

Cereal Leaf Beetle: *Oulema melanopus*

Monitoring Protocol

Host Plants: All cereals, grains and various grasses including; barley, wheat, oats, rye, sorghum, timothy, ryegrass, foxtail grass and bluegrass.

Identification, Life Cycle and Damage:

Adult: Adult cereal leaf beetles (CLB) have shiny bluish-black wing-covers (Figure 1). The thorax and legs are light orange-brown. Females (4.9 to 5.5 mm) are slightly larger than the males (4.4 to 5 mm). Adult beetles overwinter in and along the margins of grain fields in protected places such as in straw stubble, under crop and leaf litter, and in the crevices of tree bark. They favour sites adjacent to shelterbelts, deciduous and conifer forests. They emerge in the spring once temperature reaches 10-5°C and are active for about 6 weeks. They usually begin feeding on grasses, then move into winter cereals and later into spring cereals.

Egg: Egg laying begins about 14 days after the emergence of the adults. Eggs are laid singly or in pairs along the mid vein on the upper side of the leaf and are cylindrical, measuring 0.9 mm by 0.4 mm, and yellowish in colour. Eggs darken to black just before hatching.

Larva: The larvae hatch in about 5 days and feed for about 3 weeks, passing through 4 growth stages (instars). The head and legs are brownish-black; the body is yellowish. Larvae are usually covered with a secretion of mucus and fecal material, giving them a shiny black, wet appearance (Figure 2). When the larva completes its growth, it drops to the ground and pupates in the soil.

Pupa: Pupal colour varies from a bright yellow when it is first formed, to the colour of the adult just before emergence. The pupal stage lasts 2 - 3 weeks. Adult beetles emerge and feed for a couple of weeks before seeking overwintering sites. There is one generation per year.



Figure 1: Adult



Figure 2: Larva



Figure 3: Cereal leaf beetle damage to a wheat leaf

Monitoring

Timing:

During the later part of the oviposition period, both adults and larvae can be found in the field at the same time. Depending on the local conditions this is generally from **mid-June to early July**. Recommended time for winter wheat is **mid May to mid June**.

Location:

Give priority to following factors when selecting monitoring sites:

- Choose fields and sections of the fields with past or present damage symptoms.
- Choose fields that are well irrigated (leaves are dark green in color), including young, lush crops. Areas of a field that are under stress and not as lush (yellow) are less likely to support CLB. Monitor fields that are located along riparian corridors, roads and railroads for human aided dispersal. Also include farms and hay facilities for this purpose.
- Survey the sides of a field that are close to brush cover or weeds, easy to access, with a sheltered area nearby: hedge rows, forest edges, fence lines, etc.

Focus your site selection on the following host priorities:

- **First** - winter wheat. If no winter wheat is present then;
- **Second** - other cereal crops (barley, wheat, oats, and rye). If no cereal crops are present then;
- **Third** - hay crops. If no hay crops or cereal crops are present then;
- **Fourth** - ditches and water corridors

Sweep net Sampling for Adults and Larvae:

A sweep is defined as a one pass (from left to right executing a full 180 degrees) through the upper foliage of the crop with a 37.5 cm diameter sweep net. A sample is defined as 100 sweeps taken at a moderate walking pace, 4-5 meters inside the border of a field.

Four samples are taken from each site, totalling 400 sweeps per site. The contents of each sample are visually inspected for life stages of CLB and all suspect specimens are to be retained for identification. Please note that because the CLB larvae are covered in a sticky secretion when they are caught in a sweep net they are often covered in debris and are very difficult to see. To help determine the presence of CLB place the contents of the sweep net into a large ziploc bag for observation.

Visual Inspection:

Both the adults and larvae severely damage plants by chewing out long strips of tissue between the veins of leaves, leaving only a thin membrane. When damage is extensive the leaves turn whitish (Figure 3). The plant may be killed or the crop may be seriously reduced. In addition to the feeding damage inspectors should be looking for all life stages of the CLB. In a field of host material the visual survey should be conducted between "sweep samples". Other locations to be examined include grass covered ditch banks and young host crops that are too low to sweep. Experienced surveyors should spend 15 minutes on visual inspection. Less experience surveyors should spend an additional 10 minutes on the visual component.

Optimum conditions for conducting a survey

- **Time of day:** early morning after the dew has evaporated.
- **Temperature:** greater than 10°C, but not midday when the sun is hot and plants are wilting.
- **Wind:** low wind
- In Creston, BC, adults are present once the host cereal crops reach a height of 10 - 20 cm. Larvae are found in the latter half of June into July.

If a positive sample is confirmed in a county or land district the focus of the survey may be switched to a delimitation survey. The delimitation survey may be conducted as a multi-year survey monitoring the growth and movement of the localized CLB populations. Population density within an infested field of host material will be established by examining leaves on 100 tillers. At a positive site, four areas of the field will be sampled. Areas are to be selected at random with 25 tillers selected from each area totalling 100 tillers (25 x 4). The leaves on the tillers are to be examined for CLB eggs and larvae with exact counts taken and recorded