

Ottawa Hill Plots 2015: a photo essay of pests and disease

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The hill plots:



Hill plots are small groups of plants grown in the field 1m apart in a grid pattern. They are used to evaluate early generation breeding lines and populations for genetic studies. Various agronomic traits are measured during the season, including disease resistance. Typically, single panicles or 10-12 loose seeds are sown for each line. In Ottawa, hill plots are sown last – usually in May, but sometimes even into June, so disease problems are often worse than under production conditions.

Herbicides are often applied at the beginning of the season, but other pesticides are rarely used. While not as precise as using a controlled environment, hill plots are a valuable tool for determining which oat lines are tolerant or resistant to the local populations of pests and diseases.

Barley Yellow Dwarf Virus (BYDV):



BYDV is carried by aphids, which introduce the virus when they pierce the stem of the plant. In 2015, very little BYDV was seen in the hill plots.



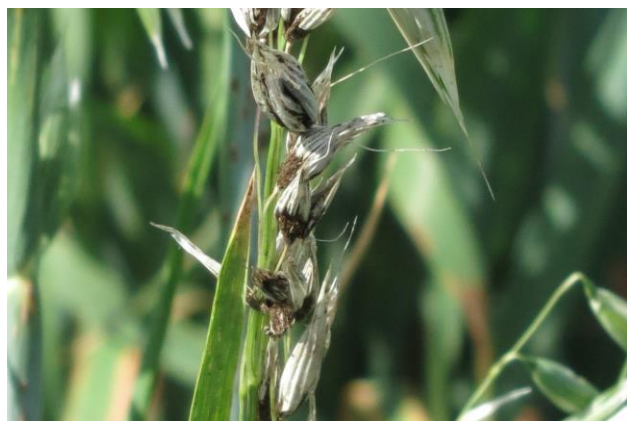
This may have been because of the large number of ladybugs, whose larvae feed on aphids.

Flies:

Something curious this year was the presence of large numbers of flies in early July. They were identified as belonging to the species *Delia florilega*. The larvae of this species usually infest bean seeds during germination. Their presence makes some sense, as the oat hill plots are usually planted after soybeans.

Cereal leaf beetles:

This was the first year that so many cereal leaf beetles were seen in the plots. As the name suggests, the larvae feed on the leaves of cereal plants. They can become a serious pest.

Smut:

Very little smut was seen in the plots, but one example was found.

Bacterial blight:

Maybe.... This could also be a physiological response to some sort of stress.

Crown rust (*Puccinia coronata*):

The crown rust fungus is always very common in the fields of the Central Experimental Farm, and this year was no exception. One of the experiments grown in this year's hill plots included about 150 wild oat lines, and we were hoping that some of those accessions, particularly those representing *Avena sterilis* or *A. strigosa*, would prove to be rust resistant. Alas, those lines tended to be the most susceptible to the fungus. On a more positive note, it is tempting to speculate that

the defeated rust genes found in the cultivated oat lines being grown in the same field were still providing some low level of resistance to the local races of crown rust.

Stem rust (*Puccinia graminis*):

Over the last few years, stem rust has become very common in Ottawa, which is of some concern. Infections are very heavy, and do not stay confined to the stems, but also spread to the leaves and panicles. Fortunately, some of the newer breeding material seems to have resistance to this fungus.



This photo shows a leaf infected with both crown rust (orange, flat) and stem rust (reddish brown, raised).

Ergot:



Certain populations of oat seem more susceptible to ergot, perhaps because the florets are more open and the anthers are more prone to being extruded. Some ergot was seen in the field this year, but not as much as in the past few years, even on some of the same oat lines.

***Fusarium* spp.**



Fusarium is rarely seen in Ottawa fields, but this year, the emerging panicles of several very late maturing plants were covered with a fluffy white mass along the stems and underneath the flag leaves. These masses were tested and determined to be a mixture of *Fusarium sporotrichioides* and *F. equiseti*, both of which produce highly toxic compounds.

Noctuid moths:

At the end of the season, the presence of masses of eggs on the glumes of mature panicles on several plants was noticed. These hatched into small caterpillars, but I was unable to rear them to adulthood for identification. They were most likely noctuid moths (cutworms) from one of several possible genera (*Mythimna unipuncta*, *Spodoptera*, or *Euxoa*).

The oat breeder:

The most destructive critter of all? While he didn't cull anything in my hill plots (which were being used for genetic studies), Weikai Yan, ORDC oat breeder, showed no mercy in making selections in his own plots!

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