CropPest Ontario

Agriculture Development Branch
Editor—Albert Tenuta– Field Crop Pathologist
www.omafra.gov.on.ca/croppest

ISSN 1203-2204 VOLUME NO. 16, ISSUE NO. 15 October 19 2011

"IN THIS ISSUE"

Comments, suggestions or articles are welcome. To be added to the distribution list please contact:

Albert Tenuta or Mirjam Hall
Phone 519-674-1690
Fax 519-674-1564
albert.tenuta@ontario.ca or mirjam.hall@ontario.ca

2011 Grain Corn Ear Mould and Vomitoxin Survey

Greg Stewart, Corn Specialist, OMAFRA, Guelph
Albert Tenuta, Field Crop Pathologist, OMAFRA, Ridgetown

Survey

In the past several weeks increased attention has been given to the potential for ear moulds in the 2011 corn crop and the mycotoxins potentially associated with these moulds. These mycotoxins, particularly the vomitoxin (DON) can be disruptive when fed to livestock, especially hogs.

To increase our understanding of the situation OMAFRA Field Crop Staff conducted a survey of Ontario corn fields. In this survey corn fields were selected from across the province; in each corn field 4 sites were identified and at each site 5 consecutive ears were hand harvested. These 20 ears were then immediately dried and shelled. The resultant sample was thoroughly mixed and a sample was taken to Agri-Food Labs in Guelph for vomitoxin (DON) analysis.

2011 Grain Corn Ear Mould and Vomitoxin Survey .....continued

Of the 99 samples taken 75 of them recorded a DON level of less than 2.0 PPM; 12 were in the 2 to 4 PPM range; and 12 recorded DON levels greater than 4 PPM. The accompanying map shows the geographic distribution of the sampled fields and the DON level at each location.

The incidence of mould (and DON in the harvested grain) is quite widespread across the province. However, there are clearly areas of the province that will produce high quality corn with low DON levels. The map also does tend to indicate some areas where growers may need to be particularly diligent in assessing mould and vomitoxin concentrations.

It is important to note that this survey cannot capture all the factors that may influence the mould or vomitoxin in a given field. Hybrid differences, planting date effects, previous crops, localized weather patterns and insect or bird damage may all impact the level of mould in a given field and can explain why fields in close proximity have different mould development.

Moving Forward

Some producers with on-farm storage may need to segregate crop by DON levels to allow them to more easily match market demands.

Prior to harvest it is important for producers to scout fields for visible mould. To verify the presence of mycotoxins prior to harvest it is recommended that at least 10 ears (2 locations in the field x 5 consecutive ears) should be hand-shelled, thoroughly mixed and sent to a lab for testing. Once harvest has begun samples could be collected at the combine from several locations in the field. Current labs for testing grain samples are listed below.

A good strategy is to identify and rate the fields, hybrids and planting dates for the presence of ear mould and vomitoxin. Screens, cylinder and concave settings, and fans on combines should be set to create as clean a sample as possible, including the exclusion of smaller tip kernels if possible.

Testing Facilities in Ontario

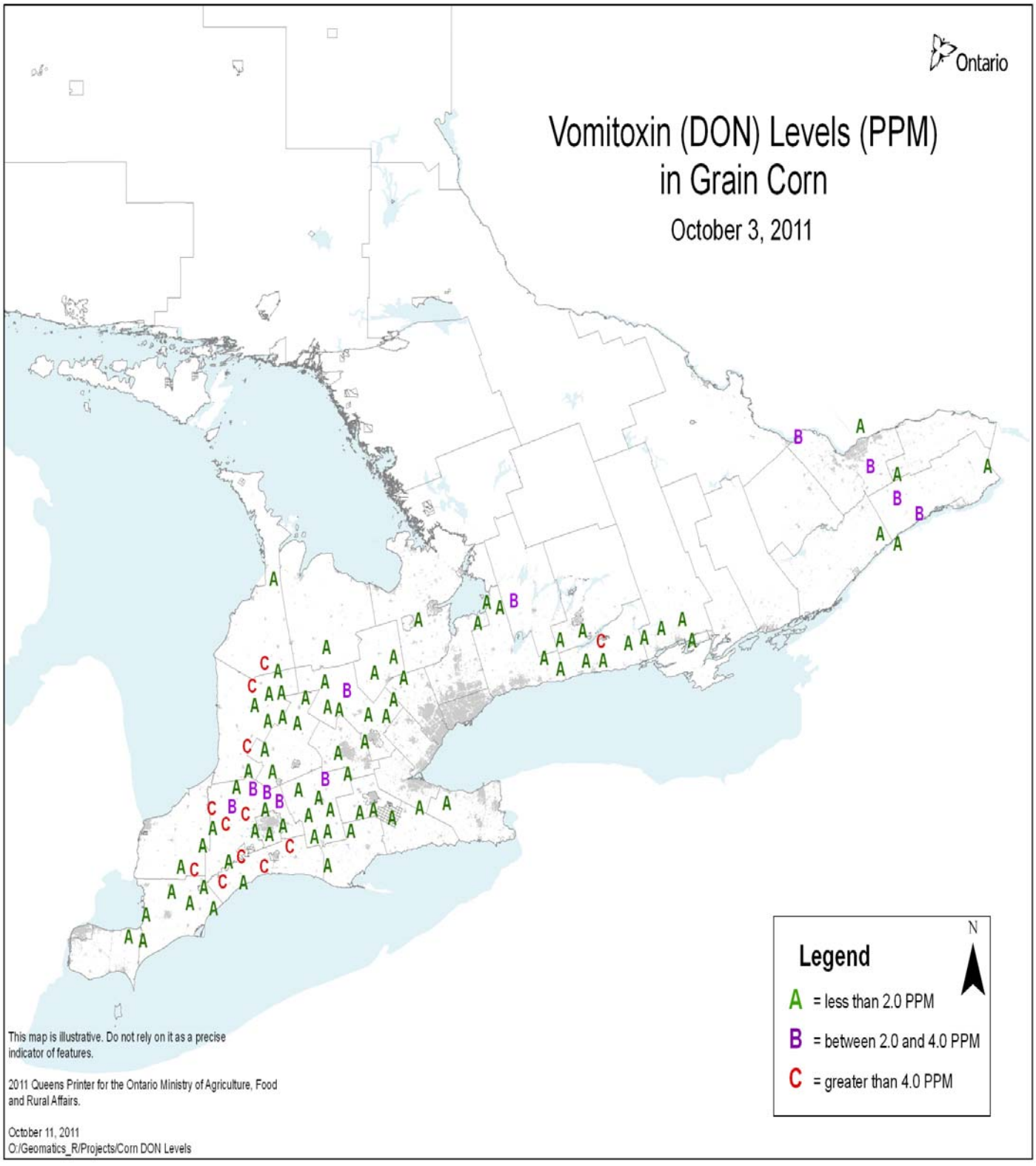
A&L Canada Laboratories Inc. 2136 Jetstream Rd London, Ontario N5V 3P5 (519) 457-2575	Agri-Food Laboratories Unit #1, 503 Imperial Rd. N. Guelph, Ontario N1H 6T9 1-800-265-7175
Laboratory Services University of Guelph 95 Stone Road West Guelph, Ontario N1H 8J7 (519) 767-6299	Agribrands Purina Strathroy Central Laboratory 127 Zimmerman St. S. P.O. Box 303 Strathroy, Ontario N7G 3W3 (519) 245-9600
Intertek Testing Services 960 C Alloy Drive Thunder Bay, Ontario (807)345-5392	Shur-Gain 600 James St. South St. Marys, Ontario N4X 1C7 (519) 349-2152
Stratford Agri-Analysis P.O. Box 760 1131 Erie St. Stratford, Ontario N5A 6W1 (519) 273-4411	

Acknowledgement

Appreciation is extended to the Grain Farmers of Ontario and Agri-food Laboratories for their support of the survey and analysis.

2011 Grain Corn Ear Mould and Vomitoxin Survey

.....continued



What does Rootworm Bt-Resistance in the US Corn Belt Mean for Ontario?

Jocelyn Smith, Research Associate, University of Guelph Ridgetown Campus

Numerous reports have recently been released from the US Corn Belt of field failures of Bt-corn planted to control corn rootworm. Reports of significant root injury, goose-necking, lodging, and yield loss on Bt-corn hybrids that express insecticidal protein to control rootworm are making headlines in extension bulletins in Illinois, Iowa, Minnesota and South Dakota in 2011. Iowa State University researchers have published results of laboratory studies showing that rootworms collected from Bt-corn fields with rootworm damage in 2010 had three times greater survival on Cry 3Bb1 (YieldGard RW) corn than beetles collected from fields without reported problems (http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0022629). In 2008, researchers from the University of Missouri published their results of laboratory experiments in which resistance occurred within three generations of constant exposure to the same Bt-rootworm event.

For Ontario corn producers this should be a wake-up call. Corn rootworm is a serious pest of corn in Ontario and the US and is a formidable opponent when it comes to long-term management. Rootworms have a long history of adapting to whatever control methods are used against them. They have developed resistance to multiple groups of insecticides that werewidely used in the US for larval and adult beetle control and within the last 20 years have adapted to a corn-soybean crop rotation in many areas of the Corn Belt, which we now call the "rotation-resistant variant".

So far, the information we know about the potentially Bt-resistant rootworms in the US indicates that they have developed in areas where corn was continuously grown and the same Btproductfor rootworm control was used for at least three years in a row and there were high rootworm populations in these fields. It is also very plausible that refuge requirements were not properly followed in these locations as we all know how challenging it is convince and enforce among growers the importance of following insect resistance management (IRM) requirements.

Another major factor in this scenario is that the Bt events for rootworm control that are currently available only provide a low to moderate dose against rootworm larvae resulting in survival of a portion of the population that could carry genes for resistance to that event.Bt products that contain stacked or pyramided events for rootworm control should improve our chances against resistance development to both events at the same time, but in locations where resistance has developed to one of the events, deploying the pyramided events after the fact is likely no better than using one event alone.

OMAFRA Field Crop Staff Working for You!

Dawn Pate	Manager—Field Crops	519-826-3257
Joel Bagg	Forage Specialist	705-324-5856
Scott Banks	Emerging Crops Specialist	613-258-8359
Cara McCreary	Entomology, Field Crops Program Lead (Acting)	519-674-1696
Horst Bohner	Soybean Specialist	519-271-5858
Christine Brown	Nutrient Management Field Crop Program Lead	519-537-8305
Mike Cowbrough	Weed Management Field Crops Program Lead	519-824-4120 ext.52580
Brian Hall	Edible Beans & Canola Specialist	519-271-0083
Peter Johnson	Cereals Specialist	519-271-8180
Adam Hayes	Soil Management Special-ist—Field Crops	519-674-1621
Ian McDonald	Applied Research Coordina-tor-Field Crops	519-824-4120 ext 56707
Gilles Quesnel	IPM Program Lead-Field Crops (Bilingual)	613-258-8250
Greg Stewart	Corn Industry Program Lead	519-824-4120 ext 54865
Albert Tenuta	Pathologist – Field Crops Program Lead	519-674-1617

What does Rootworm Bt-Resistance in the US Corn Belt Mean for Ontario?

...continued

In Ontario and many parts of the US, crop rotation remains our best management option for corn rootworm control. Rootworm larvae that hatch from eggs laid in the soil in late summer and fall will die in the spring if they do not have corn root tissue to feed on. Planting a crop other than corn following corn will ensure the death of almost all rootworms deposited in the field the previous year. Surveys for the rotation-resistant rootworm have been conducted in Ontario since 2004 by Dr. Art Schaafsma at the University of Guelph Ridgetown Campus and the results have indicated that the rotation-resistant rootworm is not present in economically damaging levels to date. Ontario's diverse agricultural landscape and typical corn-soybean-wheat rotation has likely helped to prevent the establishment of this pest and should continue to do so.

It remains to be seen how the Bt-rootworm resistance scenario will play out in the future. Simultaneous, wide-spread resistance may be unlikely in the near future due to the limited movement of rootworm beetles, but the repeated use of the same management tactics year after year places significant selection pressure on rootworm populations against that tactic. There is no doubt that the "old-fashioned" concept of Integrated Pest Management (IPM) is the best way to manage corn rootworm to date. Crop rotation is your first line of defence, followed by alternating other control options such as transgenic corn events, soil insecticides, and seed treatments if you're growing corn after corn. Repeatedly relying on one method of control and choosing not to follow IRM requirements creates a perfect storm for resistance development.

The Canadian Corn Pest Coalition, Ontario Corn Committee, and the Canadian Seed Trade Association have just updated a useful web-based tool for all of your IRM information. Simply select the Bt hybrid or trait being planted and field size and the Refuge Selector will provide a list of eligible refuge hybrids, the refuge size, placement and treatment options along with herbicide tolerance information. Please check it out at www.cornpest.ca or www.refugeselector.ca.

Corn Ear Moulds—Identification

Albert Tenuta, Field Crop Pathologist, OMAFRA, Ridgetown
Greg Stewart, Corn Specialist, OMAFRA, Guelph

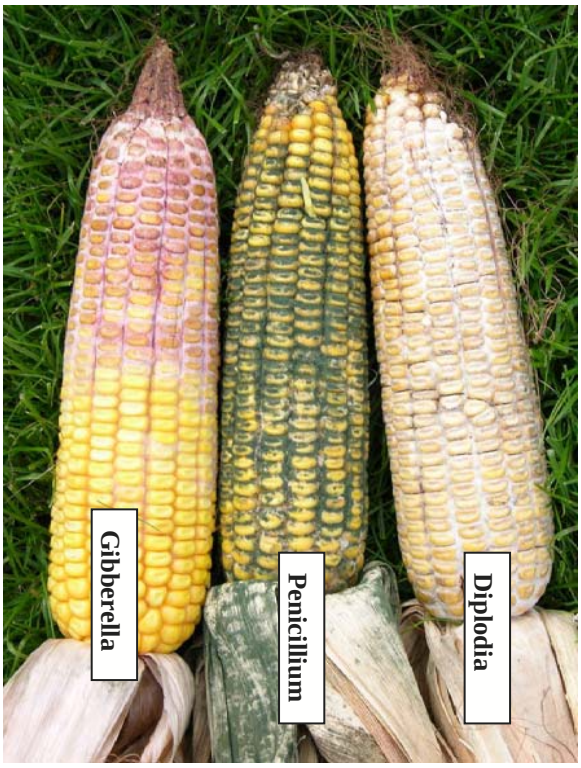
Gibberella Ear Rot

- The most common and important ear mould in Ontario is Gibberella zeae which is the sexual reproductive stage of Fusarium graminearium
- Infection often begins at the ear tip and moves down towards the ear base.
- Although the fungus can produce a white-coloured mould which makes it difficult to tell apart from Fusarium Kernel Rot, the two can be distinguished easily when Gibberella produces its characteristic red or pink colour mould.
- Toxins produced by Gibberella include Deoxynivalenol (vomitoxin or DON), Zearalenone (ZEN) and T-2 toxin. If grain is to be used for feed, a myctoxin test is recommended.
- Reducing toxin levels by combine adjustment and grain cleaning is difficult.

Fusarium Ear Rot

- Unlike Gibberella, Fusarium infected kernels are often scattered around the cob amongst healthy looking kernels.
- In most cases does not fuse the husk to the ear unlike Gibberella.
- A "white streaking" or "star-bursting" can be seen on the infected kernel surface.
- Although many Fusarium species may be responsible for these symptoms, the primary species we are concerned about in Ontario is Fusarium verticillioides which produces the toxin Fumonisin.

Corn Ear Moulds - Identification ....continued



Diplodia Ear Rot

- The characteristic ear symptom of Diplodia maydis infection is a white mould that begins at the base of the ear and can eventually cover and rot the entire ear.
- Mould growth can also occur on the outer husk which has small black bumps (pycnidia) embedded in the mould.
- No known mycotoxins produced.

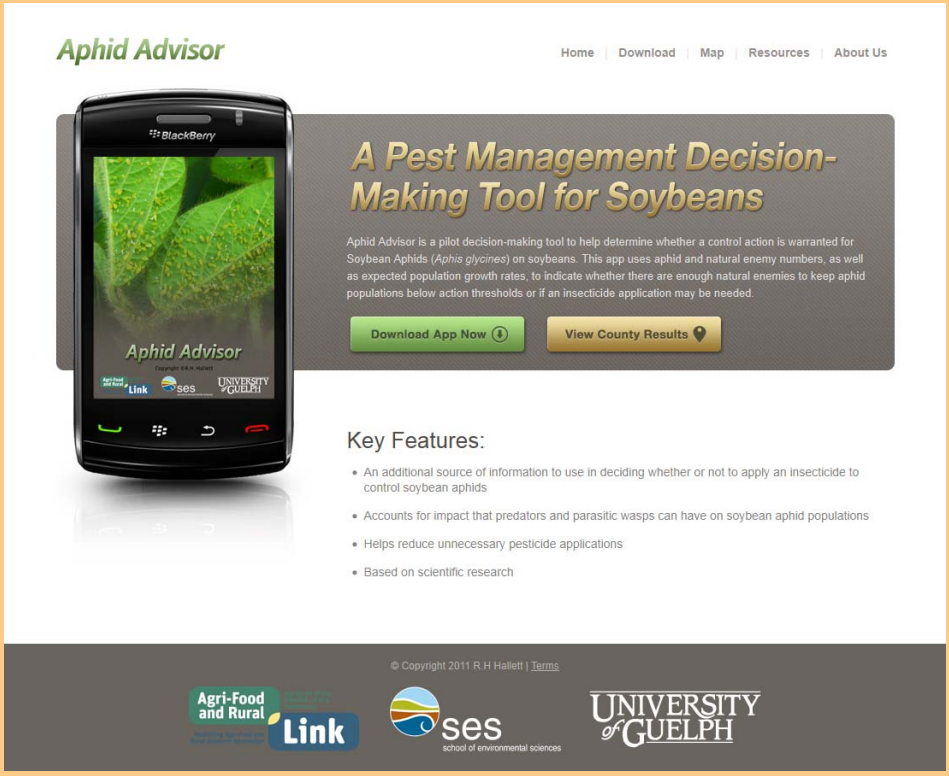
Penicillium Ear Rot

- Penicillium sp produces a light blue-green powdery mould which grows between the kernels and cob/ husk surface.
- Can be a serious problem if corn is stored at high moisture levels (greater 18%).
- Ochratoxins can be produced

Cladosporium Ear Rot

- Cladosporium was particularly prominent in 2009.
- Delayed maturity, frost events and wet conditions contributed to the Cladosporium development
- Cladosporium produces a black mould on the ear and kernel surface. Cladosporium grows mainly on the kernel surface or between kernels and are not great colonizers. They are often referred to as "surface contaminants" and therefore the mould (mycelium) they produce rubs of easily. Basically as the corn dries often the Cladosporium mould dries as well and some friction such as combining will remove it to some degree.
- Cladopsorium does not produce any known toxins and if properly stored or ensiled mould growth should stop under anaerobic (oxygen-free) conditions.

Introducing Aphid Advisor—A Pest Management Decision — Making Tool for Soybeans



- Aphid Advisor is a smart phone application that can be used to help determine whether a control action is warranted for soybean aphids (*Aphis glycines*) on soybeans. Based on aphid and natural enemy numbers, this tool indicates whether there are enough natural enemies to keep aphid populations in check or if an insecticide application may be needed.

- Aphid Advisor was developed by Rebecca Hallett (UofG) with assistance from Tracey Baute (OMAFRA) and Christie Bahlai (UofG), and is based on research conducted at the University of Guelph in the School of Environmental Sciences and Department of Plant Agriculture.

- Funding for app development e was provided by the Agri-Food and Rural Link, a component of the OMAFRA - U of G Partnership.

Download the free pilot version for BlackBerry devices with OS 5 and higher at:

http://www.aphidapp.com/