

Insects That Attack Seeds and Seedlings of Field Crops

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This NebGuide discusses how to identify and control eight insects that feed on planted seeds and seedlings.

Planted seeds of field crops can attract several kinds of insects. In many cases, the insects do not cause enough damage to justify control procedures. However, under some conditions seed pests may be very destructive. Seed that is slow to germinate and establish is more likely to be damaged. Situations such as first-year crops following sod or pasture, ecofallow, or reduced tillage/heavy crop residue conditions have a good chance for seed/seedling damage. Consider grower experience and past pest problems when deciding about individual fields.

This NebGuide describes eight insect pests which may attack seeds and seedlings of Nebraska field crops.

Seedcorn Beetles

Seedcorn beetles (*Figure 1*) are brown or blackish-brown and about 1/3 inch in length. They cause damage by feeding on the seed in the soil, damaging the seed so it doesn't sprout.

Slender seedcorn beetles (*Figure 2*) are uniform chestnut brown or reddish brown and are slightly longer, but narrower than the seedcorn beetle. Damaged seed often does not sprout.

Both types of seedcorn beetles belong to the same family of insects, Carabidae (ground beetles). Most other species of ground beetles are beneficial because they feed on other insects.

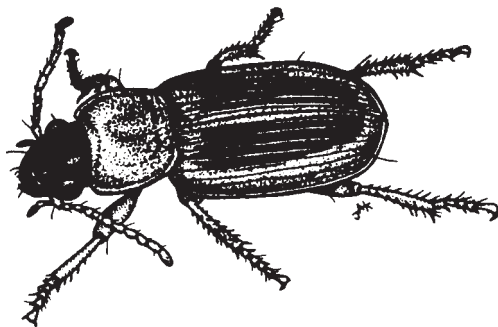


Figure 1. Seedcorn Beetle (7x)

Seedcorn beetles overwinter as adults or pupae. The adults walk over the soil surface and crawl into cracks in the soil. Damage occurs when beetles feed on the seed and destroy the germ, resulting in an uneven stand. Slow or poor germination as a result of cool, wet or dry soil conditions after planting increases the probability of damage. The use of quality seed and a registered planter box insecticide seed treatment are recommended to ensure satisfactory germination and reduce the likelihood of damage caused by these insects.

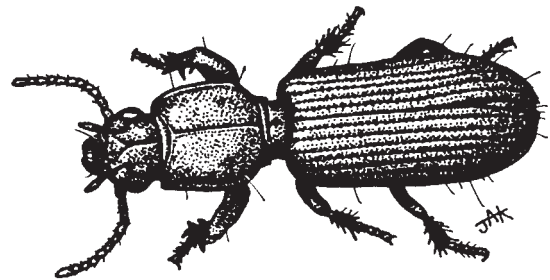


Figure 2. Slender Seedcorn Beetle (9.5x)

Seedcorn Maggot

Seedcorn maggots (*Figure 3*) are dirty, yellowish-white legless larvae about 1/4-inch long. They are blunt at the posterior end and tapered sharply to the head. They burrow into and around all types of seeds in the soil, causing seeds to fail to sprout or to produce weak seedlings. The maggot (larva) overwinters inside a dark brown puparium in the soil that resembles a dark wheat seed.

Adults resemble small house flies. They are gray to light brown and about 1/4-inch long. In April and May they may be seen hovering over freshly worked soil. Adults may be more readily attracted to fields with an abundance of decaying organic matter (i.e., newly plowed or destroyed small grain or heavy applications of manure). The life cycle (egg through adult) is about three weeks. There are three to five generations each year. Later generations are of little economic importance.

Illustrations of insects are magnified to better show detail; the level of magnification is indicated by the number in the caption.

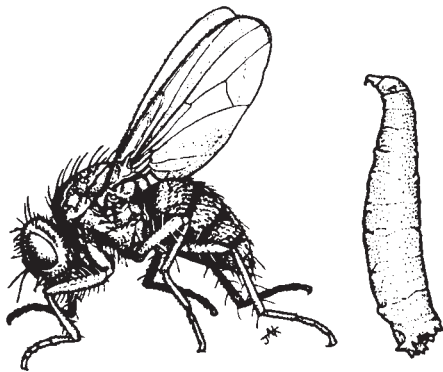


Figure 3. Seedcorn Maggot Adult and Larva (4x)

Any condition that delays seed germination may increase damage from this pest. Use quality seed and a registered planter box insecticide seed treatment to ensure satisfactory germination and to reduce the likelihood of damage.

Thief Ant

Thief ants (Figure 4) are extremely small orangish-brown ants just over 1/16 inch long. They damage seeds by eating the starch portion of the kernel.

You may find starch grains scattered in the soil around the seed or the interior portions of the seed will be hollowed out. Affected seedlings often appear weak and sickly in appearance. Use quality seed and a registered planter box insecticide seed treatment to ensure satisfactory germination and to reduce the likelihood of damage from this insect.

Wireworms

Wireworms (Figure 5) are slick, shiny, brown to reddish-brown, smooth, hard-shelled, six-legged, 1 to 1-1/2 inch long larvae.

Wireworms are among the most difficult insects to control and may be very destructive by feeding on both seeds and seedlings. Planter box insecticide seed treatments will reduce damage to the seeds, but will not protect seedlings. Wireworms feed on the seeds and roots of corn, sorghum, small grains, grasses, soybeans, dry beans, sugarbeets, potatoes, and various other root crops. Wireworm feeding may reduce seed germination or produce weak seedlings. Wireworms eat the germ

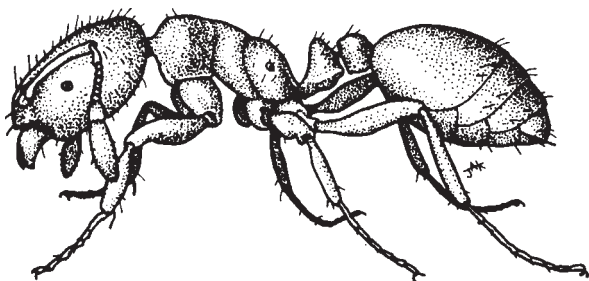


Figure 4. Thief Ant (40x)

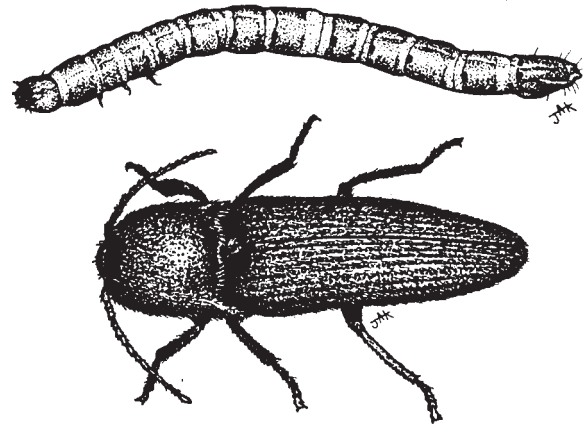


Figure 5. Wireworm and Adult Click Beetle (3.5x)

of the seeds or hollow them out completely, leaving only the seed coat. Crop emergence may be poor or appear normal in the beginning. Later the stand becomes thin or patchy. Larvae boring into the lower portion of the stem cause seedlings to dry up and die. Later in the season, wireworms will feed on plant roots and may damage developing potato tubers.

These insects may spend the winter as adults or larvae. Adults are about 1/4 to 3/4 inch long, hard shelled, brown to nearly black with a streamlined body (tapering toward the end). The adults are called click beetles because when they are on their backs, they will flip up and turn over with a clicking noise. Adults can live 10-12 months. Larvae live from two to six years in the soil feeding primarily on roots. The females lay their eggs mostly around the roots of grasses. Therefore, there is a high probability that first year row crops following sod, small grains, or weedy alfalfa will be attacked by wireworms. Thorough scouting of these fields is important.

Bait Stations

Bait stations (Figure 6) may be used to assess levels of wireworms before planting. The bait consists of germinating corn and wheat seeds. Substances produced by the seedlings attract the wireworms to the bait.

Bait stations should be set up two to four weeks before the planned planting date. They should be placed randomly throughout the field at a rate of one station per acre. If this rate

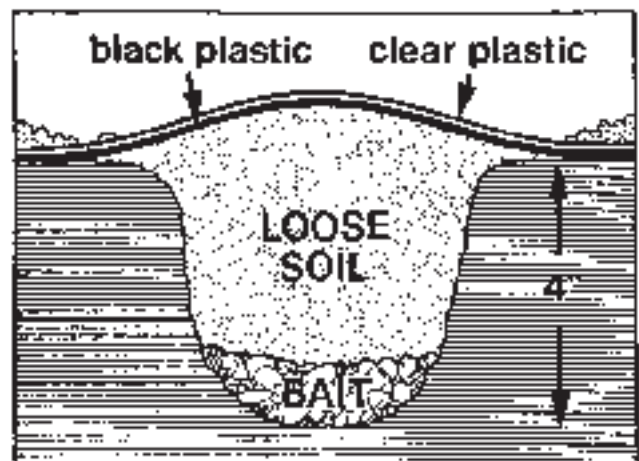


Figure 6. Wireworm Bait Station

is not practical in large fields, use a minimum of 10 stations per field. Be sure to place stations in different parts of the field (areas with different rotational histories, soil types, low or high spots, etc.) to obtain a representative sample.

Bait Station Construction

1. Use a 1/2 cup mixture of untreated wheat and untreated shelled corn for each station.

2. Dig a hole and bury the bait about four inches deep. Cover the bait with loosely packed soil, and cover the soil with 18-inch square pieces of black and transparent plastic anchored on the edges with soil.

The plastic helps heat the soil with sunlight and speeds seed germination.

3. Mark each station with a flag or stake.

4. In 10 to 14 days, dig up the stations and count the number of wireworms.

If you find an average of one or more wireworms per bait station, use an in-furrow application of a labelled soil insecticide, plus a planter box seed treatment. Follow all pesticide label directions concerning placement and application rate to avoid phytotoxicity problems. If wireworms are present in only part of the field, it may be possible to treat only the infested portion. If wireworms are present at low levels (less than one per station), a planter box seed treatment alone should be sufficient to prevent serious damage.

White Grubs

White grubs (Figure 7) are C-shaped, six-legged larvae (grubs) that are from 1/2 to more than an inch long, with large brown heads and distinct jaws.

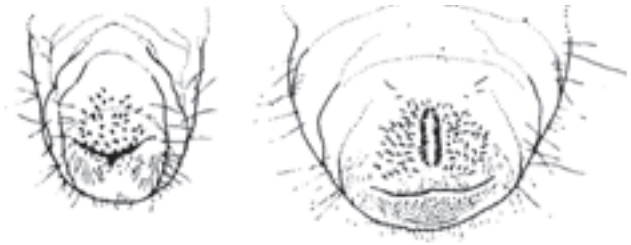
After planting, the seeds sprout and plants emerge more or less normally. If the soil is moderately to heavily infested with white grubs, the plants stop growing and dry up after reaching eight to 10 inches in height. Roots are usually chewed off clean and not tunneled. Injury is usually more severe to row crops after sod or grassy weeds.

The different species of white grubs can have life cycles of one, two, three, or four years. *Phyllophaga* spp. grubs usually have a three-year life cycle and are the most damaging. The Masked chafers (*Cyclocephala* spp.) have a one-year life cycle and are less likely to cause economic damage to crops. Because of the differences in their life cycles and damage potentials, it is important to know which species is present. The pattern of hairs or spines on the underside of the last abdominal segments is the best way to distinguish between *Phyllophaga* and *Cyclocephala* grubs (Figure 8).

Phyllophaga spp. Grubs (three-year life cycle): Pearly white eggs are laid by the brown to brownish-black May or June beetle female in July. The eggs are laid one or more inches below the soil surface in sod or patches of grassy weeds in cropland areas. Weed-free stands of clover or alfalfa and clean



Figure 7. White Grub (2x)



Annual White Grub
(*Cyclocephala* spp.)

Three-Year White Grub
(*Phyllophaga* sp.)

Figure 8. White grub identification according to hair patterns at the tip of the abdomen.

cultivated row crops are not likely to be infested. C-shaped larvae or grubs hatch from the eggs in two to three weeks. These young grubs feed on the roots and other underground parts of the plant throughout the growing season. During the first year, the damage to infested crops is usually minimal. In the fall, they move down in the soil, usually below the frost line, to spend the winter. As the soil warms up the following spring, they move up in the soil and again resume feeding on new plant roots. During the second summer their feeding damage is most severe. They become nearly full-grown during this summer. In the fall, they again move down in the soil for the winter. The next spring they move up near the surface, feed for a short time, pupate and change into the adult beetle. The adults then emerge from the soil and start the cycle over.

Masked chafers or annual white grubs (one-year life cycle) have pearly white eggs laid by the tan June beetle female in July. The larvae that hatch from these eggs are also C-shaped and feed on the roots of plants for the remainder of the summer. By late July or August most plants have enough root mass that insect feeding does little damage. In the fall, these larvae also move down in the soil for the winter. In the spring they return to the soil surface, pupate and emerge as adults the following June or July. These larvae feed very little in the spring, and are rarely present in high enough numbers to justify treatment.

Corn Root Aphids and Cornfield Ants

Corn root aphids (Figure 9) are light bluish-green and found on the corn roots. They often are accompanied by the small, brown **Cornfield ant** (Figure 10). The ants construct cone-shaped mounds of soil. They tunnel in the soil along

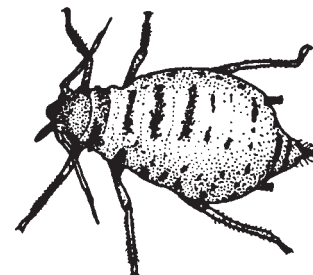


Figure 9. Corn Root Aphid (16x)

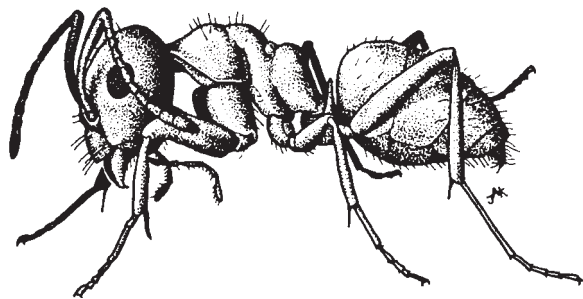


Figure 10. Cornfield Ant (*Lasius alienus*) (23x)

the corn roots, sometimes feeding on the starch portion of the kernel before it germinates.

A corn plant infested with corn root aphids usually germinates and starts growing normally. When the plant reaches 4 to 10 inches in height it becomes stressed in appearance, dries and dies. An examination of the infested area usually will reveal many small ant hills around the dead corn plants. Clinging to the roots of any remaining live plants will be many bluish-green aphids and usually some ants.

Corn root aphids only exist with the help of the cornfield ant. The aphids overwinter as eggs in the nests of cornfield ants. The eggs hatch about the time that small smartweed plants begin to grow in the spring. The ants carry the young aphids

to the roots of smartweed, corn, and other grasses where they feed and mature. There can be as many as 16 generations of corn root aphids per season.

Corn grown in lighter, sandy soils often has an increased likelihood of problems with corn root aphids. Soil insecticide treatments used for corn rootworm control effectively control corn field ants and corn root aphids.

Additional Information

For control recommendations, refer to the current year's issue of EC1509, *Insect Management Guide for Nebraska Corn and Sorghum*, EC1511, *Insect Management Guide for Alfalfa, Soybeans, Wheat, Range and Pasture*, and EC1537, *Insect Management Guide for Sugarbeets, Dry Beans, Sunflowers, Vetch, Potatoes and Onions*, available at your local University of Nebraska–Lincoln Extension office.

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