

# 5 - Major Insect Pests of Grain Sorghum in Arkansas and Their Management

Paul McLeod and Jeremy Greene

---

Grain sorghum production in Arkansas has been erratic until recent years both in yield per acre and in number of acres planted. The low level of profitability has often caused the crop to be viewed as a “last resort” planting. Many potential pests of grain sorghum have often been ignored. Among these pests, insects often attack and may severely impact yield of grain sorghum in Arkansas. However, the low potential for profit has often prevented the producer from actively managing insect pests. As yields have increased in recent years, however, grain sorghum is beginning to be viewed as a crop with greater potential for profit and interest in management of all pests is increasing.

Much of the insect management information for Arkansas grain sorghum production is based on data from other states. However, with the formation of the Arkansas Corn and Grain Sorghum Promotion Board in 1998, funding became available for research on grain sorghum insects and substantial progress has been made. Initial surveys have now been completed on insects and their impact on grain sorghum throughout the state. Major insect pests have been identified and their distribution within the state has been established. Much has been learned on the biology of major insect pests and this information has enabled the improvement of insect management on grain sorghum.

Although much of the research on sorghum insects has only recently been completed and numerous additional studies are needed, substantial knowledge has been gained. The next step in the process was to provide the grain sorghum producers of Arkansas with this information in a usable production manual. The objective of this manual chapter is to provide the producer with the most current information on identification, biology and management of insect pests of grain sorghum in Arkansas. Emphasis has been placed on the major insect pests and their management. Additional insects, now considered to be minor pests, may pose

greater threats in future years. Also, new species may migrate into the state. Thus, continual research is needed to identify these changes and develop management strategies. As these findings become available, updates to the production manual will be made. Additional information can be found on websites maintained by the University of Arkansas Department of Entomology (<http://comp.uark.edu/%7Epjmcleod/>) and the Cooperative Extension Service ([http://www.aragriculture.org/pestmanagement/insects/grain sorghum](http://www.aragriculture.org/pestmanagement/insects/grain%20sorghum)).

From a producer’s perspective the major insect pests of Arkansas grain sorghum can be divided into three groups, i.e., those attacking seed and seedlings early in the season, the sorghum midge and those that feed directly on the seed during later season. Early-season pests include a diverse group of insects. Among the most damaging are chinch bugs, cutworms, aphids and wireworms. Probably the most destructive insect pest of Arkansas grain sorghum is the sorghum midge that attacks during flowering. Late-season insects that feed directly on seed include corn earworms, fall armyworms, sorghum webworms and stink bugs. Discussions of the major pests follow.

## **Early-Season Insect Pests**

Aphids  
Chinch bugs  
Cutworms  
White grubs  
Wireworms

## **Insect Pests Attacking at Bloom**

Sorghum midge

## **Late-Season Insect Pests**

Corn earworms  
Fall armyworms  
Sorghum webworms  
Stink bugs

## Aphids Including the Greenbug, Corn Leaf and Yellow Sugarcane Aphid, Homoptera: Aphididae

### Description

Aphids found on Arkansas grain sorghum are minute (<1/8 inch long), blueish-green insects (Photo 5-1\*). Clear membranous wings may be present but wingless forms are more common. Aphids occur in colonies which contain different size nymphs and adults. As the newly born nymphs increase in size, molting occurs and the white exoskeleton is left on the leaf surface.

### Distribution, Damage and Impact

Aphid species that attack grain sorghum occur throughout the state. Among the aphids found on grain sorghum in Arkansas, the greenbug is generally the most damaging. Aphids feed by inserting their stylet or beak into the plant tissue and removing plant sap. Large amounts of sap are removed and the partially digested contents are excreted onto the plant surface in the form of a clear sticky honeydew. A dark gray mold may later form on the honeydew. The level of injury in Arkansas grain sorghum is often low and beneficial organisms may provide sufficient control. Aphids also transmit viral diseases but aphid control is not effective in viral disease management.

### Life History

Aphids are capable of overwintering on alternate host plants in Arkansas. Also, winged aphids are carried into the state on winds coming from more southern areas each spring. Adults colonize grassy hosts and grain sorghum seedlings and reproduce asexually through the summer. Development of nymphs is rapid and many generations occur each season. Foliar insecticides applied for control of other insects may reduce beneficial insect populations and result in an aphid population increase.

### Management

Excessive aphid populations on actively growing grain sorghum may be managed with **foliar insecticides** but the benefits may be very limited.

Numerous **beneficial organisms** affect aphids, including naturally occurring insect pathogens, parasites and predators and insecticide use may reduce their effectiveness. Some grain sorghum hybrids possess some level of **resistance** to the aphid.

### Insecticide Recommendations for Aphids on Grain Sorghum

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Chinch Bug, *Blissus leucopterus leucopterus*, Heteroptera: Lygaeidae.

### Description

Chinch bug adults are true bugs, i.e., the front half of the forewing is hardened while the rear portion is membranous. Color is generally black but the light-colored wings give the appearance of a white band across the midsection (Photo 5-2). Adults are only about 3/16 inch long. Immatures vary greatly in appearance. Newly hatched nymphs appear as minute reddish/orange specs on sorghum stalks and foliage (Photo 5-3). As nymphs develop, color changes from orange to dark gray or black. All nymphs are wingless.

### Distribution, Damage and Impact

In Arkansas, chinch bug populations have varied greatly during the past four years. Few were detected during 1999 and 2000 except for Lafayette County in extreme southwest Arkansas. Surveys during the last two years, however, have detected chinch bugs throughout the state. Outside of Arkansas, chinch bug occurs in all states east of the Rocky Mountains and into southern Canada. On seedling grain sorghum, adult chinch bugs can be found either on the ground or on stems near the ground, often under leaf sheaths. Here they insert their stylet mouth parts into the plant and remove plant fluids. Infested plants often become yellow and distortion of seedlings is common.

---

\*Photos can be found on pages 35 and 36. Tables 5-1 and 5-2 can be found on page 34.

## Life History

Generally adult chinch bugs migrate from overwintering sites, including grasses, into seedling grain sorghum where they mate and begin egg laying. The orange nymphs emerge and by peeling back the lower leaves on seedlings, large numbers of nymphs can often be detected. Nymphs develop for a few weeks and form the winged adult. This process continues throughout the growing season. In Arkansas about three generations of chinch bug can develop each season.

## Management

Chinch bug damage is generally greater under hot, dry conditions. Plants with **sufficient moisture** are more able to outgrow the damage. Thus, irrigation during periods of drought may reduce the impact of chinch bugs on grain sorghum. Irrigation also may aid the uptake of insecticides applied to the seed or soil.

In areas with a history of chinch bug problems, it may be beneficial to use **seed treated with insecticide or to apply a soil insecticide** at planting. However, chinch bug populations may experience great fluctuations between years and preventative soil or seed insecticides may not always be justified. In areas with a history of chinch bug problems and where treated seed or soil insecticides are used, it is suggested that a small portion of the field be left untreated and periodically checked for chinch bug. The final approach at chinch bug management is with the use of **insecticide sprays** applied to the foliage of seedling grain sorghum.

The chinch bug threshold is variable and depends on the rate of plant growth and size. Slow growing smaller plants are most susceptible to severe damage. A general threshold for chinch bug has been established on seedlings less than 6 inches in height. Foliar treatments should be justified when 20 percent or more of the sampled plants harbor a minimum of two chinch bugs per plant. Fields should be sampled in several areas due to the variability in chinch bug distribution. Because the chinch bug is often found between the leaf sheath and stem, spray coverage is critical. Foliar insecticides must be applied in a minimum of 20 gpa and directed at the top of the seedling. Also, surfactants will likely increase effectiveness.

## Insecticide Recommendations for Chinch Bug on Grain Sorghum

See Tables 5-1 and 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Cutworms Including the Black Cutworm, *Agrotis ipsilon*, Lepidoptera: Noctuidae

### Description

Cutworm larvae are dark gray to black caterpillars that can generally be found just below the soil surface feeding on seedling grain sorghum. Although larvae are minute (<1/8 inch long) at hatching, they are not likely to be detected until they are at least 1/2 inch long. At maturity, larvae are almost 1.5 inches in length (Photo 5-4). The caterpillars have three pair of true legs on the thorax and five pair of fleshy “prolegs” on the abdomen.

### Distribution, Damage and Impact

Cutworms occur throughout the U.S. and throughout Arkansas. Recent surveys have detected large populations near Stuttgart and Des Arc. Larvae feed on emerging seedlings and often cut off the plant near or below the soil surface. Several adjacent plants within the drill line can be killed by a single cutworm. Also, rough or cloddy soil appears to harbor larger cutworm populations.

### Life History

Cutworms generally are capable of overwintering as pupae in soil in Arkansas especially in southern counties. In addition to adults emerging in late winter from the overwintered pupae, adult moths fly into Arkansas from more southern states. Moths lay eggs on many weed hosts and crops, including grain sorghum. Newly hatched larvae can produce “shot holes” in grain sorghum foliage. Larger larvae often cut the seedling and feed below the soil surface. Where damage occurs, larvae can be detected by removing the upper layer of soil near a damaged plant. The number of generations per year varies from one to three depending on cutworm species.

## Management

The first step in cutworm management is proper **crop rotation**. Grain sorghum that follows grain sorghum or planting grain sorghum in recently turned pastures tend to have more damage from cutworms. Also, adults are attracted to fields with weeds on which eggs are laid. Thus, **early seedbed preparation** prior to planting reduces the likelihood of cutworm damage. Providing a minimum of two weeks of host-free time prior to planting should reduce the attractiveness of the field to cutworm adults. No or reduced till fields are more susceptible to economic losses from cutworms.

Also, seed beds prepared during wet conditions are often cloddy. This may later harbor increased numbers of cutworms. Bed knockers or flat rolling beds can reduce the chances of developing damaging cutworm populations. In areas with histories of cutworm problems, **treated seed or soil insecticides** applied at planting may be justified. **Foliar insecticide sprays** may be used to reduce cutworm populations but early scouting for damage is critical. Foliar insecticide sprays should only be used when the damage levels exceed the threshold of 6 to 8 percent of the seedlings with cutworm damage above the surface of the ground or 2 to 4 percent of the plants cut below the surface. Finally, insecticide success may be reduced when late stage larvae are targeted as most of their time is spent underground.

### Insecticide Recommendations for Cutworms on Grain Sorghum

See Tables 5-1 and 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

### White Grub, *Phyllophaga* spp., Coleoptera: Scarabaeidae

#### Description

White grub is generally a term given to the larvae stage of a group of over 200 species of scarab beetles. Adult descriptions vary greatly but the most

common is referred to as the May beetle. These adults are commonly found at lights during late spring and summer nights. May beetles are about 1 inch long and tan to dark brown in color. Larvae are cream-colored scarabs with a tan head capsule and dark internal markings on the end of the abdomen (Photo 5-5). Six true legs are easily seen on the thorax.

#### Distribution, Damage and Impact

White grubs occur in the soil of grain sorghum fields throughout Arkansas. Damage may occur when the grubs feed on underground roots. However, in recent surveys the impact of white grub has been minimal. Fields recently converted from pastures are most susceptible.

#### Life History

The biology of white grubs varies greatly due to the many different species. In general, adults emerge in the spring, mate and deposit eggs in a cell below the soil line. Larvae hatch and can complete their development through the summer and fall or may take two or more years to mature. Pupation occurs in the soil.

#### Management

In south Arkansas **avoidance of recently plowed grassy fields**, including pastures, will reduce the attractiveness of the field to adult beetles. **Rotation** of grain sorghum with broadleaf crops, especially soybean, will reduce the likelihood of damage. Use of **treated seed or soil insecticides** applied at planting may reduce larval populations but is not likely to be economically effective if directed only at the white grub.

### Insecticide Recommendations for White Grub on Grain Sorghum

See Table 5-1 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Wireworm, Coleoptera: Elateridae

### Description

Several species of wireworms occur in Arkansas and descriptions of the different species vary. In general, wireworm adults, also known as click beetles, are dark brown hard-bodied beetles. The term “click” comes from the ability to snap the hinge between the thorax and abdomen resulting in a flip that rights the upturned insect. Size varies, but adult wireworms in grain sorghum are about 1.25 inches long. Larvae occur in the soil. Although the larvae of some species are white, the most common in Arkansas is tan and at maturity about 3/4 inch in length (Photo 5-6). True legs are evident and the head is somewhat flattened.

### Distribution, Damage and Impact

Wireworms occur throughout the state but the major damage resulting from their feeding has been observed in Clay County in northeast Arkansas and near Paris in Logan County. Larvae feed on newly planted seed, emerging seedlings and can be found infesting the lower stems of larger grain sorghum plants. Damage in some fields has been substantial and at times fields have been replanted due to stand loss.

### Life History

The biology of wireworms is also quite variable. Some species complete two generations per year while some require up to five years for a single generation. In general, adults emerge from overwintering larvae in the spring and search for grassy fields. Eggs are laid in the soil usually where grasses are available for the larvae to feed. When grain sorghum is planted, the seed and emerging seedlings are burrowed into. Seedlings can be weakened and killed. Wireworm larvae can be found by carefully digging up weak seedlings and searching the soil. In dry conditions wireworm larvae move deep into the soil and are difficult to detect.

### Management

In Arkansas **avoidance of recently plowed grassy fields**, including pastures, will reduce the likelihood of damage from wireworms. **Crop rotations**, i.e., grain sorghum following a broadleaf

like soybean, will reduce damage but with wireworms that require multiple years for development, damage may be substantial. Damage also is more severe in fields where seed are slow to germinate and where seedling growth is retarded. Thus, **delaying planting** until soil is warmer may reduce the impact of the wireworms. Although the use of **treated seed** and **soil insecticides** applied at planting may provide some control, wireworm problems persist in Clay County despite insecticide application. Foliar insecticide application to seedlings is of no benefit.

### Insecticide Recommendations for Wireworms on Grain Sorghum

See Table 5-1 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Sorghum Midge, *Contarinia sorghicola*, Diptera: Cecidomyiidae

### Description

The sorghum midge is generally the most damaging insect pest of grain sorghum in Arkansas and without management may devastate the crop. The adult sorghum midge is a minute (<1/8 inch long) orangish “gnat-like” fly which can be detected on flowering sorghum heads. Larvae are minute orange maggots found in the seed.

### Distribution, Damage and Impact

The sorghum midge occurs worldwide and throughout Arkansas. Larvae feed directly on the developing seed and may destroy all seed within each sorghum head (Photo 5-7). Where high sorghum midge populations are left unmanaged, resulting damage may be severe and yield reduction may approach 100 percent.

### Life History

When temperatures climb into the 70s in late winter or spring, adult flies begin to emerge from old seed heads in which larvae have overwintered.

Wild grasses, including johnsongrass, are the initial host plants and several generations can develop within these hosts prior to flowering of grain sorghum. Because of the limited availability of the wild hosts, midge populations generally remain below damaging levels in early summer. As early planted grain sorghum begins to flower, adult flies migrate into these fields, especially into the edge of the sorghum field immediately downwind from the wild host. The flies mate and each female midge can deposit up to 250 eggs in less than two days. Larvae emerge from the eggs within two days and burrow into the developing seed. Pupation occurs on the seed and lasts for about three days. The time required for a complete generation varies from two to three weeks depending on temperature. Thus midge populations can rapidly increase and later sorghum plantings may be severely infested.

## Management

The first choice of management should be **early and uniform planting**. In areas, or even within fields, where the period of sorghum flowering is extended, the sorghum midge can complete multiple generations on grain sorghum and build to damaging levels in late blooming fields. Because only the flowering stage is susceptible to midge attack, delaying subsequent grain sorghum plantings for five or six weeks may disrupt population increase. **Destruction of wild host plants, including johnsongrass**, early during the season may slow midge population development. Some **grain sorghum hybrids** possess some level of resistance to sorghum midge.

In fields with the potential for high yields and profit, it is important to scout for sorghum midge as soon as the plants begin to bloom. Scouting should be initiated when about 25 percent of the field begins to bloom. Sorghum heads on the field edges should be searched for the orangish flies. This can be accomplished by slowly approaching the plant and visually searching all sides of the head for adult midges. Also, placing a clear half-gallon plastic bag over the head and shaking the head in the bag will dislodge and capture adults. By carefully removing the bag and examining the contents, adults can be counted. Mornings with reduced winds are the best time for sampling. Within each field (80 acres or smaller) 100 heads should be counted with emphasis placed on the field borders.

The current economic threshold in Arkansas is an average of one adult sorghum midge per head. If the field possesses the potential for economic profit and the threshold is surpassed, **insecticide application** is likely warranted. Additional scouting should be completed at about two-day intervals until the soft dough stage. Adults detected at this stage are unable to infest the seed. Following harvest, grain sorghum **crop residue should be destroyed** as larvae overwinter within seed.

## Insecticide Recommendations for Sorghum Midge on Grain Sorghum

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Corn Earworm, *Helicoverpa zea*, Lepidoptera: Noctuidae

### Description

Adults of the corn earworm, also known as the cotton bollworm, are light tan in color and are about 1.25 inches long. Moths generally have green eyes. Eggs are near white when laid but darken just prior to larvae emergence. Larvae initially are minute, about 1/16 inch, but at maturity can reach 1.75 inches in length. Three pair of true legs occur on the thorax and four pair plus an anal pair of prolegs are found on the abdomen (Photo 5-8). Color of larvae varies greatly. Mature larvae that have developed on foliage are mostly green while those developing on seed are reddish brown with longitudinal lines. The pupal stage occurs in soil and color ranges from light tan shortly after pupation to dark brown just prior to moth emergence.

### Distribution, Damage and Impact

All stages of the corn earworm can be found throughout Arkansas and resulting damage may be severe. This damage occurs in several forms, including foliar damage to young grain sorghum and direct damage to seed heads.

## Life History

Adults that are active in late winter arise from two sources, i.e., overwintering pupae and flights of moths from southern areas. Adults are attracted to many host plants but flowering plants are favored. Eggs are deposited on foliage of seedling grain sorghum and larvae may consume large amounts of foliage. When accurate counts are made, however, the percentage of seedling grain sorghum plants infested with corn earworm is generally very low and control is not feasible. Later generations deposit eggs during flowering and head formation and emerging larvae feed directly on seed. Regardless of host plant structure on which the larvae develop, mature larvae move to the ground and pupate within the upper 6 inches of soil. In Arkansas three or four generations occur each year.

## Management

Lepidopterous caterpillars often feed within the heads of grain sorghum and visual examination of the head may not detect all larvae. By shaking the seed head over a white bucket, the larvae will be dislodged and can be more easily counted. At least 30 plants per 80 acre field should be sampled. Thresholds for caterpillars on grain sorghum heads vary greatly due to the profit potential of the crop. In general, when lepidopterous caterpillars (corn earworm, fall armyworm and sorghum webworm) number two or more per head in grain sorghum nearing maturity, **foliar insecticides** may be warranted. Use of foliar insecticides to reduce damage may not produce economic benefits and should only be used against high insect populations. Numerous **beneficial organisms** affect corn earworm, including naturally occurring insect pathogens, parasites and predators, and insecticide use may reduce their effectiveness. **Fall plowing** to destroy and bury crop residue will reduce overwintering populations of corn earworm. Finally, **“open headed” grain sorghum hybrids** better expose caterpillars to foliar insecticide sprays and to beneficial organisms.

## Insecticide Recommendations for Corn Earworm on Grain Sorghum

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative

Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

## Fall Armyworm, *Spodoptera frugiperda*, Lepidoptera: Noctuidae

### Description

Fall armyworm adults are large bodied moths with dark gray forewings that have lighter banding. A light spot occurs near the apex of the forewings. Mature larvae are up to 1.5 inches long and are dark brown in color with numerous black spots (Photo 5-9). The head capsule has a distinct light-colored inverted “Y.”

### Distribution, Damage and Impact

Fall armyworm occurs throughout Arkansas and its impact on grain sorghum is similar to that of the corn earworm. This impact occurs in the form of direct damage to seed.

### Life History

In early spring adults migrate into Arkansas from more southern states, mate and seek suitable host plants for egg laying. Eggs are laid in masses that contain up to a few hundred eggs. Emerging larvae feed for two to three weeks and then pupate just below the soil surface. Multiple generations occur each year.

### Management

Lepidopterous caterpillars often feed within the heads of grain sorghum and visual examination of the head may not detect all larvae. By shaking the seed head over a white bucket, the larvae will be dislodged and can be more easily counted. At least 30 plants per 80 acre field should be sampled. Thresholds for caterpillars on grain sorghum heads vary greatly due to the profit potential of the crop. In general when lepidopterous caterpillars (corn earworm, fall armyworm and sorghum webworm) number two or more per head in grain sorghum nearing maturity **foliar insecticides** may be warranted. Use of foliar insecticides to reduce damage may not produce economic benefits and should only be used against high insect populations. Numerous **beneficial organisms** affect fall

armyworm including naturally occurring insect pathogens, parasites and predators and insecticide use may reduce their effectiveness. **Fall plowing** to destroy and bury crop residue will reduce overwintering populations of armyworm. Finally, **“open headed” grain sorghum hybrids** better expose caterpillars to foliar insecticide sprays and to beneficial organisms.

### **Insecticide Recommendations for Fall Armyworm on Grain Sorghum**

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

### **Sorghum Webworm, *Nola sorghiella*, Lepidoptera: Nolidae**

#### **Description**

Adult sorghum webworms are white moths with a wingspan of about 1/2 inch. Larvae are smaller than corn earworm and fall armyworm larvae and at maturity are only about 1/2 inch long. Many setae occur on the sides and back of the caterpillar giving it a hairy appearance (Photo 5-10). Larval color is greenish to yellowish and four red to brown longitudinal lines occur on the back.

#### **Distribution, Damage and Impact**

The sorghum webworm occurs throughout the state and the larvae damage grain sorghum by feeding directly on the seed. Impact varies considerably but in recent years sorghum webworm has produced considerable damage in late planted sorghum in eastern Arkansas.

#### **Life History**

Little is known about the biology of the sorghum webworm in Arkansas. Based on information from adjacent states, the webworm overwinters in plant debris as larvae and moths emerge in late spring. Early generations may develop on grass hosts. Adults emerging from these alternate host plants migrate to late planted grain sorghum where they mate and lay eggs. The eggs

hatch in about five days and larvae feed on sorghum seed for about two weeks. Pupation occurs in plant debris and lasts for seven to ten days. The entire generation is about one month.

#### **Management**

Lepidopterous caterpillars often feed within the heads of grain sorghum and visual examination of the head may not detect all larvae. By shaking the seed head over a white bucket, the larvae will be dislodged and can be more easily counted. At least 30 plants per 80 acre field should be sampled. Thresholds for caterpillars on grain sorghum heads vary greatly due to the profit potential of the crop. In general when lepidopterous caterpillars (corn earworm, fall armyworm and sorghum webworm) number two or more per head in grain sorghum nearing maturity **foliar insecticides** may be warranted. If webworms are the only caterpillar found on grain sorghum, the threshold may be adjusted to five per head. Use of foliar insecticides to reduce damage may not produce economic benefits and should only be used against high insect populations. Numerous **beneficial organisms** affect webworm, including naturally occurring insect pathogens, parasites and predators, and insecticide use may reduce their effectiveness. **Fall plowing** to destroy and bury crop residue will reduce overwintering populations of webworm. Finally, **“open headed” grain sorghum hybrids** better expose caterpillars to foliar insecticide sprays and to beneficial organisms.

### **Insecticide Recommendations for Sorghum Webworm on Grain Sorghum**

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

### **Stink bugs, Hemiptera: Pentatomidae**

#### **Description**

Several stink bugs, including the brown stink bug, the green stink bug, the southern stink bug and the rice stink bug, occur on grain sorghum in Arkansas. Stink bugs are true bugs having the front



half of the forewing hardened while the rear portion is membranous. Adults are about 1/2 inch long and color varies from tan to green depending on species (Photo 5-11). Immature stink bugs or nymphs resemble the adults but are wingless.

### Distribution, Damage and Impact

Stink bugs occur throughout Arkansas and impact grain sorghum production by feeding during early stages of seed formation. Soft seed is fed on by the bug inserting its stylet or beak into the seed and withdrawing partially digested plant material (Photo 5-12). After the seed hardens damage from stink bugs is minimal.

### Life History

Stink bugs overwinter as adults in plant debris located on field borders. In late winter or spring when temperatures approach 70 degrees, adults become active, mate and females begin to deposit eggs. Each female can deposit several hundred eggs on weed hosts. Nymphs emerge and feed on alternate hosts and cultivated plants for over one month before they form wings and disperse. In Arkansas several generations are produced each year. Populations can build to high levels in late summer and fall. Grain sorghum in early stages of head formation can sustain considerable damage during this period.

### Management

**Destruction of overwintering sites** may play a role in stink bug population development. Because adult bugs are strong flyers, however, this practice may have little benefit. The most practical management tactic is use of **foliar insecticides**. Fields should be scouted for adult and immature stink bugs from flowering to maturity. Because of the clumped distribution of stink bug populations, efforts to scout entire fields should be undertaken. A minimum of 30 sorghum heads should be shaken into a white bucket and the stink bugs should be counted. The recommended threshold in Arkansas is five stink bugs per sorghum head. As seed mature this number should be greatly increased, i.e., 16. Numerous **beneficial organisms** affect stink bug populations, including some beneficial stink bugs, and insecticide use may reduce their effectiveness.

### Insecticide Recommendations for Stink Bugs on Grain Sorghum

See Table 5-2 for insecticide recommendations current at time of publishing. Current updated recommendations can be found in the Cooperative Extension Service publication MP-144 and on the world wide web at [www.cdms.net/manuf/default.asp](http://www.cdms.net/manuf/default.asp). Always follow instructions on pesticide labels.

### References

- Flint, M.L. 1990. *Pests of the Garden and Small Farm*. Univ. of California, Oakland, CA. 276 pp.
- Foster, R. and B. Flood. 1995. *Vegetable Insect Management*. Meister Publishing Co., Willoughby, OH. 206 pp.
- Howard, R.J., J.A. Garland, and W.L. Seaman. 1994. *Diseases and Pests of Vegetable Crops in Canada*. Entomol. Soc. of Canada, Ottawa, Canada. 554 pp.
- Steffey, K.L., M.E. Rice, J. All, D.A. Andow, M.E. Gray, and J.W. Van Duyn. 1999. *Handbook of Corn Insects*. Entomol. Soc. of America, Lanham, MD. 164 pp.
- Sorensen, K.A. and J.R. Baker. 1994. *Insect and Related Pests of Vegetables*. North Carolina State Univ., Raleigh, NC. 180 pp.

### Acknowledgments

Dr. William Johnson, formerly with the University of Arkansas Cooperative Extension Service, has provided much information used in this manual. Several county agents including Hank Chaney, Mitch Crow, Roger Gipson, Brent Griffin, Brady Harmond, Kevin Lawson, Bob Rhodes, Larry Stauber, Eugene Terhune, Andy Vangilder and Joe Vestal, have assisted in locating insect damaged fields and in data collection. The majority of grain sorghum research plots have been located at the Cotton Branch Station, Claude Kennedy, Director.

Funding for recent sorghum insect studies and for production of this manual was provided by the Corn/Grain Sorghum Promotion Board. The authors also are ultimately indebted to the grain sorghum producers of the state of Arkansas who have permitted use of their fields and supplied funds through their check off program to the Board.

**Table 5-1. 2003 Recommendations for Insecticides Applied to Soil at Grain Sorghum Planting.**

Insecticide	Amount of Product per 1000 row ft.	Aphids	Chinch Bug	Cutworm	White Grub	Wireworm
Lorsban 15G	4-12 oz.		X	X		
Cruiser 5FS*	5.1 oz./100 lb. seed	X	X			X
Counter 15G	7 oz.	X	X		X	X
Gaicho*		X	X			X
Temik 15G	7.5 oz.	X	X			
*Seed treatment						

**Table 5-2. 2003 Recommendations for Insecticides Applied to Grain Sorghum Foliage.**

Insecticide	Amount per acre	Aphids	Chinch Bug	Cutworms	Sorghum Midge	Corn Earworm	Fall Armyworm	Sorghum Webworm	Stink Bugs
Asana XL	2.9-9.6 fl. oz.		X	X	X	X			
Baythroid 2EC	1.0-2.8 oz.		X	X	X	X	X	X	X
Fury	1.4-2.9 fl. oz.		X	X	X	X	X	X	X
Karate 2.08 CS	0.96-1.92 oz.		X	X	X	X	X	X	X
Lannate 2.4 LV	0.75-1.5 pts.				X	X	X	X	
Lannate SP	0.25-0.5 lbs.				X	X	X	X	
Lorsban 4E	0.5 - 2 pt.	X	X	X	X	X	X	X	
Mustang Max	1.28-4.0 oz.		X	X	X	X	X	X	X
Warrior T	1.92-3.84 fl. oz.		X	X	X	X	X	X	X
Dimethoate 2.67	0.75-1.5 pts.	X							
Malathion 57	1.5 pts.	X							
Sevin XLR	1-2 qts.		X	X		X	X	X	

## Photo Descriptions

The following descriptions correspond to the numbered photographs on the next two pages.

- |     |  |      |   |
|-----|--|------|---|
| 5-1 | Adult and immature aphids.                   | 5-8  | Mature corn earworm larvae feeding on grain sorghum.  |
| 5-2 | Adult chinch bug on grain sorghum foliage.   | 5-9  | Mature fall armyworm larvae feeding on grain sorghum. |
| 5-3 | Chinch bug nymph.                            | 5-10 | Sorghum webworm larvae feeding on sorghum seed.       |
| 5-4 | Mature cutworm larvae.                       | 5-11 | Adult stink bug.                                      |
| 5-5 | Mature white grub larvae.                    | 5-12 | Stink bug feeding on sorghum seed.                    |
| 5-6 | Mature wireworm larvae.                      |      |   |
| 5-7 | Sorghum midge damage on grain sorghum heads. |      |   |

Photographs are referenced throughout Chapter 5 – Major Insect Pests of Grain Sorghum in Arkansas and Their Management



