Cereal Leaf Beetle

Identification (and life cycle/seasonal history)

Adult cereal leaf beetles are five millimeters (3/16 inch) long, with a metallic blue head and wing covers, a red pronotum (neck), and yellow-orange legs. Newly laid eggs are elliptical, yellow, and about the size of a pin head; they reflect light well. Larvae are dark and slug-like in appearance. Their skin is yellow or yellowish brown and covered by a mass of slimy, dark, fecal material. Clusters of adult beetles overwinter in grass stems, grain stubble, cracks, and fenceposts. In the spring the adults emerge when maximum daily temperatures reach about 10°C (50°F). They immediately begin heavy feeding on wild grasses and then move to winter wheat and spring oats and barley if available. Adults prefer spring grains to winter wheat.

Within two weeks the beetles quit feeding and the females begin laying eggs. One female may lay up to 300 eggs, depositing each egg on its side, singly or in rows of three or four. Normally, eggs are placed on the upper leaf surface near the midrib of the leaf. Eggs hatch in four to 23 days, depending on temperature. After feeding for 10 to 14 days, the mature larvae crawl down the plant into the soil to pupate. The entire length of larval feeding can extend beyond two weeks because of extended egg laying and egg hatch. In two to three weeks, a new generation of adult beetles emerge. The newly emerged adults feed on a variety of plants, but prefer succulent grasses, grain, and young corn. After about two weeks of feeding, the adult goes into a period of summer dormancy. As temperatures drop in the fall, the adult beetles search out suitable overwintering sites.

Plant Response and Damage

Most adult damage is easily outgrown by the plant. Larvae have a unique feeding pattern, they eat the upper layer green mesophyll cells, which create the green color and generate plant energy. They feed down to the cuticle, staying between the leaf veins. When viewed closely, elongated slits are apparent following the veins. This feeding pattern gives the leaves a "frosted" appearance when viewed from a distance.

Management Approaches

Resistant Varieties

Though resistant varieties are not commercially available, resistance screening indicates that leaf pubescence results in fewer eggs being laid and deters feeding by young grubs.
Biological Control

Five species of exotic parasites have been used as biological control agents, including an egg parasite, Anaphes flavipes (Forester), and a larval parasite, Tetrastichus julis (Walker). The importance of these parasites is not clearly established, but T. julis has become established in northwestern Wyoming and Montana where cereal leaf beetle occurs. Parasitism by T. julis currently varies greatly (zero to 100 percent of larvae dissected, averaging 26 percent). This high variation may be due to the parasite's recent introduction. In the mid-western states, where cereal leaf beetle and parasites have been present for several decades, these parasites have had great impact on the economic status of cereal leaf beetle.

Chemical control

Surveying

Eggs near hatching and larvae are the target of insecticide control and are monitored by plant inspection since thresholds are expressed as egg and larvae per plant or per stem/tiller, based on work at Montana State University and USDA-ARS. Examine 10 plants per location and select one location for every 10 acres of field. Count number of eggs and larvae per plant (small plants) or per stem/tiller (large plants) and get an average number of eggs and larvae per plant or stem/tiller.

Economic Thresholds

Boot stage is a critical point in plant development and impact of cereal leaf beetle feeding damage can be felt on both yield and grain quality. Before boot stage, the threshold is: three eggs and larvae or more per stem/tiller. Larvae feeding in early growth stages can have a general significant impact on plant vigor. At boot stage feeding is generally restricted to the flag leaf, which can significantly impact grain yield and quality. The threshold is decreased at the boot stage to: one larva or more per flag leaf. These thresholds may need to be modified for malting quality barley because of its higher quality and high grain quality needs.

Product List for Cereal Leaf Beetle:

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Product per Acre (Fl oz. or oz. product)</th>
<th>Preharvest Interval, remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baythroid XL R1</td>
<td>1.0</td>
<td>30 days. Not more than 4.8 oz/acre/season. W3</td>
</tr>
<tr>
<td>carbaryl 1,2</td>
<td>See labels</td>
<td>21 days to grain, 7 days to graze. W3</td>
</tr>
<tr>
<td>chlorpyrifos 4E R1,2</td>
<td>16</td>
<td>28 days. 14 days to graze. Not more than 2 applications/crop. W3</td>
</tr>
<tr>
<td>Cobalt R1</td>
<td>13-25</td>
<td>28 days grain and straw. 14 days forage and hay. W3</td>
</tr>
<tr>
<td>Dimilin 2LR</td>
<td>4</td>
<td>50 days grain and straw. 15 days hay. 3 days forage. W,B,O,T3</td>
</tr>
<tr>
<td>endosulfan 3EC2</td>
<td>10.6 - 21.4</td>
<td>Do not apply after heads begin to form. Do not feed treated forage to livestock. W,B,O,R3</td>
</tr>
</tbody>
</table>
lambda cyhalothrin $R_{1,2}$ 2.56 - 3.84 30 days to grain. Do not apply more than (0.48 pt) per acre per season. $W,T_{3}$

Lannate LV 12 - 24 7 days. 10 days graze. $W,B,O_{3}$

malathion 5EC 2 16 - 24 7 days. $W,B,O,R_{3}$
malathion ULV 2 4 - 8 7 days. $W,B,O,R_{3}$

Mustang MAX $R_1$ 1.72 - 4.0 14 days. $W,T_{3}$

Proaxis $R_1$ 2.56 - 3.84 30 days. Not more than 0.48 pt/acre/season. $W,T_{3}$

Radiant 1 2-6 21 days grain or straw. 3 days fodder, forage or hay. $W,B,O,R,T_{3}$

Tracer 4E 1 1 - 3 21 days grain or straw, 14 days graze. $W,B,O,R,T_{3}$

$R$ Restricted use pesticide. 1 Labeled for chemigation 2 Generic active ingredient, other formulations available. 3 Labeled on W (wheat), B (barley), O (oats), R (rye), T (triticale).

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Categories: Small grains, Insects, Mites, Cereal leaf beetle

Date: 5/23/2008