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Does a Foliar Fungicide Application Increase Grain Corn Moisture?

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In previous CropPest Ontario issues (July 17, 2009 - “Factors to Consider in Your Corn Fungicide Decision!” and July 31, 2009 – “Lodging (Stalk Rot) and Corn Fungicides”) we discussed corn fungicide trials conducted in 2008 (and again in 2009) by the University of Guelph Ridgetown Campus and OMAFRA. In these articles we discussed corn fungicides interactions with hybrids as well as their impact on stalk rot/standability. This time we will present 2008 data which showed an association between increased grain moisture and a fungicide application (Headline) at the tassel to silking stage in 21-hybrid trial (Figure 1). Due to limited space and resources we did not apply any other fungicides in this trial.

Does a Foliar Fungicide Application Increase Grain Corn Moisture?
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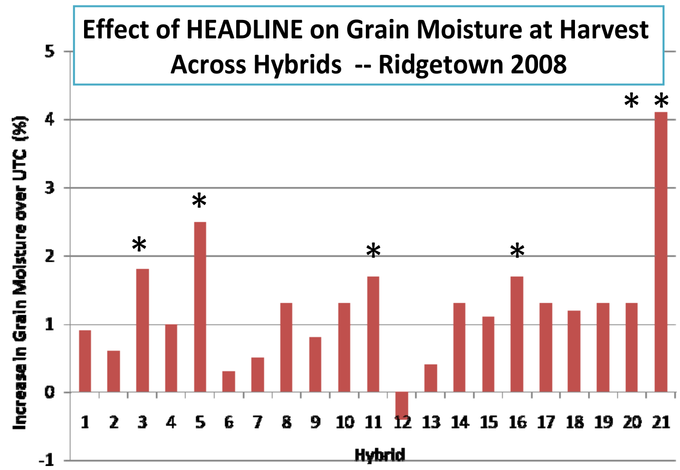
Figure 1 shows the individual hybrid grain moistures as compared to the untreated check at the Ridgetown Campus location. When all three locations (Ridgetown, Belmont and Wingham) were combined, we found the application of HEADLINE increased average grain moisture across hybrids by 1.2%. The effect on grain moisture depended on the hybrid, with some hybrids showing no differences while several others were approximately 4.0% higher in grain moisture at harvest compared to the untreated check.



* = significantly different than no fungicide at p=0.05

Each response average of 4 replications

The higher grain moistures associated with certain hybrids could be attributed to longer stay green among hybrids associated with strobilurin fungicides (such as Headline and Quadris).

Does a fungicide application delay physiological maturity? We have no evidence that indicates a delay in physiological maturity beyond the rating of the hybrid. In high disease environments however, maturity may be delayed where leaf diseases were controlled with a fungicide application. In this case, grain moistures may be higher with a fungicide application, but they are usually accompanied with significant yield gains (but not always). For example, Hybrid 21 in Ridgetown was 4% higher in moisture at harvest, but yielded 35 bu/ac higher with much better standability compared to the untreated check where no fungicide was applied. Our other work in high disease environments (inoculated trials) support this observation as well. Keep this in mind as we approach harvest.

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Soybean Cyst Nematode Management: Understanding How Management Actions Influence Population Levels and Genetic Changes in the Population

Albert Tenuta, Field Crop Plant Pathologist, OMAFRA, Ridgetown

In the May 14, 2009 CropPest Ontario Issue #2 ("Soybean Cyst Nematode Varieties Pay Big Dividends!") I described how OMAFRA, AAFC (Harrow) along with funding from the Ontario Soybean Growers are participating in a multi-year project with colleagues from the North Central United States. The primary project objective is to reduce losses and improve soybean cyst nematode (SCN) management in Ontario and the North Central US states.

The following is a SCN info-sheet generated from this cooperative SCN project which summarizes the preliminary data. - Albert Tenuta, Field Crop Plant Pathologist, OMAFRA Ridgetown

Fig 1. Susceptible soybean showing typical soybean cyst nematode injury in our Ontario demo trial.

Fig 2. SDS and SCN are often found in the same field as shown in our demo trials.

While soybean cyst nematode (SCN) is the most yield limiting disease of soybean in the United States and Canada, not all soybean growers are properly managing it. Extension plant pathologists and nematologists from the North Central states and Ontario are collaborating on a SCN management project funded by the North Central Soybean Research Program and the Ontario Soybean Growers (through ORD Funding) with an objective of delivering a consistent message on SCN management.

The Strategic Goal of this project is **"To improve soybean cyst nematode (SCN) management in the North Central states and Ontario".** As part of this overall goal of this project, on-farm demonstration and research plots were established in all states involved. In addition to the direct effect on yield, the effects of different resistance sources on SCN populations are also being studied and demonstrated.

A field protocol agreed upon by all cooperators was followed for plot establishment in producer fields. In 2008, field strip trials were established in the following states and Ontario, Canada (Number of locations): IL (2), NE (2), IA (3), OH (2), MN (3), MO (2), ND (3), WI (2), KS (2) one conventional planted and one double crop, MI (3), SD (2), ON (2). Replicated strip plots that were a minimum of 250 ft in length were established with a minimum of four replications. All locations utilized large plots with the exception of ND where only small areas of a small number of fields are known to have SCN at this time. At all locations, multiple

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varieties were established which represent the main resistance genes for SCN management. The number of varieties varied from 4 to 8 varieties at some locations. Plots were harvested and yields were determined, and SCN populations were determined in the spring and fall for all locations. In addition, SCN populations collected from each site were used to determine the HG type present. The HG type identifies the ability of the population to reproduce on each of the resistance sources used in the trials.

At a few of the locations, we were not able to secure varieties with some resistance genes due to the time of year for the project being approved in 2008. Several locations utilized multiple PI88788 varieties when they could not identify other genetic sources. Yields for each plot were determined at maturity and were grouped into low (0-499 SCN eggs/100 cc soil), medium (500-2,999 SCN eggs/100 cc soil) and high (≥ 3,000 SCN eggs/100 cc soil) SCN populations based on the spring population assessment (Figures 1, 2, and 3).

Yield was consistently increased with the use of resistant varieties, and response varied significantly with location. The yields were highest for varieties utilizing the Peking source of resistance, which had a 5.3 bu/A yield advantage over susceptible varieties averaged over all locations. In fields with high SCN populations , the average yield advantages of varieties utilizing the Peking, PI 88788, and Hartwig sources of resistance were 15.5, 11.8, and 6.3 bu/A better than the susceptible varieties, respectively.

Resistant varieties were able to reduce the reproduction of SCN in the field trials compared to the susceptible varieties (Figure 4). The exception to this was at the Renville, MN location, where varieties with the PI 88788 source of resistance did not reduce SCN reproduction. At some sites, SCN type 2 populations were present. Type 2 populations of SCN are able to reproduce on varieties with the PI 88788 source of resistance at a rate similar as reproduction on a susceptible variety. Table 1 reports on the SCN types observed in the soil samples collected in the spring of 2008. SCN types also will be determined from soil samples collected in the fall of 2008 from the research sites.

SCN population and HG Type results were not complete at the time of development for this fact sheet. Updates on the influence of soybean genetics on SCN populations and HG type will be presented in future updates.

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Figure 1. Effects of SCN resistance source on yield in fields with low SCN populations (0-499 eggs/100 cc soil).

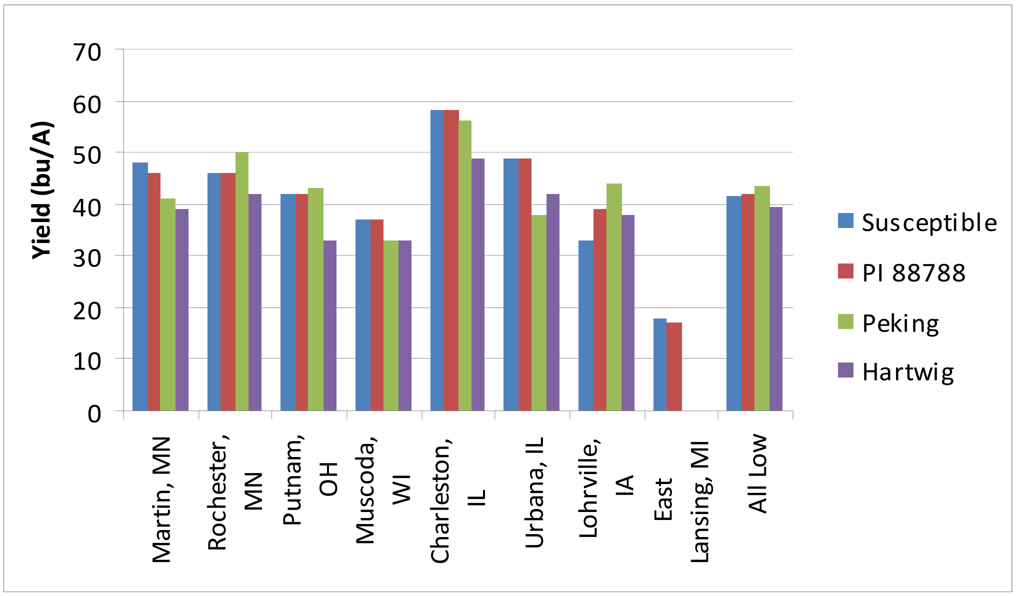

Figure 2. Effects of SCN resistance source on yield in fields with medium SCN populations (500-2,999 eggs/100 cc soil).

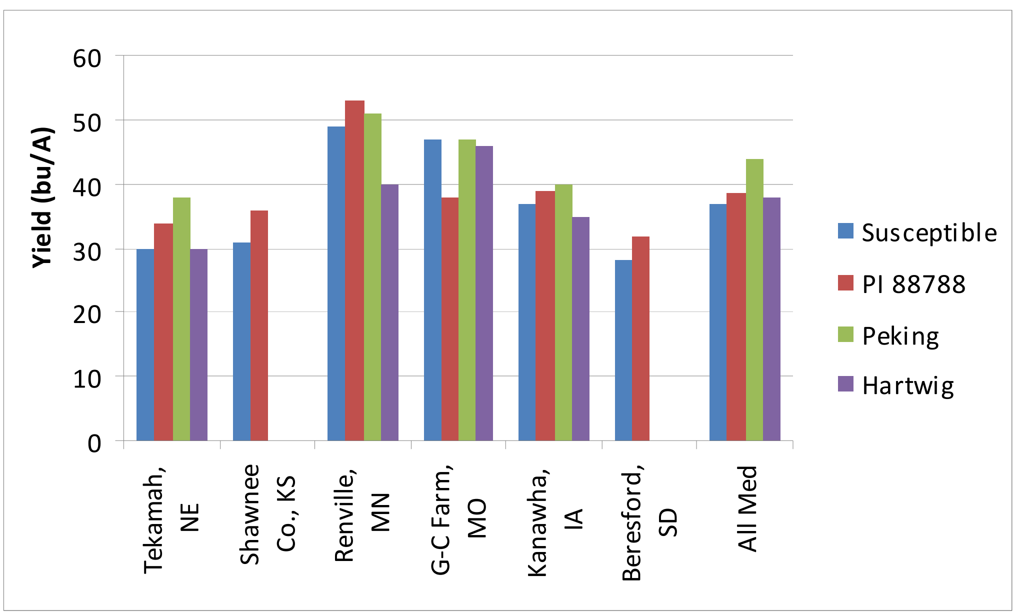

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Figure 3. Effects of SCN resistance source on yield in fields with high SCN populations (≥ 3,000 eggs/100 cc soil).

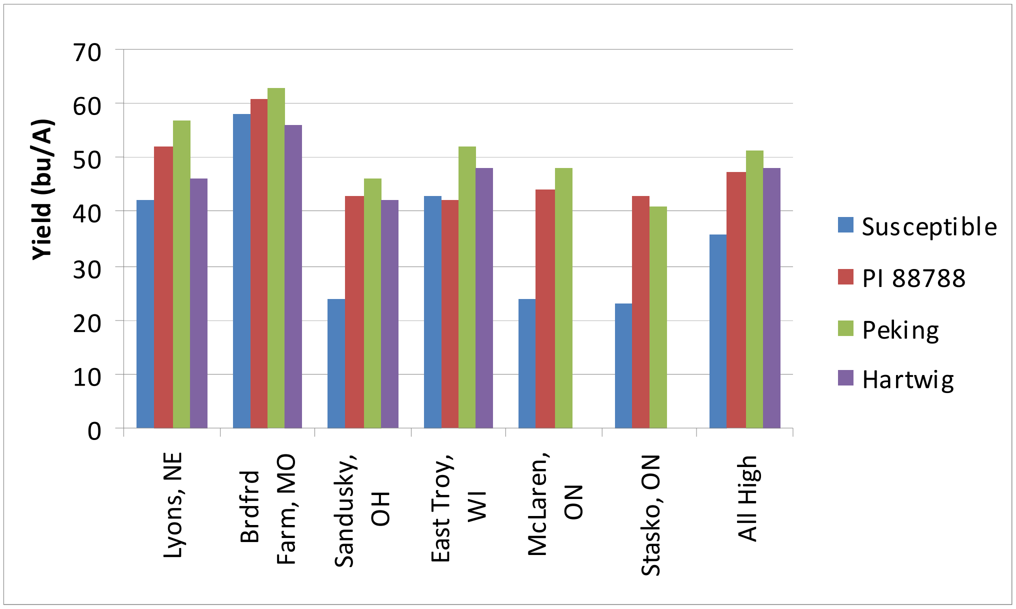

Figure 4. Effects of soybean variety resistance source on SCN reproduction factors (population at harvest / initial population).

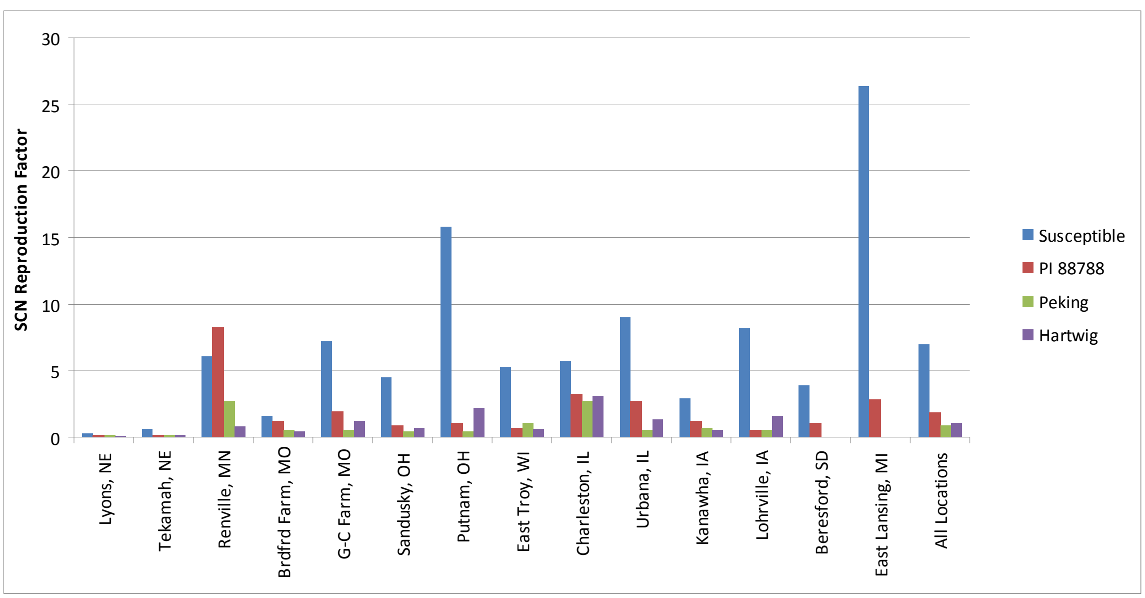

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Table 1. SCN types present in soil samples collected in the spring of 2008 at research sites.

State	Location	SCN Type*
Illinois	Urbana	0
Illinois	Charleston	0
Iowa	Ames	2
Iowa	Kanawha	2
Iowa	Lohrville	0
Kansas	Edwards Co.	0
Kansas	Shawnee Co.	1.2
Michigan	Collins	2
Michigan	Kendle	2
Michigan	Arting	2
Minnesota	Renville	1.2
Minnesota	Ormsby	2
Missouri	Bradford Farm	1.2
Missouri	Graves-Chapple Farm	2
Nebraska	Lyons	0
Nebraska	Tekamah	2
North Dakota	Richland Co. 1	0
North Dakota	Richland Co. 2	0
Ohio	Sandusky	2
Ohio	Putnam	0
Wisconsin	Muscoda	2

*The SCN Type test determines the ability of the nematode population to develop on three indicator lines: PI 548402 (Peking), PI 88788, and PI 437654 (Hartwig). A Type 0 cannot develop on any of the three; a Type 1 develops on Peking, a Type 2 on PI 88788, and a Type 4 on Hartwig (there is no Type 3 in this test).

Investigators/institutions involved in this project: *Loren Giesler co-project leader (University of Nebraska), Carl Bradley co-project leader (University of Illinois), Anne Dorrance (The Ohio State University), Terry Niblack (USDA/ARS/University of Illinois), Greg Tylka (Iowa State University), Doug Jardine (Kansas State University), Dean Malvick (University of Minnesota), Laura Sweets (University of Missouri), Sam Markell (North Dakota State University), Lawrence Osborne (South Dakota State University), Paul Esker (University of Wisconsin), George Bird (Michigan State University), Albert Tenuta (Ontario Ministry of Agriculture, Food & Rural Affairs) and Tom Welacky (Agriculture and Agri-Food Canada).*