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**CHINCH BUG CONTROL**  
**PRACTICES FOR**  
**OKLAHOMA FARMS**

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# **CHINCH BUG CONTROL PRACTICES FOR OKLAHOMA FARMS**

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## **INTRODUCTION**

The chinch bug is one of the most destructive of all insects attacking small grains, corn, and sorghum crops in Oklahoma. This pest occurs in damaging numbers in the state each year, and in outbreak proportions in much of the state during many years. It is often a limiting factor in the production of sorghums, corn, and spring barley. This circular discusses its biology and distribution in Oklahoma and describes the best practices for reducing or eliminating serious damage to crops by this pest.

### **Distribution in Oklahoma**

Chinch bugs occur in greatest numbers in the southwestern, central, and northeastern parts of the state. They are seldom injurious in the southeastern, northwestern, or panhandle sections of Oklahoma. Very little injury from chinch bugs occurs west of the 25-inch rainfall line.

### **Plants Attacked**

So far as known, the chinch bug injures only plants belonging to the grass family, and many species serve as host plants. This family includes small grains, corn, millet, Johnson grass, sorghum (grain and forage sorghums, Sudan grass and broom corn), and many of the native grasses. All of these hosts are common in Oklahoma, and their periods of growth are such that ample food for this insect is always available. Of the small grain crops, barley is a favorite food plant, while wheat is preferred to oats. Susceptible sorghum varieties seem to be preferred to all corn varieties that have been tested at the United States Dry Land Field Station, Lawton, Oklahoma, when the bugs had a chance to choose between them.

### **Character of Injury**

Chinch bugs feed on plants during any stage of growth by sucking the sap from the plant and such feeding is an important factor in causing injury. It is not believed, however, that the removal of the sap alone accounts for all the injury that results. After the withdrawal of the mouth parts, some injury results by exudation of plant juices through the puncture. The

opening left in the plant also permits entrance of disease organisms. The red, injured condition that appears at the feeding places on sorghum plants probably results from a clogging of certain plant tissues. The injection of toxic substances by the insect may also be a factor.

#### Life History

Three complete generations of chinch bugs occur each year in Oklahoma. The over-wintered adults (fig. 1) usually leave winter quarters, such as native grass, Johnson grass, and sorghum stubble, during the last half of March and the first part of April. They fly to small grain crops, especially barley and winter wheat, where eggs for the first generation are deposited during the latter half of April. The young bugs of this generation usually appear early in May and feed on wheat or barley, and to some extent on oats. About the time the small grain crops mature, or during the first half of June, these insects are forced to seek another source of food. In the southwestern part of the state, and to some extent in the central part, this migration is accomplished by flight since the bugs have matured and developed wings by this time. When small grain crops mature before the bugs reach the winged or adult stage, they are forced to migrate to a new source of food by crawling. This is the usual condition in northern Oklahoma and the middle west.

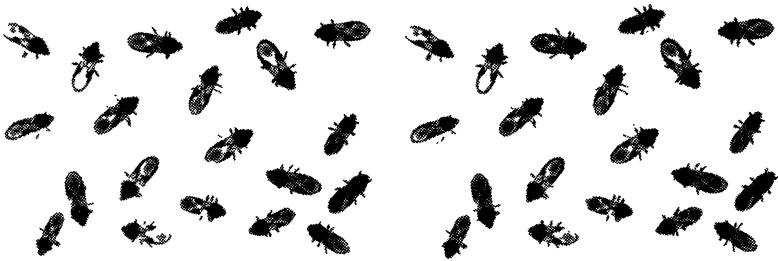


Fig. 1.—Chinch bugs, twice natural size. (U. S. Department of Agriculture.)

Eggs for the second generation are deposited on and near young sorghum and corn plants during the last part of June. Young bugs of this generation usually appear early in July. They feed on the sorghum and corn plants until they become adults in late July and early August. Eggs for the third generation are deposited on and near sorghum plants during the first half of August. The young bugs of this generation appear about August 15. They feed on late sorghums, and on second growth where the main crop has been harvested, until they become adults. The third generation adults may either hiber-

nate in sorghum stubble or fly to nearby grassland for hibernation. The principal places of hibernation are native grasses such as Little Bluestem and Big Bluestem that have a bunch habit of growth (fig. 2).



**Fig. 2.—Bunch grass, a favorite hibernating place for chinch bugs. (U. S. Department of Agriculture.)**

## **PREVENTIVE MEASURES**

### **Plant Corn and Sorghums Away from Small Grains**

Sorghums and corn should be planted as far away as possible from small grains such as barley, wheat, and oats. This forces the bugs either to fly or crawl much farther to locate such susceptible crops when they leave the small grains in which they have developed. This in turn delays and may reduce injury somewhat.

### **Plant Adapted Varieties of Corn**

Select a variety of corn for planting that is well adapted to Oklahoma's soil and climatic conditions. Under a severe chinch bug infestation, 26 percent of the plants of Mexican June variety were killed by the chinch bug as compared with 68.6 percent of the plants of Neal Paymaster. Such other varieties as Red June, Surcropper, Southwestern Yellow Dent, Improved Leaming, and Oklahoma Silvermine are in between the above in the order listed in their comparative susceptibilities to this insect. Tests showed that Hays Golden is a good variety to plant in the more heavily infested chinch bug area. This variety is early and often escapes serious chinch bug and drought injury.

### **Plant Resistant Varieties of Sorghum**

Sorghums are subject to severe chinch bug damage because of their relatively long growing period. The wide range in comparative susceptibilities of the varieties to chinch bug damage, indicates the necessity of planting those which are more resistant. Atlas sorgo is highly resistant to this pest, being more so than Sourless (African Millet) or Standard Sumac. Reed, Dawn Selection, Sharon, and Weskan are among the most resistant kafirs. Feteritas and milos are quite susceptible to chinch bugs, especially the latter.

For further information on recommended corn and sorghum varieties for the heavily infested chinch bug area, consult Oklahoma Experiment Station Bulletin 232.

### **Plant Sorghums Early**

Early planted sorghum is less likely to be injured seriously by chinch bugs than when this crop is planted late. Southwestern Oklahoma plantings made April 15 were injured less severely than those of May 4, while early June plantings were almost a total loss in years of heavy chinch bug infestation. For the more northern parts of the state, the best date for planting sorghum, to escape heavy chinch bug damage, is correspondingly later.

### Corn Planted Too Early May Be Subject to Early Infestation

Corn should be planted as early as possible to allow for maturity before drought conditions which may prevail in July and August. It is a mistake to plant too early, however, because if the young corn plants are up by the time chinch bugs migrate from winter quarters to growing crops, they will be gradually infested, with little hope for a crop except in small fields where the plants can be sprayed with a contact insecticide to kill the bugs. Ordinarily this migration takes place early in April. A good spray for this purpose is one-half ounce of 40-percent nicotine sulphate in one gallon of water in which 1 ounce of soap has been dissolved.

### Some Crops Not Attacked by the Chinch Bug

Legumes such as alfalfa, sweet clover, vetch, lespedeza, cowpeas, soybeans, and peanuts are not attacked by this insect. Cotton is another immune crop.

### CHINCH BUG BARRIERS

#### Barriers Are Effective in Northern Oklahoma

Barriers are effective in Oklahoma only in the northern part of the state. In this section the bugs are still immature and wingless at the time the ripening of the small grains forces them out and into the corn and sorghums. In the south and

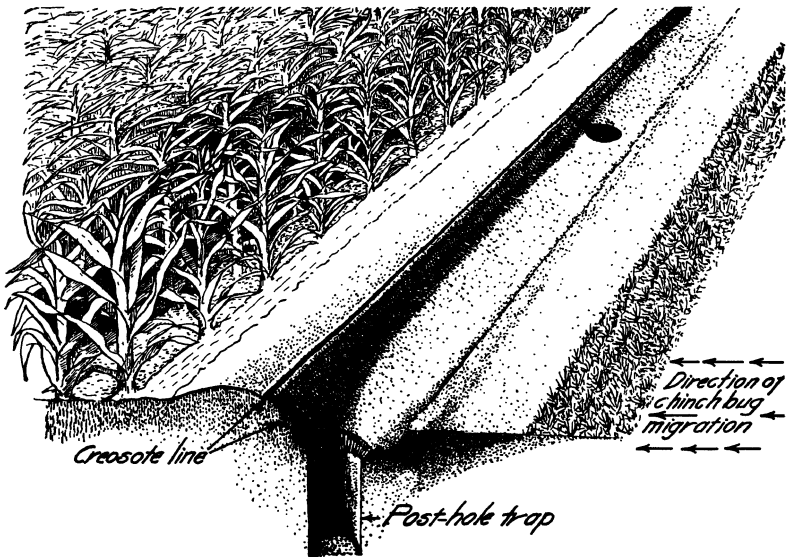


Fig. 3.—A dirt-ridge creosote barrier. Very efficient if creosote line and post-hole traps are properly constructed and maintained. (U. S. Department of Agriculture.)

southwestern sections, as previously stated, the bugs have largely matured at this time, their wings are developed, and they fly into the fields.

#### **The Dirt-Ridge Creosote Barrier Most Effective**

The dirt-ridge creosote barrier (fig. 3), is constructed between the infested small grains such as barley or wheat and the corn or sorghum crops. This barrier should be in place at or just before the migration of the bugs starts or when the grain begins to ripen. In case the bugs have already invaded the outer rows of corn or sorghums, make the barrier between the last infested row and the balance of the field (fig. 4).



**Fig. 4.—Corn at left ruined by invasion of chinch bugs from adjacent small grain; that on the right saved by a creosote barrier. (Illinois State Natural History Survey.)**

The barrier is made as follows:

1. Plow a furrow between the small grains and corn or sorghums, throwing the dirt towards the latter crops. The ridge should be 6 to 8 inches high with a flat surface at least 2 inches wide near the top as a base for the creosote line.

2. Thoroughly pulverize, smooth, and pack the soil on the furrow slice or ridge side. This may be done by dragging a straight log back and forth in the furrow; or the furrow can be smoothed down with the back of a spade.



3. Dig post holes in the bottom of the furrow or partly in the sloping side. These should be 1 to 4 rods apart and 18 to 20 inches deep. The number of holes will depend upon the number of migrating bugs; the more numerous the bugs the more holes are needed. The tops of the holes should be flared and kept dusty to increase their efficiency in trapping the insects.

4. Procure some repellent material to use on the barrier. The following materials are listed in the order of their effectiveness: coal-tar creosote, naphthalene drain oil, gas tar, pine-tar oil, and wood creosote. Thirty-five to 50 gallons are usually required for each one-fourth mile of barrier including renewals for a 14 to 18-day period. The creosote or other repellent material is now poured into a galvanized or tin bucket, about an inch from the bottom of which an 8-penny nail hole has been punched directly below the point where the handle is attached on one side. The creosote runs out from this hole as the pail is being carried along and the stream is guided so that it forms a line about half an inch wide along and somewhat below the top of the ridge on the side towards which the bugs are migrating so they will be crawling uphill when they reach the barrier, as shown in figure 3.

The line of creosote is very important and will continue to repel the bugs for about 24 hours. It should be renewed each day during the period when most bugs are migrating, which is in the afternoon. It is very important to watch the barrier each afternoon and re-treat with creosote any places where dirt or trash have blown across the creosote line, thus forming a bridge over which the bugs can cross. The trapped bugs in the post holes should be killed each day by pouring 2 to 3 tablespoonfuls of kerosene or waste oil in each hole.

#### **The Coal-Tar or Gas-Tar Barrier**

This barrier depends upon the repellent odor of the tar, and it also acts as a physical barrier because of its stickiness. It is prepared by pouring a line of coal-tar or gas-tar along a path between the infested small grain fields and the corn or sorghums. The soil in the path should be packed and smoothed to hold the tar. Post holes, as previously described, are also needed to make this barrier effective. The tar used in this barrier must be renewed more often than the creosote used in the dirt-ridge creosote barrier, but if the right kind of repellent is used, the barrier is very effective. Tars containing creosote or cresylic acid should be used. Tars from which these materials have been distilled or tars from the manufacture of water gas are of little value as chinch bug repellents.

### The Dusty-Furrow Barrier Should be Used Only in an Emergency

The dusty-furrow barrier is the easiest to construct. Unfortunately it is also the least reliable because a shower will render it ineffective. It is only recommended as a last resort when creosote or other repellent materials cannot be obtained. It is most effective in dry, hot weather on sandy or thin soils. It is made by plowing a dead furrow, throwing the dirt both ways and then dragging a log back and forth in the bottom of the furrow until a fine dust mulch has been formed. No post holes are needed. The hot dust serves as a barrier to the bugs which are killed by the intense heat of the sun, by the drag, or penetration of dust particles into their breathing tubes. Very often the constant labor needed to maintain this barrier makes it the most expensive.

### The Paper Fence Barrier Is Effective

During the recent chinch bug outbreak in the Middle West, a new type of barrier was developed which proved very effective in Iowa and Illinois. This is the paper-fence barrier (fig. 5). It is especially recommended for heavy or "tight" soils where it is difficult to pulverize or smooth the dirt as recom-

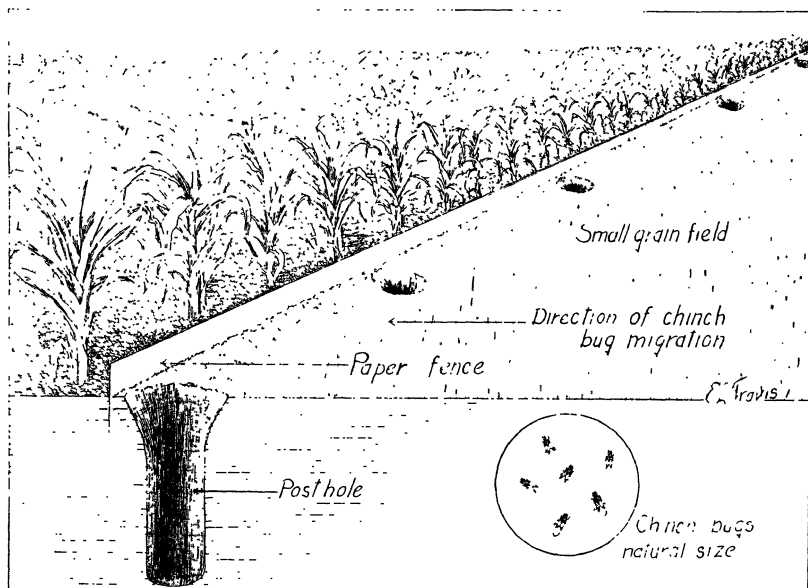


Fig. 5.—Creosote-treated paper-fence barrier, a recent improvement over the creosote ground-line type. (Iowa State Agricultural Experiment Station.)

mended for the dirt ridge creosote barrier. This barrier has not been tested in Oklahoma. It is constructed as follows:

1. Procure a roll of red rosin building paper (30-pound grade), tarred felt (14-15 lb. grades), or untreated felt of the same weight. Single faced corrugated paper or heavy chip and chip strawboards ranging from 20 to 40 points in thickness may be used. Nine strips of 150-foot lengths are required for a quarter mile.

2. Cut paper with a cross cut saw into rolls about 4 inches wide.

3. Soak rolls for at least 12 hours in sufficient creosote to keep them covered. Then drain for an hour or more.

4. Prepare a ridge or path free from litter and then open a small furrow in which to place the paper.

5. Place the paper fence in this furrow in an upright position.

The method used in this operation depends upon the tools available but there should be 2 inches of the paper projecting above the ground. The soil holding the paper in place is firmly tamped.

6. Dig post holes as shown by the diagram.

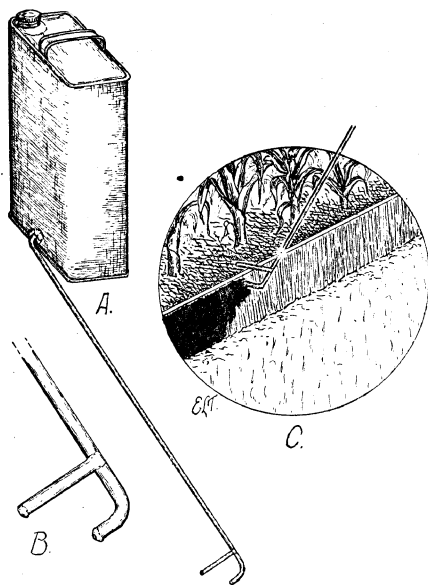


Fig. 6.—Method of applying creosote to paper barrier. (Iowa State Agricultural Experiment Station.)

This paper will repel the bugs for 2 to 3 days. It should then be treated with more creosote which is applied to the top edge of the paper on the side towards which the bugs are coming (fig. 6). Two to three gallons of creosote are needed to renew one quarter mile of paper fence. The paper fence barrier, though somewhat more difficult to install, is more effective, somewhat cheaper, and requires less attention than the dirt-ridge creosote barrier. It should be especially effective in windy weather and in tight lumpy soils.

#### **INEFFECTIVE CONTROL MEASURES**

The practice of winter burning of hibernation places is not generally recommended in Oklahoma. Cold weather, which should follow burning to make it successful, cannot be depended upon during the winter months, particularly in the southwestern part of the state. Furthermore, chinch bugs hibernate in sorghum stubble and other places where burning cannot be done. The burning, moreover, destroys grass often badly needed for livestock feed during the winter months. Burning does not improve pasture conditions the year following, and it encourages soil erosion.

Under warm humid conditions chinch bugs may be killed in great numbers by a disease caused by a white fungus. The spores of this fungus are present naturally in the fields and will germinate and produce an epidemic among the bugs only when the above mentioned climatic conditions prevail. Therefore, the spreading of cultures of diseased bugs as a method of control is no longer recommended.

It is believed by some that chinch bugs are killed by cutting a few rows of green stalks of corn or sorghum plants and making a swath of the cut stalks around the field. The insects will not feed long on the withered plants and are not harmed by the fermenting sap. Sometimes cast-off skins of the bugs found under these piles have led people to believe this method is effective. Until further observations are made on the effectiveness of this method, it can not be recommended at the present time.