Distribution, Biology, Impact, and Biological Control of Cereal Leaf Beetle in Oregon

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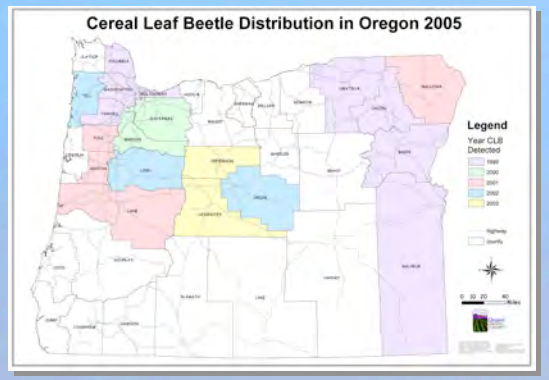
Introduction

Cereal leaf beetle (CLB) was first identified in Michigan in 1962 as an introduced pest from Europe. Since then it has spread to most states east of the Mississippi River. In 1986 it was found for the first time in the Western US near Salt Lake City, Utah. It quickly spread to the neighboring states of Wyoming, Montana, and Idaho. Oregon first found CLB in 1999, in Malheur County. CLB now infests 19 counties in Oregon.



Damage On Grain Crops - Take A Closer Look

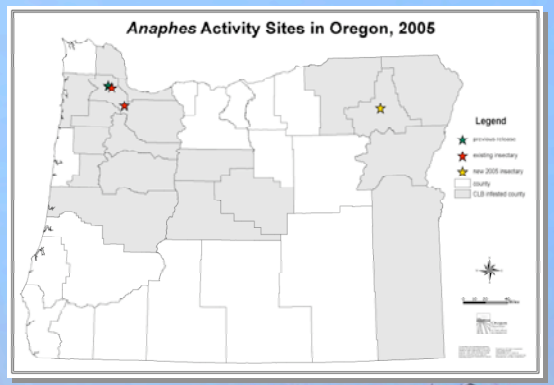
Adult damage on corn (above) and wheat or oats (right). Adults usually chew strips completely through the leaf.

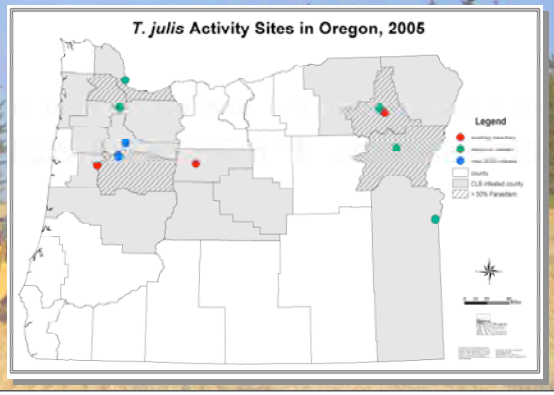
Larvae cause most of the economic damage on grains. Heavily infested fields have a frosted appearance.

Larvae typically strip the upper "flag" leaves, the main energy producers, thereby reducing grain yield.

Larvae generally feed only on the upper surface of the leaf removing the chlorophyll containing layer.

Actual size of CLB adult



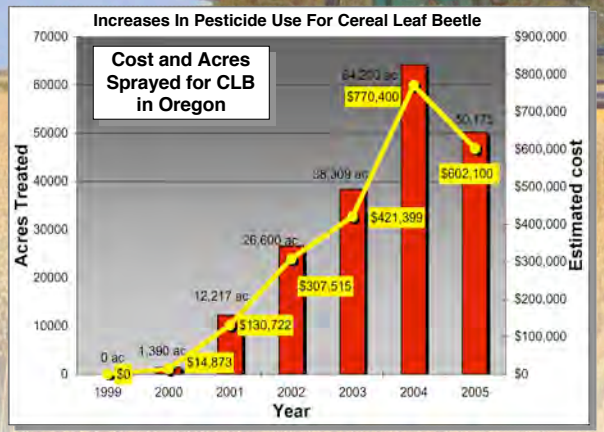


Primary Hosts

OATS WHEAT BARLEY

Secondary Hosts

CORN	FESCUE	BROME	ORCHARD GRASS
SORGHUM	MILLET	RYEGRASS	CANARY GRASS
TIMOTHY	RICE	BLUEGRASS	QUACK GRASS



Life Cycle Of The Cereal Leaf Beetle:

A) Eggs are laid by overwintered adults in the spring on the leaf upperside, parallel to the veins; B) Larvae strip leaves by chewing on the upper surface. They secrete a mucous layer to which they add their fecal matter for protection. Larvae are the most economically damaging life stage; C) Pupal cases are formed in the soil from bits of sand, dirt and debris; D) Adults emerge and feed for a short time in late summer on crops such as corn. They overwinter as adults, emerge in early spring, and begin to feed on leaves of young grains and grasses. Egg laying begins shortly thereafter. Adults normally do not cause economic damage.

Biological Control Program

Biological control has proven to be an effective weapon against CLB in the Eastern US. Oregon's cooperative CLB biological control program (ODA, USDA, and OSU) began immediately after the initial detection of CLB and continued in 2005. The program now has six field insectaries, three for the egg parasitoid *Anaphes flavipes* (Hymenoptera, Mymaridae) in Washington and Union counties, and another three for the larval parasitoid, *Tetrastichus julis* (Hymenoptera, Eulophidae) in Benton, Jefferson, and Union counties. More than 32,000 *A. flavipes*, obtained from the Colorado Dept. of Agriculture's Biocontrol Lab were released in two Oregon insectaries in 2005. Recovery samples showed parasitism rates of up to 30%. More than 24,000 *T. julis* were released in either larval parasitoid insectaries or growers' fields. *Tetrastichus julis* was recovered with parasitism rates ranging between 3% and 100%. Recoveries of *T. julis* in Linn County, where it had never been released before, suggest that *T. julis* is actively spreading in western Oregon. *Tetrastichus julis*-parasitized CLB larvae were acquired for release from Pennsylvania, Wyoming, Montana, and Oregon. The parasitism rates among CLB release material from all areas ranged from 29% to 100%.

1) *A. flavipes* in rearing colony; 2) *T. julis* parasitizing a CLB larva; 3) Close view of stake with field release carton for *A. flavipes*; 4) Inside carton showing sponge and petri dish with parasitized CLB eggs; 5) Releasing *T. julis* as parasitized CLB larvae on Sauvie Island in 2000; parasitism rates have now reached 100% on the island; 6) ODA staff releasing *A. flavipes* at the new Union Co. insectary field; notice the line of stakes with mounted cartons.

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