

## Chinch Bug Management

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The life cycle and control of the chinch bug is discussed, with descriptions of possible management options.

The chinch bug is a native North American insect that can destroy cultivated grass crops, especially sorghum and corn, and occasionally small grains, such as wheat and barley. Broad-leaved plants are immune to feeding damage. Crop damage from this insect is most often found in southeast Nebraska and northeast Kansas and is associated with dry weather, especially in the spring and early summer months. Chinch bugs have few effective natural enemies. Ladybird beetles and other common insect predators found in Nebraska prefer to feed on other insects rather than on chinch bugs. Although chinch bugs can be difficult to control, many farmers have satisfactorily protected their crops with an integrated program of careful crop management and insecticide application.



Figure 1. Chinch bug life stages.

### Description

Fully grown chinch bugs are about 3/16 inch long, with a black body and white forewings. Newly-hatched bugs are

small and bright red. All life stages feed on susceptible grass plants between the leaf sheath and stalk (*Figure 1*). As the young bugs (i.e., nymphs) grow, they shed their skin (i.e., molt) five times in going through six stages. They are red to brown with a white band across their backs during the first four stages. The fifth nymphal stage is nearly black, with a white spot between the developing wings. The sixth and final stage is the adult. Chinch bugs have piercing-sucking mouth-parts at all stages. They injure host plants by sucking plant juices. They have a characteristic musty odor that is detectable when large numbers are present or when the bugs are crushed.

### Life Cycle and Plant Injury

The preferred overwintering sites of adult chinch bugs are dense clumps of native warm-season bunchgrasses such as little bluestem, big bluestem and switchgrass. Chinch bugs fly to and overwinter in native grass pastures, prairies and CRP (Conservation Reserve Program) acreages near fields they infested during the previous late summer. (*Figure 2*). Chinch bugs can be found during the winter by spreading a dense clump of little bluestem and looking in

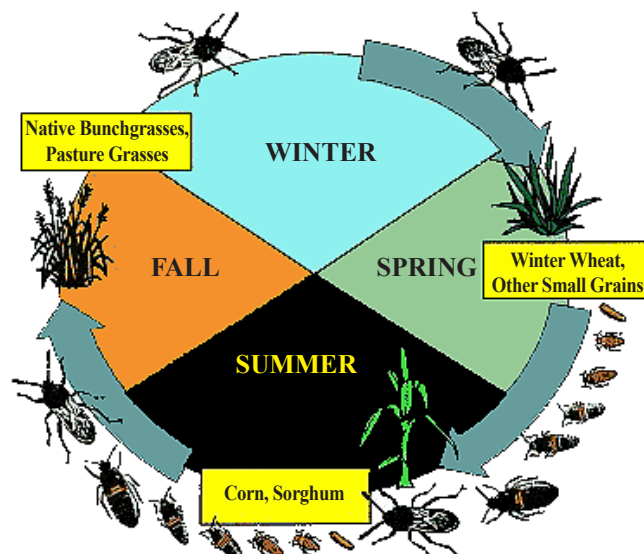


Figure 2. Life cycle of the chinch bug.

the dried plant material near the ground. If temperatures are relatively warm, chinch bugs may be seen crawling in the dried vegetative matter above the soil surface. Although chinch bugs also may be found overwintering in cool-season pasture grasses like smooth brome or in other grassy areas in fence rows and field margins, the insulation provided by clumps of the warm-season grasses makes them preferred sites. Few chinch bugs overwinter under crop residue in corn or sorghum fields.

Adults leave overwintering sites and fly to small grains, such as wheat (including volunteer wheat), barley, oats and rye, on sunny spring days when temperatures rise above 70°F for several consecutive days. Nebraska studies have shown that, within a geographical area, chinch bugs are most attracted to the poorest, thinnest stands of wheat. A poor wheat stand can result from low seeding rates, inadequate fertilization, non-productive land, late planting date, winter kill, poor germination from dry soil or volunteer wheat from the previous summer's crop. After arriving in small grain fields, chinch bugs mate and begin to lay eggs. Eggs are deposited behind lower leaf sheaths and at the crowns of plants near or just below the soil surface. If the soil is porous or cracked, eggs are deposited on or near the roots. Females may lay several hundred eggs in two to four weeks. The eggs are less than 1/25 inch long. They are white when first laid and become orange-red before hatching.

Young bugs and adults feed by sucking fluids from small grain plants at the root zone just below the soil surface or behind the leaf sheath. If the soil is dry and there is a crust on the surface, chinch bugs may be found underneath by scraping the crust away by hand. Under heavy infestations, plant leaves turn yellow, then brown, starting with lower leaves and proceeding to upper leaves. Economic losses almost never occur in healthy stands of fall-sown wheat, but thin winter wheat and spring-sown grains, especially barley, may be heavily damaged. After the wheat canopy closes in late May-early June, a minor adult flight often occurs from wheat to other crops. When this occurs, growers may subsequently notice sizable isolated areas within seedling sorghum or corn fields that may be damaged and infested with chinch bugs.

After the wheat starts to ripen, chinch bugs move in large numbers to nearby corn or sorghum fields. Usually, most of the bugs will be in a non-winged immature stage and must walk to the nearby crop. Adults, however, may fly to the new field. Severe damage may occur to corn or sorghum if the migration and feeding continues. When chinch bugs occur in large numbers on corn and sorghum, the plants may be killed, particularly seedling plants less than 12 inches tall. Early feeding occurs at the crowns and below the soil surface on the roots and stems of small plants. Later, the bugs feed on aboveground stems behind the leaf sheaths. During high infestations, the chinch bugs are frequently present in such large numbers that stems and lower leaves may be covered with nymphs and adults. Typical damage usually begins in the field margin near the infested small grains and progresses quickly, destroying

many acres in a short time. Chinch bug damage has been observed in sorghum and corn fields that were over 1/2 mile away from wheat or other small grains. If sorghum or corn is planted directly into infested wheat stubble, chinch bugs feeding on the stem below the soil surface may attack and kill the seedlings before emergence.

After moving into corn or sorghum, the nymphs become adults that will fly and disperse throughout these fields before they deposit their eggs for the second generation. Migrating chinch bugs also will be attracted to very late-planted sorghum or corn and second generation feeding may cause substantial losses, especially when plants are small. Larger host plants may not be killed, but large numbers of chinch bugs can reduce yields. During September and October, adults move out of crop fields and into bunchgrass when the temperature begins to fall below 70°F and the days become shorter. Damage to fall-sown wheat seldom occurs because the bugs do not feed actively after they become adults in late summer.

### **Risk Factors**

Many observers believe that a fungal disease keeps chinch bug numbers relatively low in years when spring and summer rainfall are above normal. High humidities are necessary for this disease to develop. Following several dry seasons, populations of chinch bugs can build up, causing considerable crop damage. The following risk factors have been associated with chinch bug infestations and crop losses during dry years in southeastern Nebraska:

1. Poor stands of wheat or other spring grains (or other newly seeded grasses) during the time chinch bugs fly out of overwintering sites, usually in April. Volunteer wheat also may be a target of migrating chinch bugs.
2. Planting sorghum or corn near an infested stand of wheat.
3. Native grass pastures or prairie (overwintering sites) in close proximity to wheat and sorghum.
4. A nearby infestation (even a minor one) the previous year.

### **Management Situations and Options**

Sorghum and corn producers can use several management strategies to reduce the likelihood of chinch bug problems during dry years.

- A. **Substitute another crop for winter wheat.** Broad-leaved substitutes are safest, such as alfalfa, soybeans, or sunflowers. If this is not possible, try to plant wheat away from where sorghum or corn will be planted next year. Consolidation of small fields into larger ones will result in fewer borders that will be adjacent to susceptible crops.

**B. If you must grow wheat, use optimal management practices, including:**

1. If possible, plant between Sept. 25 and Oct. 1. University tests show significant yield losses every day planting is delayed after Oct. 9. If planting before fly-free dates for the Hessian fly (approximately Sept. 25 for much of southeast Nebraska), use a variety resistant to this pest.
2. Use a moderate to heavy seeding rate of viable seeds. In eastern Nebraska, optimal seeding rates are 50-60 pounds per acre, although heavier rates (up to 80 pounds per acre) may be planted if moisture is adequate. Even though a thin wheat stand will tiller in the spring and fill in, a heavier plant density is less attractive to chinch bugs when they move into wheat in early April.
3. Use the best and most fertile fields possible for wheat production, and do not reduce fertilizer use below recommended levels. Grow another crop in fields that consistently produce a poor wheat crop.
4. Do not plant susceptible grass crops (sorghum, corn, sorghum-sudangrass, millet) into recently harvested wheat fields unless several weeks have passed after harvesting.
5. In areas where chinch bugs have been a problem, wheat should not be grown as a winter cover crop, torn up in the spring, and planted to a susceptible crop like sorghum or corn. There is a good chance that the torn-up wheat, thinned and stressed, will be very attractive to migrating chinch bugs. A legume would make a safer cover crop.

The wheat field that is least likely to be attractive to chinch bugs during their spring migration is the one with the thickest, healthiest stand. Any practices or conditions resulting in a "thin" stand will make the field more attractive to chinch bugs. Be sure to control volunteer wheat that has germinated in last year's wheat field before the spring migration, especially if the intent is to plant sorghum or corn directly into the wheat stubble. Destroying volunteer wheat in late summer or fall will reduce the attraction to chinch bugs in those fields the next season. Wheat grown for forage is just as susceptible to chinch bug attack as that grown for grain. Also, cattle grazing in wheat fields may reduce the stand or thin the canopy and make it more attractive to chinch bug infestations.

**C. If wheat is infested, plant a broad-leaved crop (soybeans, alfalfa, sunflowers) instead of sorghum or corn in adjacent fields.**

A 100-ft. border of soybeans may not be enough to deter chinch bugs from finding the sorghum on

the other side. A separation of at least 1/4 mile between infested wheat and sorghum is suggested. Corn seems to be a little more tolerant to chinch bug injury than sorghum. Tolerance in sorghum increases with the size of the plant so planting sorghum early may help the plants tolerate damage.

**D. Relying on insecticides to control chinch bugs may not be satisfactory.**

Suggested insecticides for chinch bug control are listed in UNL Department of Entomology's Web site at <http://entomology.unl.edu>.

Growers often are dissatisfied with insecticides as chinch bug controls. One reason is that pesticides labeled for chinch bug control have relatively short residual activity, and a single application may not be satisfactory. However, in emergency situations, the following chemical control strategies may be used:

1. When planting sorghum or corn, apply a systemic insecticide into the seed furrow or a seed treatment insecticide such as Cruiser, Gaucho or Poncho (corn only) in the first 50 rows nearest the small grain field. The insecticide will be taken up into the plant and may protect the plant from chinch bugs. However, large numbers of chinch bugs may overwhelm this type of insecticide treatment. Be aware that there will be only about three to four weeks of protection after planting. Therefore, if chinch bugs move into the field after this time, plants will not be protected.
2. Several insecticides can be sprayed in the borders of sorghum or corn fields for chinch bug control. When nymphs begin moving from small grain fields, be prepared to make several insecticide applications to the rows nearest the small grain. Make the multiple applications far enough into the field so the infested plants, plus a few extra rows, are treated. It takes a week or more for chinch bugs to invade a sorghum or corn field, and none of these recommended chemicals are active more than two or three days. Foliar insecticide applications for second generation chinch bug nymphs may be needed in July or August, but larger corn or sorghum plants are more resistant to chinch bug attack. Be sure to follow all insecticide label directions for dosage rates and restrictions concerning frequency and number of applications.

For best control with sprays, use at least 40 gallons of water per acre directed to the base of the plants and a band of soil 6 inches wide. Sprays must contact the bugs to kill them. Since many of the bugs are hidden in the soil or behind the leaf sheaths, broadcast applications may not be effective. Drop and swivel nozzles are necessary to get the spray to the lower portion of the plant and surrounding soil. Hollow cone nozzle tips are preferable to flat fan tips for spraying foliage. If flat fan tips are used, turn them so that

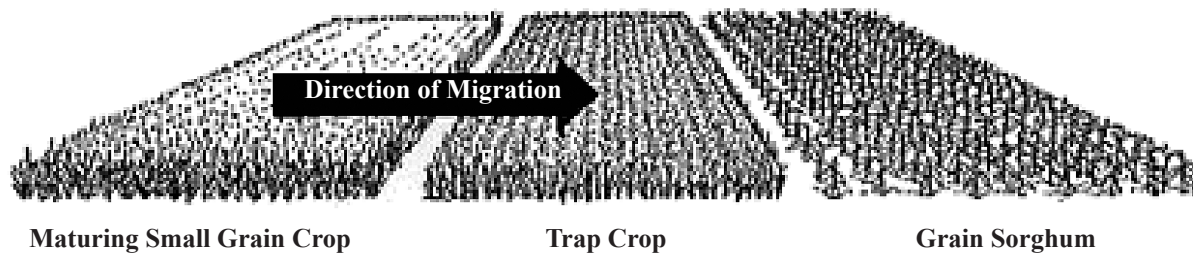


Figure 3. Placement of sorghum-sudangrass trap crop to intercept chinch bug migration.

the spray fan is aligned parallel to the row, directly on the middle and lower portion of the plant. This will reduce the amount of spray applied to the soil surface between rows. Control will be most effective if the insecticide is applied when the bugs are out in the open. The time of day when most of the bugs are active will depend on temperature and amount of sunshine. In the summer, better control is usually obtained before 10 a.m. and after 6 p.m., or following rainfall. The amount of control obtained by using these methods may not exceed 50 percent, especially when only small amounts of solution are used or with broadcast sprays.

3. Another method of insecticide application is to apply a granular systemic insecticide to the base of plants at cultivation and cover with 1 to 2 inches of soil.
- E. **Some farmers have reported good success in preventing damage from migrating chinch bugs by using a trap crop.**

Forage sorghum or sorghum-sudangrass hybrids can be drilled thickly between the infested small grain and the area to be planted to sorghum or corn (Figure 3). Width of the trap crop should be at least 25 to 30 feet. Plant trap crops two to three weeks before normal planting time for the sorghum or corn. When chinch bugs begin moving from the small grain into the trap crop, apply an insecticide to the trap crop at regular intervals as long as the migration continues. Follow label directions for dosage rates and restrictions concerning frequency and number of applications. It is essential to closely monitor chinch bug movement to be able to stop the migration before the bugs move out of the trap crop.

#### Acknowledgment

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