

CEREAL LEAF BEETLE

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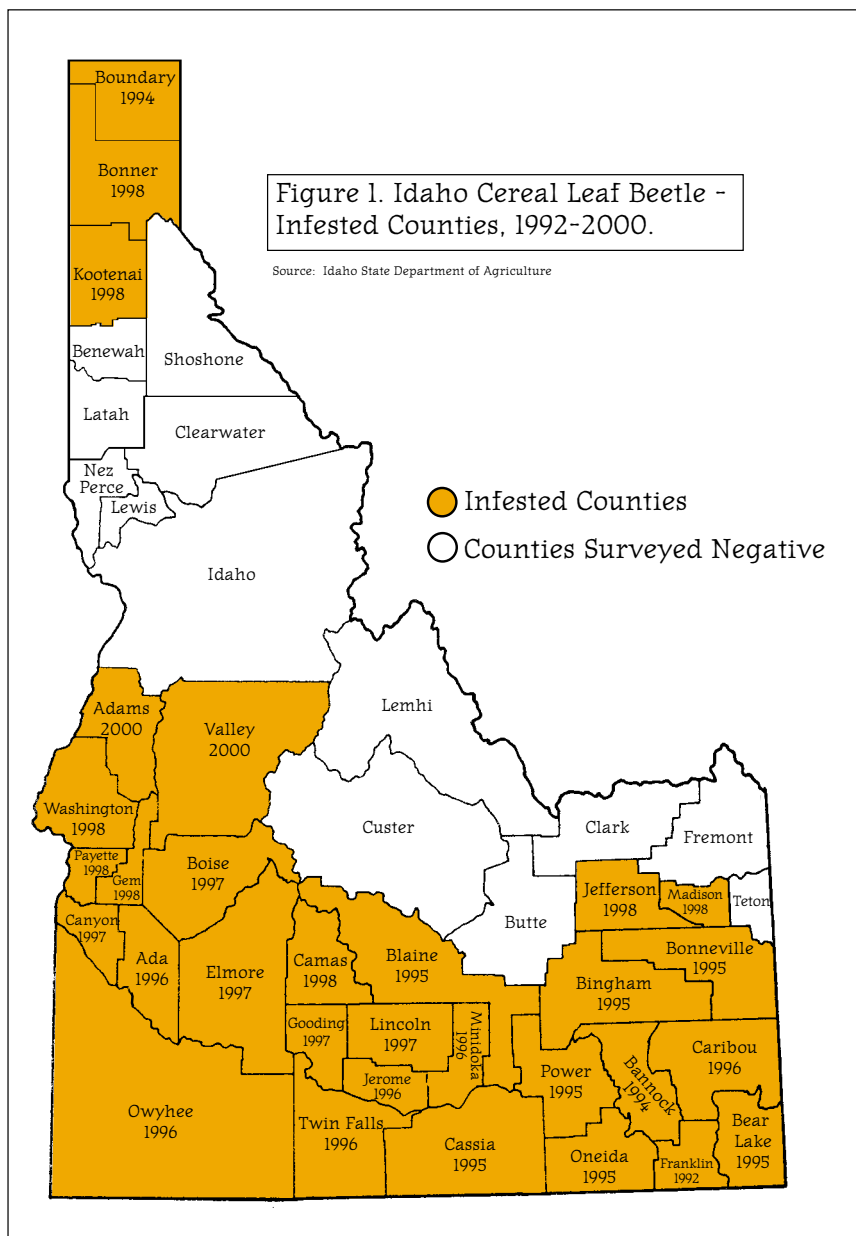
History and spread

The cereal leaf beetle, *Oulema melanopus*, has been recognized as a pest of small grains in Europe since 1737. It was first identified in the United States in 1962 in Berrien County, Michigan. Since then it has spread to many states in the eastern and midwestern United States and parts of eastern and western Canada.

This insect first appeared in Idaho in Franklin County in 1992. Infestations now occur in 29 counties in Idaho (figure 1); the northern half of Utah; parts of Montana; Malheur, Baker, Umatilla, Union, Columbia, Multnomah, Washington, and Yamhill counties in Oregon; Spokane County, Washington; Elko County, Nevada; and parts of British Columbia.

Host plants

The cereal leaf beetle feeds on oats, barley, wheat, rye, and corn as well as on weeds such as wild oat and quackgrass. It also feeds on forage grasses, such as timothy, ryegrass, orchardgrass, and reed canarygrass. Its preferred hosts are spring-seeded small grains—especially oats and barley.



Cereal Leaf Beetle

Description

Adults. The adult beetle is small but easy to identify. It is a hard-shelled beetle, 1/4- to 3/16-inch long, with a metallic blue head and wing covers, a red pronotum, and yellowish-orange legs (figure 2).

Eggs. Newly laid eggs are elliptical, yellow, and about the size of a pinhead (less than 1/16-inch long). Before hatching, they turn almost black. Eggs are laid on their sides rather than on their ends. They are never laid in clusters but are deposited singly or in rows of up to three or four. Normally they are found close to the mid-rib on the upper surface of the host plant leaf (figure 3).

Larvae. Mature larvae are slightly larger than adults and look much like slugs. Their skin is yellow or yellowish brown and is covered by a mass of slimy, dark fecal material (figure 4). This fecal deposit is thought to protect the larvae from desiccation and predators. It also appears to attract some of the beetle's host-specific parasites. Immediately after a molt is the only time larvae are found without this excrement. Disturbed larvae easily cast off this fecal covering. Field workers' shoes, pants, and shirts often become

covered with this slimy material when they are working in an infested field.

Pupae. Pupae are yellow to yellowish brown. They are rarely seen because they are under the soil surface encased in earthen cells.

Life cycle and damage

Cereal leaf beetles overwinter as adults in grass stems and debris, under bark, and in the crowns of grasses. In some areas, the beetles survive in

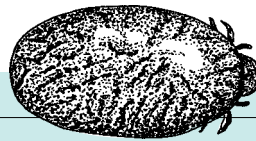
woody or brushy locations, especially areas adjacent to infested fields. They have also been found under the siding of homes and farm buildings and behind fence boards.

In the spring, when maximum daily temperatures reach about 50°F, the overwintered adults become active. Full adult activity (mating and flight) occurs when temperatures reach about 66°F. Adults are active fliers and move around in search of acceptable host plants. Heavy feeders, they consume up to 3.5 times their body weight in a single day as they prepare for egg laying, but rarely cause economic damage.

The adults mate and begin to lay eggs on host plant leaves within 10 days of breaking diapause. One female may lay up to 300 eggs.

Eggs take from 4 to 23 days to hatch, depending on temperature. Larval populations peak in early summer (mid to late June) depending on altitude and temperature. With a warm, early spring, these populations may peak up to 1 month early.

Larvae eat the upper layer of green mesophyll cells, which create the green leaf color and generate plant energy. They feed down to the cuticle, staying between leaf veins. This feeding pattern



Economic thresholds for chemical control

Before Boot

3 larvae per plant *or*
3 eggs per plant *or*
both

After Boot

1 larva per flag leaf

ADULT



Figure 2. Adults are hard-shelled beetles with metallic blue head and wing covers, red pronotum, and yellowish orange legs.

EGG



Figure 3. Cereal leaf beetle eggs, typically one per leaf, rest on their sides rather than on their ends.

LARVA

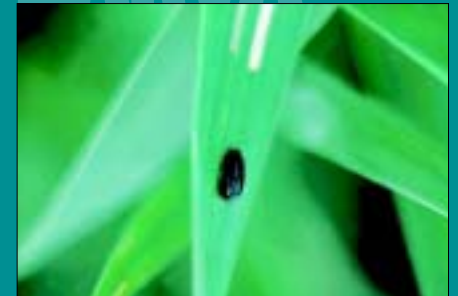


Figure 4. Larvae normally are covered in a mass of slimy, dark feces.

Cereal Leaf Beetle

gives the leaves a frosted appearance when viewed from a distance (figure 5). This feeding pattern is characteristic of the cereal leaf beetle and is one way of detecting its presence. This pattern can also be detected late in the season on old, brown, dried-up leaves.

After 10 to 14 days and three to four instars, the mature larvae pupate in small, hardened, mucous-lined cells they construct in the soil. The pupal stage requires from 10 to 21 days, depending on environmental conditions.

Newly emerged adults feed on a variety of material, but prefer succulent grasses, grain, and young corn. Even though their numbers can reach several hundred per plant, newly emerged adults rarely cause economic damage because they feed for such a short time.

Adults feed entirely through the leaf surface. They eat between the leaf veins, staying in a straight line. This produces a stripping effect instead of the frosted appearance created by larvae (figure 6).

Toward fall, after about two weeks of feeding, adults go into a resting stage, or diapause. They seek shelter and become quiescent until the following spring. The cereal leaf beetle has only one generation per year.

Quarantines

California has imposed quarantines on products from the infested areas to prevent this insect from spreading. Current quarantines involve barley and wheat hays and grains. Clean alfalfa hay is exempt. Please consult the Idaho State Department of Agriculture or the University of Idaho extension agricultural educator in your county to determine the current quarantine status.

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Control recommendations

Cultural control practices that successfully reduce populations of cereal leaf beetle have not been identified.

The economic threshold for chemical control is based on insect population densities and growth stage of the grain crop:

Before boot stage. Prior to boot stage, do not spray cereal crops unless populations reach an average of three larvae per plant, three eggs per plant, or both. When counting, be certain to inspect all the tillers in each plant. It is best to walk a wide circle through the field, taking 10 to 20 sample counts to ensure accuracy.

After boot stage. After boot stage, the economic threshold becomes one larva per flag leaf. If control is required, consult the current edition of the *Pacific Northwest Insect Management Handbook* for specific recommendations.

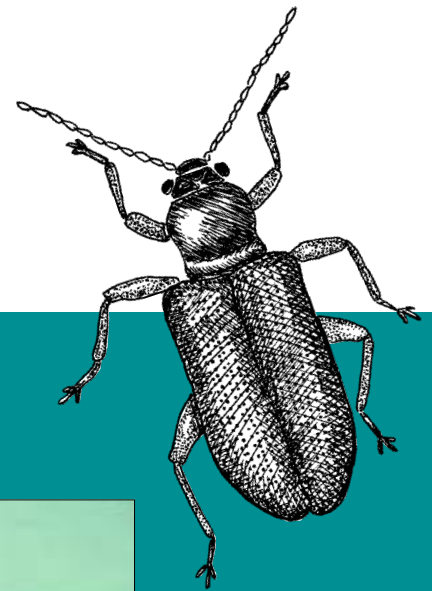


Figure 5. Heavy larval feeding gives the leaves a frosted appearance.



Figure 6. Adults feed through the leaf surface, between leaf veins, producing a stripping effect.

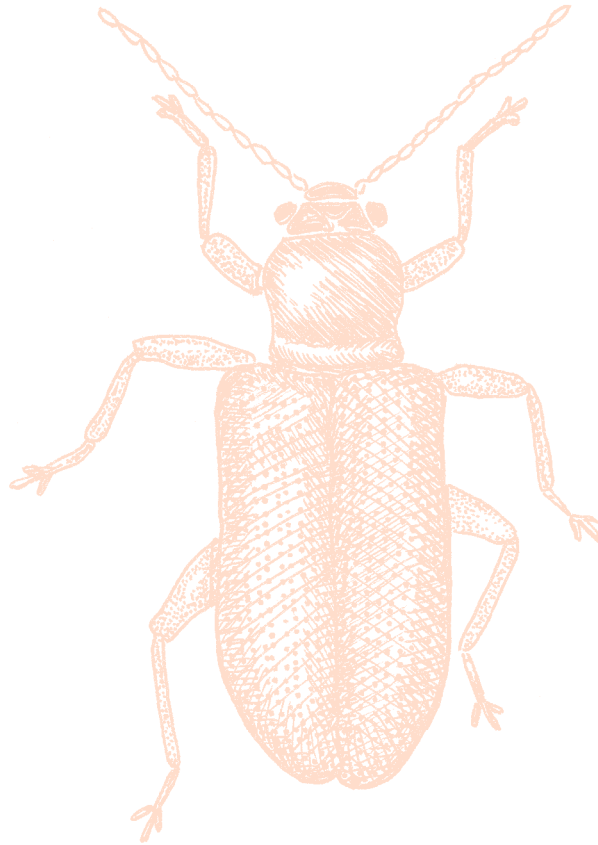
Biological control

A concentrated effort by state and federal agencies the past several years has produced a successful parasite introduction program in the midwestern and eastern United States. Several species of parasitic wasp have been used in this biological control program. The species *Tetrastichus julus* has been the most successful at becoming established where it has been released. Once established, this parasite typically reduces beetle populations by about 60 percent and grain losses to less than 1 percent without chemical control.

Studies show that 30 to 40 percent parasitism results in a controlling population. Populations of cereal leaf beetle usually disappear soon after this level is reached.

Presently the USDA, Idaho State Department of Agriculture, and University of Idaho are working together to establish parasite populations in Idaho. Egg and larval parasite releases have been made in several counties. Egg parasites have proven to be very difficult to establish. Larval parasites have been recovered from several release sites. Complete introduction and establishment of the parasites will take several years.

Even with the establishment of parasites the cereal leaf beetle continues to spread to new areas. In areas where the parasites have been recently introduced, chemical spraying should be limited to protect the growing parasite population. Limited spraying may be necessary for three to five years while parasites build up in the new beetle population and reduce it to a level that does not seriously affect yields.



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Copies of the annually revised *Pacific Northwest Insect Management Handbook* are available by contacting Ag Publications, University of Idaho, P.O. Box 442240, Moscow, ID 83844-2240; telephone (208) 885-7982; email cking@uidaho.edu; Web site <http://info.ag.uidaho.edu>

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