DIVISION OF AGRICULTURE
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Control of Insects in Corn

Glenn Studebaker
Extension Entomologist

Donald R. Johnson
Extension Entomologist

Gus Lorenz
Extension Entomologist
IPM Coordinator

Many insects may attack growing corn, but economic damage may not occur every year. In years of heavy infestations, any one of several insects may cause a loss in yield.

To prevent loss, you must have knowledge of the insects and the most practical controls. When yield potential is low or other factors are involved (price, etc.), insecticide use may be impractical. In such cases, harvesting the crop as silage or fodder may be the best means of salvage.

Several aphids transmit a plant virus which causes a disease known as maize dwarf mosaic. Insecticide control of the aphid is not an effective method of controlling the disease because the disease is transmitted prior to aphid death. The most effective means of virus management is the use of disease-tolerant varieties.

Early Planting to Reduce Insect Damage

Insect infestations are normally higher in late summer, so late planted corn is usually subject to more severe damage than early planted corn. Budworm damage is usually light until July and August. Infestations of first generation southwestern corn borer are much lighter than the second and third generations. Corn earworm damage to ears is lighter in early planted corn. Make every effort to plant corn in Arkansas by the first of May.

Soil Insects

Several soil insects attack corn. They feed on the germinating seed, roots or underground stems. The most important of these are seed corn maggot, southern corn rootworm, white grubs and wireworms.

Seed Corn Maggot

The seed corn maggot is a small white maggot that feeds on corn seed and may cause stand reduction or loss. The adult flies appear early in the spring and lay eggs on moist soil high in organic matter. The eggs hatch in a few days and the small, white, tapered maggots begin to feed and burrow into the seed. The feeding may prevent germination or, if germination occurs, the seedlings are weak and may die. Any condition that delays seed germination may increase damage from seed corn maggot since damage is greatest during cool, wet springs.

To detect damage, dig in areas where plants have failed to emerge. Once serious damage has occurred, the only alternative is to replant the crop. Early plowing to reduce the amount of organic matter prior to planting makes fields less attractive to seed corn maggot. Systemic in-furrow insecticides listed in Table 1 will aid in control of seed corn maggots.

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Table 1. Insecticides for Control of Seed Corn Maggot

Insecticide	Formulation/ 1,000 Ft Row	Method
Lorsban 15 G	8 oz	In-furrow or band
Dyfonate II 15 G	8 oz	Band
Counter 20 G	6 oz	In-furrow or band
Furadan 4 F	2.5 oz	In-furrow or band
Force 3 G	4-5 oz	In-furrow or band
Aztec 2.1 G	6.7 oz	In-furrow or band
Regent 4 SC	0.24 oz	In-furrow
Gaucho		Seed treatment

Comments: Banded treatments should be incorporated lightly. All treatments are for prevention of infestations.

Imported Fire Ants

Imported fire ants can be a problem on lighter soils in central and southern Arkansas. These insects can cause a reduction in stand by removing seeds from the seed furrow. They can also be beneficial in that they prey upon many other insect pests. Application of a soil-applied insecticide or seed treatment for corn rootworm at planting will also suppress these insects, giving the seedling time to establish.

Southern Corn Rootworm

The southern corn rootworm damages corn by feeding on the root system. The adult southern corn rootworm female lays eggs around the base of seedling plants in early spring and the larvae move down to feed on the root system. Larvae feeding results in root pruning that may reduce yield.

Severe injury may cause plants to lodge and a goose-necked appearance results as plants try to grow erect. Corn rootworms may be controlled using insecticides listed in Table 2.

Table 2. Insecticides for Control of Corn Rootworms

Insecticide	Formulation/ 1,000 Ft Row	Method
Furadan 4 F	2.5 oz	Band
Dyfonate II 15 G	8 oz	Band
Thimet 20 G	6 oz	Band
Counter 20 G	6 oz	In-furrow or band
Lorsban 15 G	8 oz	In-furrow or band
Force 3 G	4-5 oz	In-furrow or band
Aztec 2.1 G	6.7 oz	In-furrow or band
Regent 4 SC	0.24 oz	In-furrow
Prescribe		Seed treatment

Comments: In-furrow at planting, band 7 inches in front of press wheel and incorporate lightly at planting. Applications of Accent or Beacon herbicide following Thimet may cause temporary crop injury.

Wireworms

Wireworms damage corn by feeding on germinating seeds and the root system. Wireworm larvae are yellowish-brown to brown in color and wire-like in appearance. The larvae mature in 2 to 5 years. Infestations of wireworms tend to be more severe in crop areas following sod. Infestations may be controlled by applying insecticides listed in Table 3 at planting.

White Grubs

White grubs damage corn by feeding on the root system. The pruned roots cause plants to be stunted, and stand reduction may result where heavy infestations occur. Lodging and yield reductions may occur as a result of damaging infestations. White grubs occur more frequently in corn following sod or pastures. Control may be achieved with insecticides listed in Table 3.

Table 3. Insecticides for Control of Wireworms and White Grubs

Insecticide	Formulation/ 1,000 Ft Row	Method
Counter 20 G	6 oz	In-furrow or band

Comments: Treatments should be mixed in soil lightly.

Cutworms

Several species of cutworms attack corn, but the injury to corn is similar; that is, plants are cut down at the soil line. Damage in most fields may be prevented by early seedbed preparation to allow natural control of the worms. An insecticide application to the row when damage is first noticed will provide control. (See Table 4).

Sugar Cane Beetle

Sugar cane beetle, also called rough headed corn stalk beetle, is a black beetle about 1/2 inch long. It burrows into the ground and feeds on the corn stem at or slightly below the soil surface, making a ragged hole in the stem. It is most prevalent in the low wet spots in a field or near sod areas. Infestations do not

occur every year. The sugar cane beetle is difficult to control, but insecticides listed for cutworms in Table 4 may suppress the infestations of sugar cane beetles.

Table 4. Insecticides for Control of Cutworms and Sugar Cane Beetle

Insecticide	Formulation/Acre	Acres/Gallon
Lorsban 15 G	6.67 lb	
Lorsban 4 E	2-3 pt	4 - 2.7
Asana XL 0.66 EC	5.8-9.6 oz	22 - 13
Ambush 2.0 EC	6.4-12.8 oz	20 - 10
Warrior T 1 EC	1.92-3.20 oz	66.7 - 40
Pounce 3.2 EC	4-8 oz	32 - 16

Comments: Apply insecticides when stands are threatened. Direct sprays to lower portions of plants and soil around base of plant.

Corn Flea Beetle

Seedling corn may be killed by feeding damage from the corn flea beetle. As the name implies, the beetle hops like a flea. The beetle is small, black and about 1/16 inch long. It eats holes in the leaves, and feeding may severely weaken the seedling. Control may be obtained from insecticides listed in Table 5.

Table 5. Insecticides for Control of Flea Beetles

Insecticide	Formulation/Acre	Acres/Gallon
Sevin 80 S	1.25-2.5 lb	
Methyl Parathion 4 EC	1-1.5 pt	8 - 5 1/3
Penncap M	2-3 pt	4 - 2 2/3
Sevin XLR	1-2 qt	4 - 2

Comments: Apply treatments when beetles are abundant and affecting stand vigor.

Budworm

Damage to corn whorl or buds may be caused by the corn earworm and the fall armyworm. Both insects may be present in the same field.

The larvae are similar in appearance, but the frontal suture (the inverted Y) on the front of the head is more distinct in fall armyworm. It also has a more greasy and smoother appearance than corn earworm because of fewer hairs on the body.

Corn can withstand a considerable amount of whorl damage. When infestations are heavy enough to cause dead-heart or severe stunting of plants, yield loss may occur. To determine the infestation level, check corn whorls for larvae. Control is justified when you find three to six larvae per plant. Corn earworms are cannibalistic and will often eat each other or other caterpillars in the whorl. Generally, only one or possibly two corn earworms will be found in a whorl. If several are found, they are most likely fall armyworms or European corn borers as these species are not cannibalistic.

Several insecticides are effective. It is important that the insecticide be directed down into the whorl of the corn by using a high volume of spray material. Thus, ground applications of sprays are usually much more effective than aerially applied sprays.

Table 6. Insecticides for Control of Budworms, Fall Armyworm and Corn Earworm

Insecticide	Formulation/Acre	Acres/Gallon
Sevin 80 S	2.5 lb	
Sevin XLR	2 qt	2
Asana XL 0.66 EC	5.8-9.6 oz	22 - 13
Warrior T 1 EC	2.56-3.84 oz	50 - 33.3
Lannate 1.8 L	1-2 pt	8 - 4
Lannate 2.4 LV	.75-1.5 pt	10 2/3 - 5 1/3
Ambush 2.0 EC	6.4-12.8 oz	20 - 10
Pounce 3.2 EC	4-8 oz	32 - 16

Comments: Apply insecticides when 3 to 6 larvae are found per whorl. Use insecticide as a coarse spray in 15 or more gallons total volume per acre.

Chinch Bugs

Chinch bugs occasionally attack corn and may cause severe stunting and yield reductions. Chinch bugs are routinely a problem in certain areas of the state, and intensive management may be required to control this insect. Adult chinch bugs are 1/6 to 1/5 inch long, and wings on the back are black with white covers crossed with a black zigzag line. Young immature nymphs have red bodies with a white stripe across the back. Older nymphs are darker, lacking the stripe and reddish abdomen. Chinch bugs are normally found near or below the soil line and behind leaf sheaths.

Soil-applied granular insecticides can be used in areas where chinch bugs commonly occur. Foliar treatments should be directed toward the base of the plants in 25 to 30 gallons of solution per acre.

Table 7. Insecticides for Control of Chinch Bugs

Insecticide	Formulation/Acre	Acres/Gallon
Furadan 4 F	.5-1 pt	16 - 8
Lorsban 4 E	1-2 pt	8 - 4
Sevin 80 S	2.5 lb	
Sevin 50 WP	4 lb	

Comments: Direct sprays to base of plant using a minimum of 15 to 20 gallons total volume per acre. Apply treatments when chinch bugs are evident or causing reduced vigor of plants. Sprays applied by aerial application are normally less effective than ground application.

Corn Borers

European and southwestern corn borers occur statewide and are generally present from light to heavy numbers except in early planted corn. The southwestern corn borer is the more destructive of the two pests due to greater lodging.

The European corn borer overwinters in any part of the corn plant – stubble, stalks or cobs. The larva or borer stage is gray or tan in color with rows of light brownish spots or pinkish lines running lengthwise on the body. These spots or lines give the borer a purplish cast. Eggs are laid in flat masses (10 to 20 each) with the individual eggs overlapping like fish scales. Most egg clusters are found on the underside of the leaves. Egg laying and hatching occur in June, July and August. There are normally three generations a year in Arkansas.

The European corn borer is not a heavy leaf feeder, and feeding signs may show up as rows of tiny pin holes in the leaf after it unfolds from the whorl. The small borer may be found down inside the whorl.

When 50 percent of the plants show tiny pin holes in the leaves and scarring of the top leaves, apply insecticides. (See Table 8.)

The southwestern corn borer overwinters as a full grown larva or borer in the base of the stalk under the soil line. The overwintering borer is creamy-white. During the growing season, the southwestern corn borer is white with black spots. Thus, it is easy to separate from the European borer. The southwestern corn borer tends to attack the lower half of the corn plants. When corn is very young, the borer may kill the center of the plant, causing dead-heart.

Table 8. Insecticides for Control of European Corn Borer

Insecticide	Formulation/Acre	Acres/Gallon
Sevin 80 S	1 7/8 lb	
Sevin XLR	1.5 qt	2.7
Asana XL 0.66 EC	5.8-9.6 oz	22 - 11
Warrior T 1 EC	2.56-3.84 oz	50 - 33
Ambush 2.0 EC	6.4-12.8 oz	20 - 10
Pounce 3.2 EC	4-8 oz	32 - 16
Furadan 4 F	1 qt	4
Dyfonate II 15 G	6.9-8.7 lb	
Regent 4 SC	0.24 oz/1000 ft row at planting	
Bt corn	Corn expressing the Bt insect toxin has been very effective.	

Comments: Treat when 50 percent of plants have feeding damage. Apply sprays in at least 15 to 20 gallons total volume per acre. Sprays applied by ground are usually more effective than aerially. Granules should be applied directly into whorls. Furadan applied in-furrow at planting will aid in control of first generation European corn borers.

Eggs are laid in masses, each with up to four eggs, with the individual eggs overlapping like shingles, similar to the European borer. Each egg is marked with three pink lines. Eggs are laid on both the upper and lower leaf surface. Eggs and newly hatched borers are found during June, July and August. Fortunately, in past years, southwestern corn borer infestations and European corn borer infestations have usually coincided, making it possible to control both borers at the same time.

Early planting of corn is the best way to escape heavy damage from European corn borer and southwestern corn borer. Corn planted prior to the first of May will escape much of the damage. Fields planted from the first of May to the middle of June will likely be damaged by second generation borers, and insecticide applications may be necessary when infestations are heavy. Corn planted later than the last of June will typically suffer severe damage from second and third generation borers, and control with insecticides is extremely difficult. Southwestern corn borers going into hibernation from the second and third generations girdle the stalk, causing serious damage from lodging.

Insecticidal control is effective during the 10 day period when the borers feed outside the stem. Check plants for the small, spotted worms in the whorls. Feeding may be similar to European corn borer, but more scarring or feeding on the leaf occurs. Feeding signs can be used as a guide to indicate infested plants. Apply insecticides when 25 percent of the plants have larvae present. Applications may be necessary as early as late June. One application may be sufficient. If posttreatment inspection reveals larvae still present, a second application one week later will be required.

Early stalk destruction is a very good practice to reduce overwintering borers. For southwestern corn borers, stubble should be turned up and left through the winter. Plowing or turning corn stubble in early spring will greatly reduce overwintering European corn borer larvae.

Because proper timing of insecticide application is difficult, early planting and stalk destruction just after harvest are the best management for both European and southwestern corn borers. If an insecticide is used before the young borer enters the stalk, a substantial level of control can be expected.

Planting a Bt corn variety is another option for managing both European and southwestern corn borers. These varieties have been genetically engineered to produce a protein that gives excellent control of these borers. Borers are usually more of a problem in later plantings. Therefore, the grower should consider planting a Bt variety when planting is delayed. Check the University of Arkansas Corn and Grain Sorghum Performance Tests publication to find the highest yielding varieties for your part of the state.

Table 9. Insecticides for Control of Southwestern Corn Borer

Insecticide	Formulation/Acre	Acres/Gallon
Sevin 80 S	3.75 lb	
Sevin XLR	3 qt	1.33
Asana XL 0.66 EC	4.8-9.6 oz	36.6 - 13.3
Warrior T 1 EC	2.56-3.84 oz	50 - 33.3
Ambush 2.0 EC	6.4-12.8 oz	20 - 10
Pounce 3.2 EC	4-8 oz	32 - 16
Furadan 4 F	1 qt	4
Regent 4 SC	0.24 oz/1000 ft row at planting	
Bt corn	Field corn expressing the Bt insect toxin has been very effective.	

Comments: Apply treatments when 25 percent of plants show shothole feeding in whorl. Use 15 to 20 gallons total spray per acre applied over whorl. Ground applications of sprays are usually more effective than aerial applied sprays. Granules should be applied directly into whorls.

Grasshoppers

Grasshoppers may occasionally be a problem in field border rows. The control of grasshoppers is usually necessary only in localized areas of the field, and spot treatments are usually the best way to apply controls. Insecticides recommended for grasshopper control are listed in Table 10.

Table 10. Insecticides for Control of Grasshoppers

Insecticide	Formulation/Acre	Acres/Gallon
Sevin 80 S	1.25 lb	
Sevin XLR	1 qt	4
Lorsban 4 E	1 pt	8
Malathion 57% EC	1 qt	4

Comments: Treat when grasshoppers are causing significant damage.

Corn Leaf Aphid

The corn leaf aphid is occasionally found in large numbers on corn. The corn leaf aphid is a small, bluish-green aphid. The aphids may be found in clusters on leaves and down in the whorl. Control is not normally recommended because infestations rarely cause yield reductions. Aphids are parasitized by small wasps and are also susceptible to a fungal disease. Brown, swollen aphids, abnormally larger than other aphids in the colony, indicate parasitism. Several predators also feed on aphids including lady beetles, syrphid fly larvae, insidious flower bugs and green lacewing larvae. These and several other insects prey upon aphids and assist in maintaining populations in check. Treatment for corn leaf aphids is seldom necessary.

GLENN STUDEBAKER and **DR. DONALD R. JOHNSON** are Extension entomologists and **DR. GUS LORENZ** is Extension entomologist, IPM coordinator, Cooperative Extension Service, University of Arkansas. Studebaker is located at the Northeast Research and Extension Center at Keiser. Johnson and Lorenz are located at the Little Rock State Office.

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