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### High level of cereal leaf beetle incidence in Choteau, MT *(Cropland Insects)*

**Description:** High incidence of cereal leaf beetle was noticed at several locations in Choteau County. Traditionally this pest has been considered as an economic pest of spring seed cereal crops such as in wheat, barley and oats since 1999. Please refer the MontGuide and other attached documents to know about the cereal leaf beetle biology, ecology, thresholds and management guidelines.

**Alert Period:** 06/12/2017 - 07/31/2017

**Submitted By:** Gadi V.P. Reddy

**Alert Documents:**   

### The art in the science: demystifying plant diagnoses *(General)*

**Description:** Some mindful wanderings about how we approach diagnostics in this agalert, attempting to demystify the process. Thanks to the recent text message diagnosis clients, I snagged your photos as examples! --Mary Burrows, 599-9966; [mburrows@montana.edu](mailto:mburrows@montana.edu); @MontanaCropDoc

**Alert Period:** 06/07/2017 - 07/26/2017

**Submitted By:** mary burrows

**Alert Documents:** 

### A heads up on Fusarium head blight in wheat and barley *(General)*

**Description:** Attached is some info on Fusarium head blight, or scab, of wheat and barley. This disease infects during the flowering period when relative humidity is high and temperatures are favorable. Some weather stations in NE Montana have been added to the NDAWN network for disease forecasting, the link is in this alert. --Mary Burrows, 599-9966,

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Monday, June 12, 2017

## High level of cereal leaf beetle incidence in Choteau, MT

Gadi V.P. Reddy and Govinda Shrestha

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In Montana, cereal leaf beetle, *Oulema melanopus* (Coleoptera: Chrysomelidae) has been considered as an economic pest of spring seed cereal crops such as in wheat, barley and oats since 1999. Within the last four years (2014-2017), several growers and extension agents from Golden Triangle area have been repeatedly reporting higher incidence of cereal leaf beetles in cereal crops. Brent Roeder (extension agent, Teton County) mentioned that this year and last year, about 40 and 10 Fairfield malt barely growers' sprayed insecticide to manage cereal leaf beetle, respectively.

Cereal leaf beetle is widely distributed in several areas of the North American wheat belt, particularly in Montana, North Dakota, and adjacent areas of the Canadian prairie-provinces. In Montana, it has been known to present since 1989. According to Blodgett et al. (2004), cereal leaf beetle has been considered as a serious pest of cereal crops in several counties of Montana from 1998. This pest has a broad host range such as barley, wheat, oats, and rye, where the larvae can cause serious damage (Wanner and O'Neill, 2016). The larvae are the significant damaging stage and feed largely on the upper surface of tender new leaves, scraping the leaf tissue without chewing all the way through the leaf. Adults overwinter in the debris and fallen leaves. In the spring, female adults lay eggs in grain fields.



**Figure-1: Cereal leaf beetle adult, *Oulema melanopus*** (Photo credit: WTARC)

For thresholds, chemical control and other management option, please refer to MontGuide.

### References

Blodgett, S., Tharp, S., Kephart, K., 2004. Cereal leaf beetle. Montana State University, Extension Service, Montguide, MT200406 AG, 11/04.

Wanner, K., O'Neill, R., 2016. Cereal Leaf Beetle. MontGuide, Montana State University, MT201604AG New 2/16.



# Cereal Leaf Beetle

**Cereal leaf beetle larvae are severe recurrent pests of wheat and other small grains, impacting yield and grain quality.**

by Kevin Wanner, Associate Professor, Plant Sciences and Plant Pathology, and Ruth O'Neill, Research Associate, Plant Sciences and Plant Pathology

**Species name:** *Oulema melanopus* (L.) (Coleoptera: Chrysomelidae)

**Appearance:** Adults ( $\approx 3/16$ " long) have shiny, metallic dark green wing covers and dark heads, long bead-like antennae, red legs, and red thoraxes (region behind the head) (Figure 1). Larvae ( $\approx 3/16$ " long) have a slug-like appearance due to a shiny, wet droplet of mucous and fecal pellets coating the body (Figure 2A).

**Host range:** The cereal leaf beetle has a broad host range, including barley, wheat, oats, and rye, where the larvae can cause serious damage. Adults are found feeding on small grains, corn, and sorghum but do not cause significant damage. Adult beetles are also found on many grassy weeds, including wild oats, quackgrass, timothy, canary grass, reed canary grass, annual and perennial ryegrass, foxtail, orchard grass, wild rye, smooth brome, and fescues.

**Geographic range:** A native of Eurasia, cereal leaf beetle first appeared in the mid-western U.S. in the 1960s and has since spread throughout much of the U.S. Cereal leaf beetle is now well established in several areas of the North American wheat belt, particularly in Montana, North Dakota, and adjacent areas of the Canadian prairie-provinces.

**Damage:** The larvae are the important damaging stage. Larvae feed mainly on the upper surface of tender new leaves, scraping the leaf tissue away in long, narrow, parallel strips without chewing all the way through the leaf. Feeding causes white streaks on the leaves (Figure 2B). As a result, photosynthesis is reduced. Severely damaged fields appear frosted. Adults feed on the leaves of young plants early in the spring, but damage is light (Figure 3).

**Not to be confused with:** Collops beetles are beneficial predators on soft-bodied pests such as aphids and caterpillars. Adult collops beetles are similar in size and appearance to cereal leaf beetles, and are easily confused with them. Like cereal leaf beetles, they have long antennae, metallic green wing covers, and red abdomens and thoraxes. Collops beetles differ in having shorter wing covers than cereal leaf beetles exposing the tip of the red abdomen, and their legs are not red. A common species in Montana is the two-spotted melyrid, *Collops bipunctatus*, which has a thorax marked with two black spots. The larvae of collops beetles are predatory like the adults, and they look nothing like cereal leaf beetle larvae.

**Life cycle:** There is one generation per year. The adult beetles overwinter in crop stubble and other protected areas in or around fields. Early in the spring after mating, female beetles lay one or several yellow eggs on the upper sides of leaves, often in the mid-fold; females lay eggs (Figure 3) for up to two months after mating. Larvae hatch and begin feeding from mid-May to June in winter wheat while in spring wheat larvae appear somewhat later, beginning in mid-June. Fully developed larvae drop from the plants and burrow one or two inches into the soil to pupate, with adults emerging about two weeks later.

**Management:** There are several species of beneficial insects including tiny chalcid wasps, some introduced intentionally from Europe, that attack either the eggs or larvae of the cereal leaf beetle. *Tetrastichus julis*, an internal parasite of cereal leaf beetle larvae, is now well established in several western states and can kill a substantial number of cereal leaf beetle larvae. Certain cultural practices have important effects on local

**FIGURE 1.** Adult cereal leaf beetle has a red thorax, red legs, dark head and metallic green wing covers.



**FIGURE 2.** A) Cereal leaf beetle larvae coat themselves with a droplet of mucous and fecal pellets; B) Feeding causes parallel white streaks on leaves.





**FIGURE 3.** Adult chewing damage and eggs.

**FIGURE 4.** Look-alike collops beetles are beneficial predators in wheat and other crops.

**FIGURE 5.** *Tetrastichus julius* larvae are internal parasites of the cereal leaf beetle.

parasitoid establishment and success. Plowing and disking of fields is damaging to parasitoid pupae, although some areas have successfully maintained established populations in spite of cultivation. Plants with multiple small flowers can be provided along field edges and waterways, providing an important nectar source for adult parasitoid wasps. Pesticide applications can depress parasitoid activity dramatically.

***Economic threshold for insecticide application***

The boot stage is important for developing cereal crop yield and quality, and the economic threshold for cereal leaf beetle damage depends on the plant stage. Feeding damage to young plants by the larvae has a negative effect on plant vigor. At the boot stage however, larval feeding is concentrated on the on the flag leaf, and this damage can directly impact grain yield and quality.

- Before the boot stage the threshold for insecticide application is three eggs and/or larvae per small plant and three eggs and/or larvae or more per stem/tiller of larger plants.
- After the boot stage the threshold for insecticide application is one or more larvae per flag leaf.

Examine 10 plants in one location and select one location for every 10 acres of field. Before the boot stage calculate the average number of eggs and/or larvae found per small plant or per single stem/tiller of larger plants. After the boot stage calculate the average number of larvae per flag leaf.

***Additional resources***

High Plains IPM Guide

[http://wiki.bugwood.org/HPIPIM:Cereal\\_Leaf\\_Beetle](http://wiki.bugwood.org/HPIPIM:Cereal_Leaf_Beetle)

Cereal leaf beetle adult feeding damage and eggs,  
[www.youtube.com/watch?v=OTJgO-zECKI](http://www.youtube.com/watch?v=OTJgO-zECKI)

Cereal leaf beetle adult feeding damage and mating adults,  
[www.youtube.com/watch?v=K0\\_QWXOWQ8o](http://www.youtube.com/watch?v=K0_QWXOWQ8o)

IMAGE CREDITS - 1. John Rosenfeld®; 2. A) Carmen Champagne, B) Mourad Louadfel, Bugwood.org; 3. Agriculture Canada; 4. Tom Murray; 5. Swaroop Kher, University of Alberta, Edmonton



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# Cereal Leaf Beetle

*Oulema melanopus* (L.) (Coleoptera: Chrysomelidae)

Phillip Glogoza, Extension Entomologist

The cereal leaf beetle (CLB) is an imported insect pest from Europe. It was first detected in Michigan in 1962, Utah in 1984, and Montana in 1989. Cereal leaf beetle was first detected in **Williams and McKenzie counties of North Dakota** in June 2000. The cereal leaf beetle can be a serious pest of wheat and barley. Both adults and larvae of the cereal leaf beetle damage grain crops by feeding on the leaves. The larvae are the most damaging stage and the target of control measures. Generally the CLB prefers newer plant tissue. Feeding typically occurs on the upper leaf surface and is characterized by elongated slits.

## DESCRIPTION



FIGURE 1. ADULT CLB.



FIGURE 2. ADULT FEEDING DAMAGE.

**Adult** — ¼ inch long with brightly colored orange-red thorax, yellow legs and metallic blue head and wing covers.

**Damage** — The first sign of CLB activity in the spring is adult feeding damage on the plant foliage. Adult injury is characterized by elongated, slender slits in the upper leaf surface.



FIGURE 3. CLB EGGS ON WHEAT LEAF.

**Eggs** — The eggs are laid end to end, singly or in groups of two or three on the upper leaf surface near the base of the leaf. Newly laid eggs are bright yellow, darkening to orange-brown and finally to black before they hatch. Egg hatch may take from four to 23 days depending on temperature.



FIGURE 4. CLB LARVA - WITHOUT COATING.



FIGURE 5. CLB LARVA - WITH SLIMY, BLACK COATING.



FIGURE 6. CLB LARVAL FEEDING.

**Larva** — The larva has a light yellow body with brown head and legs. They have three pairs of legs located close to the head end. The body is protected by a layer of slimy fecal material which makes them look like a slug. When working or walking in an infested field the slimy covering will rub off on your clothing. Although both adults and larvae cause feeding damage, the larvae are responsible for the majority of the damage. They feed on the leaf surface between veins, removing all the green material down to the lower cuticle, resulting in an elongated windowpane in the leaf. Severe feeding damage gives the field a frosted appearance.



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## HOST PLANTS

Cereal leaf beetle has a wide host range including the cultivated grass hosts barley, oats, wheat, and rye. Adults may feed on corn, sorghum and sudangrass. Beetles may feed on grass weeds including wild oats, quackgrass, timothy, canary grass, reed canary grass, annual and perennial ryegrass, foxtail, orchard grass, wild rye, smooth brome and fescues.

## MONITORING

In spring, inspect plant foliage for adult feeding injury, the first sign of CLB activity. While this is the first sign of infestation, it is CLB larvae that are the target of control. Eggs and larvae are monitored by inspecting individual plants. Thresholds are expressed as egg and larval numbers per plant or per stem. To determine infestation levels, examine 10 plants per location; select at least five locations in a field, more for larger fields. Count the number of eggs and larvae per plant (small plants) or per stem (larger plants) and determine an average number of eggs and larvae based on the samples you have taken.

Plant growth stage should be noted, because the treatment threshold changes with plant growth stage. Both eggs and larvae can be found by examining the upper leaf surface.

## ECONOMIC THRESHOLD

Cereal leaf beetle feeding damage can reduce yield and grain quality. The boot stage is a critical point in plant development. **Before boot stage**, the threshold is three eggs and larvae or more per plant, including all the tillers present before flag leaf emergence. Larval feeding during early growth stages can have a general impact on plant vigor. When the flag leaf emerges, feeding is generally restricted to the flag leaf. Damage to this leaf can significantly reduce grain yield and quality. **At the boot stage**, the threshold is one larvae or more per flag leaf.

## MANAGEMENT

### NATURAL CONTROL

Lady beetles prey on CLB larvae. Several imported parasitic insects attack CLB, but these parasites have not been determined to be present in North Dakota. The parasites imported from overseas and established in some areas of the U.S. include *Anaphes flavipes*, a wasp that parasitizes CLB eggs; *Tatrastichus julis*, *Diaparrsis carinifer*, and *Lemophagus curtus*, wasps that parasitize larvae; and, *Hyalomyodes triangulifer*, a tachinid fly that parasitizes adults. CLB have been reduced to a minor insect pest of small grain crops in areas where the parasites have been successfully established.

## INSECTICIDE

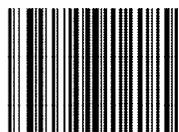
### REGISTERED INSECTICIDES FOR MANAGING CEREAL LEAF BEETLE

Insecticide	Rate (lb a.i./acre)	Rate (product/acre)	Notes
<b>FOR WHEAT, BARLEY, AND OATS</b>			
Furadan 4F <i>RUP</i>	0.25	0.5 pt	Applications must be made prior to the heads emerging from the boot. This is a 2 (ee) recommendation.
Lannate L <i>RUP</i>	0.225 - 0.45	0.75 - 1.5 pt	24 hrs to re-entry. 7 days to grain. 10 days to graze.
Malathion 5EC	0.6-1.25	1 - 2 pt	7 days to grain or graze
Malathion ULV	0.3-0.6	4 - 8 oz	7 days to grain. Most effective at temperatures over 70°F.
<b>WHEAT ONLY</b>			
Mustang <i>RUP</i>	0.022-0.05	1.9-4.3 oz	14 days to grain, forage, and hay. Do not apply more than 0.25 lb ai per season.
Sevin (XLR Plus, 4F, 4-Oil)	1.0	2 pt	21 days to grain. 0 days to feed.
Sevin 80S	1.0	1.25 pt	21 days to grain. 0 days to feed.
Warrior <i>RUP</i>	0.02-0.03	2.56 - 3.8 oz	30 days to grain. Do not apply more than 0.06 lb ai (7.68 oz) per season.

*RUP* - Restricted use pesticide

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For more information on this and other topics, see: [www.ag.ndsu.nodak.edu](http://www.ag.ndsu.nodak.edu)



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