorghum midges are found on sorghum grain heads along field edges, there should be little need to sample the entire field.

However, if you find more than one sorghum midge per flowering grain head in border areas of a sorghum field, inspect the rest of the field. Sample at least 20 flowering grain heads for every 20 acres in a field. Flowering heads are those with yellow blooms. Record the number of sorghum midges for each flowering head sampled and then calculate the average number of midges per flowering head. Almost all of the sorghum midges seen on flowering sorghum heads are female.

Economic Threshold: The economic injury level for sorghum midge can be calculated from the following equation:

$$\text{Number of sorghum midges per flowering head needed} = \frac{\text{(Cost of control as \$ per acre) X 33,256}}{\text{(Value of grain as \$ per cwt) X}}$$

(Number of flowering heads)
to trigger spray

In the equation above, the control cost is the total cost of applying an insecticide for sorghum midge control and the grain value is the expected price at harvest as dollars per 100 pounds. The value 33,256 is a constant and results from solving the economic injury equation. The number of flowering heads per acre is determined as described above.

Economic injury levels, as determined from the above equation, are shown in Table X for a range of typical treatment costs per acre, market values per 100 pounds of grain, and numbers of flowering heads per acre. Use the equation for estimating injury levels for your actual control costs, crop value and number of flowering heads per acre.

Insecticide residues should effectively suppress sorghum midge egg laying 1 to 2 days after treatment. However, if adults still are present 3 to 5 days after the first application of insecticide, immediately apply a second insecticide treatment. Several insecticide applications at 3-day intervals may be justified if yield potential is high and sorghum midges exceed the economic injury level.

Economic injury level-mean number of midges/flowering heads				
Control cost, $/acre	Crop value, $100/lbs.	Flowering heads = 18,000/a	Flowering heads =45,000/a	Flowering heads =67,500/a
5	6	1.5	0.62	0.41
5	7	1.3	0.53	0.35
5	8	1.2	0.46	0.31
6	6	1.8	0.74	0.49
6	7	1.6	0.63	0.42
6	8	1.4	0.55	0.37
7	6	2.2	0.86	0.57
7	7	1.8	0.74	0.49
7	8	1.6	0.65	0.43

Rice Stink Bug and Related Insects

Rice stink bug is a pest of grain sorghum in South Texas and the Coastal Bend. It is one of several species of true bugs, primarily stink bugs, which may move in relatively large numbers from alternate host plants into sorghum during kernel development. Bugs infesting sorghum in Texas include rice stink bug, southern green stink bug, conchuela stink bug, brown stink bug, red-shouldered stink bug, leaf-footed bug and false chinch bug.

Description: The rice stink bug is straw-colored, shield-shaped, and œ inch long. Females lay about 10 to 47 short, cylindrical, light-green eggs in a cluster of two rows.

Time of attack: During sorghum kernel development.

Damage: Rice stink bugs suck juices from developing sorghum kernels and, to a lesser extent, from other grain head parts. Damage depends on the number of bugs per grain head, the duration of infestation, and the stage of kernel development. Damaged kernels rarely develop fully and may be lost during harvest.

Sampling: Grain head-feeding bugs tend to congregate on sorghum grain heads and sometimes within areas of a field. Using the beat-bucket method, count all bugs including fliers as well as those on leaves. Sample at least 30 plants from a field. Take at least one sample per acre in fields larger than 40 acres.

Economic threshold: Determine the average number of bugs per sorghum head. Then multiply the average number of bugs per head by the plant density per acre to calculate the number of bugs per acre.

Major suggested insecticides: Carbaryl, cyfluthrin, cyhalothrin.

Insecticide	Application Rate	Harvest	Graze
Chlorpyrifos (Lorsban 4E)	8 oz	30	30
Cyfluthrin (Baythroid 2E)	1.0-1.3oz	See Remarks	14
Cyhalothrin (Karate 1E) (Warrior 1E)	1.92-2.56 oz	See Remarks	
Esfenvalerate (Asana XL)	2.9-5.8 oz	21	-
Malathion (Fyfanon ULV)	8-12 oz	7	7
Methomyl (Lannate) 2.4LV 90WSP	12-24 oz 4-8 oz	14 14	14 14
Zeta-cypermethrin (Mustang Max)	1.28-4.0 oz	14	45
Remarks: Cyfluthrin If one or two applications are made, green forage may be fed or grazed on the day of treatment. If three applications are made, allow at least 14 days between last application and grazing. Cyhalothrin Do not graze livestock in treated area or harvest for fodder, silage or hay.			

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Tips & Concerns for Insects in Grain Sorghum

West Texas

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- Spending the money trying to control worms in the whorl-the insecticide does not get to the insects.
- Though midge in the South Plains is sporadic on late-blooming grain sorghum, failure to check for this insect is a major mistake. Once midge comes it is a potentially huge threat. Prior to your own late sorghum reaching bloom (~August 1 and later in the High Plains) inquire with Extension, local crop scouts, chemical dealers if there are reports of midge in the region.
- Failure to adjust to new lower, more accurate thresholds for treating headworms.
- Using or mis-timing pyrethroids in seed and grain production thus triggering a mite problem.

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- Tips & Common Concerns for insect control in grain sorghum
- Not utilizing a seed treatment insecticide to control for yellow sugarcane aphid.
- Attempting to treat larvae in whorl stage.
- Triggering secondary pests like mites after a pyrethroid application.
- Blaming lodging problems on insects when it could have very well been water management or the lack thereof.
- Not scouting correctly if at all for midge.

Central & South Texas

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- Failure to use a systemic insecticide seed treatment or in-furrow insecticide.
- Lack of timely scouting for yellow sugarcane aphid.
- Planting sorghum late resulting in high sorghum midge numbers and failure to adequately scout and treat for the midge.
- Use of the incorrect insecticide for rice stink bug.
- Failure to scout properly for rice stink bug and headworms.

Policy Statement for Making Pest Management and Insecticide Suggestions

Labels list product uses for grain sorghum grown for grain. When using products it is impossible to eliminate all risks and conditions or circumstances that are unforeseen or unexpected that could result in less than satisfactory results. Such responsibility shall be assumed by the user of this publication. Pesticides must be labeled for use by the Environmental Protection Agency. The status of pesticide label clearances is subject to change and may be changed since this guide was printed. The USER is always responsible for the effects of pesticide residues on his livestock and crops as well as problems that could arise from drift or movement of the pesticide. Always read and follow carefully the instructions on the container label. Pay particular attention to those practices that ensure worker safety. For information about the registration status of a product and product use, contact a local chemical company representative, a dealer representative, and/or your county Extension staff.

The primary Texas AgriLife Extension Service resource for grain sorghum insects was updated in 2007 for insects, new treatment thresholds, and labeled insecticides. "Managing Insect and Mites Pests of Texas Sorghum" B-1220 and "Field Guide to Pests & Beneficials in Texas Grain Sorghum," B-6094 is available at **http://agrilifebookstore.org** or through your local county Extension office.

Texas AgriLife Extension Entomology Staff

Texas AgriLife has Extension entomologists with responsibility in grain sorghum located in Lubbock, Amarillo, San Angelo, Ft. Stockton, Stephenville, Dallas, Corpus Christi, Uvalde, and Weslaco. In addition, most of the sorghum acreage in the South Plains and Concho Valley as well as key production areas in Central Texas, the Coastal Bend, and the Rio Grande Valley are covered by county-based integrated pest management (IPM) Extension agents.

Identifying Insects

Contact your local county office or your nearest Texas AgriLife Research & Extension Center for assistance. If the insect still can't be identified then county or regional Extension staff can send a digital image or actual specimen to the Texas A&M University Department of Entomology for identification (instructions and submittal form at **http://insects.tamu.edu/insectquestions/index.cfm**; we recommend further ID be conducted through Extension staff rather than submitting directly yourself).
