

# Heartland

September 2017

# Soil & Crop News

**Waterloo member joins Hall of Fame**

**Heartland members participate in the Ontario Soil Network**

**Soil Conservation Council of Canada visits Heartland Region**



**+ OMAFRA Crop Talk | OSCIA News | County Updates**

Publications Mail # 40046341



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## From the editor

A busy summer has come to an end, with lots going on in Heartland Region! I enjoyed attending many of the events and activities hosted by our members throughout the region, and chatting with farmers about their many challenges following a wet spring and summer. Let's hope that the wet weather is behind us and we can count on Mother Nature to keep us dry as we approach the end of Harvest 2017.

The Heartland Board has taken advantage of some funding available through OSCIA which allowed us to sponsor 2 major events in Ontario this summer. In August we sponsored the Conservation Council of Canada's bus tour that visited the Perth Demo farm as well as the farm of Bob McIntosh and the Elora Research Station. In early September, we partnered with IFAO to produce videos from their Compaction Action event. More on those 2 events later in this newsletter.

In August I was fortunate to join my fellow Regional Communications Coordinators and the OSCIA board and guests at the OSCIA summer meeting in Perth, Ontario. It's been a number of years since I had the opportunity to travel to Lanark County and it was a pleasure to see that beautiful part of Ontario again. Thank you to OSCIA vice president Peter McLaren and wife Suzanne for your fabulous hospitality!

As I write this, Canada's Outdoor Farm Show has just wrapped up, and many of our members in Huron County are likely to be gearing up for the 100th annual Plowing Match in Walton. Fall Fairs are underway across the Region, and before we know it the harvest will be done and we'll be moving into the busy "meeting season". Watch the next edition of the Heartland News, and our website, [heartlandsoilcrop.org](http://heartlandsoilcrop.org), for information about upcoming county AGMs, events and activities.

I hope to see you at an event soon!



Mary Feldskov, Regional Communications Coordinator  
[heartland.scia@gmail.com](mailto:heartland.scia@gmail.com)



**Nominations are now open for the 2018 OSCIA Soil Champion Award.**

**Nominate a deserving candidate — nominations due November 1.**

**More information and a nominations form available at [www.oscia.org](http://www.oscia.org)**



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A quarterly newsletter representing one of 11 Regional newsletters produced 4 times a year in conjunction with the Provincial Newsletter and OMAFRA Crop Talk.



*Proudly serving the members of Huron, Perth, Waterloo and Wellington County Soil and Crop Improvement Associations*

*(Heartland Soil & Crop News is published 4 X a year)*

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*For more information on membership or anything at all, please contact John Poel at 519 860 7639 or at [president@heartlandsoilcrop.org](mailto:president@heartlandsoilcrop.org). Comments, ideas and sponsorship welcome!*

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# UPCOMING EVENTS

October 19: CAFA Farm Tax Update, Delta Hotel, Guelph. More info: [www.cafanet.ca](http://www.cafanet.ca)

November 14-16: Canadian Forage and Grassland Association Conference. More info: [canadianfga.ca](http://canadianfga.ca)

December 1: Wellington SCIA Annual General Meeting. Save the date!

January 3-4: Southwest Ag Conference

January 19-20: FarmSmart — Save the date!

More events, including OSCIA workshops, can be found on the OSCIA website: [www.ontariosoilcrop.org/events](http://www.ontariosoilcrop.org/events)

## OSCIA soil sample discount program extended for 2017

As a benefit of membership, take advantage of a 10% discount on soil sampling at the following laboratories. To obtain a coupon, contact your county secretary or your RCC.

*Valid for current OSCIA members only until December 31, 2017*

*Discount applies to regular priced fees only, on applicable tests and services listed. Not available in conjunction with other discounts or programs, retailers/consultants may offer other discounts. Discount applicable to all samples received on a single submission. No cash value. This coupon must be submitted with samples and grower/field information.*



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10% off soil analysis (not including non-soil samples  
such as manure, feed, tissue etc)  
Producer submitted samples only



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1-855-837-8347  
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basic plus micro-nutrient analyses (S1B + S7)  
producer submitted samples only



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[www.exova.com/sectors/environmental/](http://www.exova.com/sectors/environmental/)

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analysis packages



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10% off all agricultural services





# County updates

## Huron SCIA

President: Doug Walker

Secretary: Sharon Devine, 519-868-8946

sharondevine@tcc.on.ca



Huron County SCIA took advantage of GLASI funding to produce a video and brochure of their ongoing work at the Huronview site near Clinton.

The project, titled “Sustainability in Action” highlights the partnership between Huron SCIA, the County of Huron and the Ausable Bayfield Conservation Authority.

The project was unveiled at Canada’s Outdoor Farmshow. The video can be viewed at [heartlandsoilcrop.org](http://heartlandsoilcrop.org)

Huron County SCIA also co-hosted 2 events with the Ontario Soil Network, featuring Rick Kootstra and Alan Willits (see more on p. 8).

## Waterloo SCIA

President: Aaron Stevanus

Secretary: Lynn Strenske, 519-648-2436

Waterloo SCIA partnered with Keith Martin to host a crop tour on September 5. Keith is participating in the Ontario Soil Network program (see p. 8).

A bus tour to Quebec, originally planned for summer 2017, was postponed until 2018. Stay tuned for more information about this fantastic opportunity!

## Wellington SCIA

President: Carl Israel

Secretary: Linda McFadden

519-362-2094 [linda.mcfadden@wightman.ca](mailto:linda.mcfadden@wightman.ca)

Record breaking crowds took part in Wellington’s annual Twilight Tour, held July 20 at the farm of Jake



Kraayenbrink

and Luymes Farms. Capping off the evening was a presentation by Professor Clarence Swanton from the University of Guelph.

Special thanks to Grand River Conservation Authority and the Ontario Soil Network for sponsoring the BBQ and desserts.

## Perth SCIA

President: Kaye McLagan

Secretary: Sara Wood, [perthscia@gmail.com](mailto:perthscia@gmail.com)

Perth’s annual Twilight meeting was held June 28 at the Demo Farm near Bornholm.

Perth SCIA also generously sponsored the 2017 Soil Conservation Council of Canada’s Soil



Summit farm tour. They prepared a delicious hot lunch that was appreciated by the tour participants who had just come from a very wet tour of the Perth Demo Farm.



# Heartland Region on tour: Soil Conservation Council of Canada's Soil Summit

Held August 22—23 in Guelph, the Soil Conservation Council of Canada kicked off their 2017 Soil Summit with a tour through Heartland Region. With funding from the Farmland Health Education Trust, Heartland Region sponsored the bus tours that saw more than 140 participants from across Canada visit the Elora Research Station, Perth SCIA's Demo Farm at Bornholm, and the farm of Bob McIntosh near St. Mary's.

Special thanks to Perth SCIA for sponsoring and preparing lunch for the hungry (and wet!) tour participants., and to Huron SCIA for sponsoring one of the tour buses.



**Deanna Hutton** @DeannaHutton2 · Aug 22

@soilcouncil #soilsummit17 Tour today learning about soil health and soil ecosystems with Dr. Claudia Wagner-Riddle, U of G – at Elora Research Station



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**Tori Waugh** @tori\_waugh · Aug 22

@WheatPete vs @soilwarrior strip till demo!

This moment captured at one of the fascinating stops at #SoilSummit17



4



**Cristina da Silva** @CristinaGardens · Aug 22

Showing soil aggregates in different rotations. Continuous alfalfa (left) best, worst in CCSS rotation #soilsummit17



1 2



**Peggy Brekfeld** @PeggyBrekfeld · Aug 22

"Farmers need to realize that the water that leaves our farms will end up as someone 'a drinking water' Bob McIntosh, farmer #soilsummit17



**Lillie Ann Morris** @LandForFood · Aug 22

TY to counties of Heartland Region @OntarioSoilCrop & Huron Tractor for lunch, transportation & sponsorship of #SoilSummit17 Tour today. ❤️

# Long-time Waterloo SCIA member inducted into Conservation Hall of Fame

***Editor's note: Harold Rudy is best-known as the former Executive Director of OSCIA, but he has also been a long-time member of Waterloo SCIA. Congratulations to Harold on this outstanding achievement. Below is the citation read at the awards ceremony at the Soil Conservation Council of Canada's Soil Summit on August 22.***

Harold Rudy grew up and continues to live on the family farm with his partner Sandra, near New Hamburg, Ontario. Here he established a thorough understanding of grassroots agriculture. He earned a Bachelor of Science (Agriculture) – Economics and Business Major and a Master of Science, School of Rural Planning, both from the University of Guelph. Following positions in farm management and research, he joined the Ontario Ministry of Agriculture and Food (OMAF) as a “Soil Conservation Advisor.” Here he assisted farmers in all aspects of soil conservation.

In 1987, when Ontario Soil and Crop Improvement Association (OSCIA) began program delivery, he began his 30-year career in senior management. As their Executive Director, Harold lent his expertise in the design and administration of programs where producers, researchers, extension experts and policy-makers worked collaboratively to affect scientifically based change with the goal of improving soil management and soil health. Harold's work also focused on a formula for influencing decision-making on the farm that combined education, proven best management practices and cost-share incentives. He is particularly associated with delivery of the Environmental Farm Plan; however, he provided leadership in development and delivery of many subsequent programs and projects.

OSCIA's history of success has empowered countless agricultural producers to learn more about how their land management decisions impact on-site sustainability and profitability, and off-site quality of life. Harold has shared his insight and experience in program delivery across Canada and around the world. In his current role as OSCIA Executive Officer, Research and Business Development, his unbridled drive is to see heightened interaction between researchers and producers in targeting resources to better understand soil health and the role of soil life for optimal farm production and stewardship practices.

He has earned the respect of peers in government, university research and other organization circles, and unquestionably enjoys his long-standing relationship with OSCIA membership and colleagues.

Harold is currently working on a book, “The Soil Fixers,” which documents the many contributions to Ontario agriculture by members of the OSCIA and partners from the mid-1980s to the present day.

Harold Rudy's insight, hard work and leadership make him a worthy inductee into the Canadian Conservation Hall of Fame.



Lillie Ann Morris @LandForFood · Aug 22  
Congratulations Harold Rudy on your induction into the @soilcouncil Canadian Conservation Hall of Fame at #soilsummit17



14 18





# Ontario Soil Network in Heartland Region



Healthy soil is the foundation of sustainable agriculture and improved water quality. To improve the environment, we believe that farmers have the solutions. The Ontario Soil

Network is leadership program by farmers and for farmers, to connect each other to on-farm knowledge about cover crops, min-till, compost, etc. that improve soil health.

The program currently includes 35 farmers and 10 extension staff and operates under the umbrella of the Rural Ontario Institute, a non-profit organization that has been developing rural leadership in Ontario for decades. The Ontario Soil Network is supported by the Ontario Soil & Crop Improvement Association, the Innovative Farmers of Ontario and many other farm organizations, and funded by OMAFRA.

This leadership course is a pilot project with a goal to train, support and inspire 'soil leaders' in Ontario. If you've attended a Soil & Crop event in the Heartland Region this summer, you've likely met some of them!

**Rob Luymes** is a 29-year old farmer near Moorefield who took the plunge into the speaking circuit last year, just after he took the plunge planting soybeans into a living rye cover crop. Along with Jake Kraayenbrink, he hosted Wellington's Twilight Tour on July 20<sup>th</sup> to show off corn that was planted into a fall strip tilled cover crop.



Rick Kootstra welcomed farmers to his Clinton-area farm to discuss strip till and cover crops

**Rick Kootstra** and **Alan Willits** are Huron County farmers that ran a double-header tour for Huron Soil & Crop in August. Rick (Clinton) hosted 75 farmers for an afternoon session on strip till and cover crops, including Kate Moore, Scott Cantelon, Steve Reynolds (Huron Tractor), Stefan Zehetner (Huron Cover Crops) and two fellow Ontario Soil Network-ers, **Ross Wilson** (ABCA) and **Ken Nixon**. On August 31, Alan hosted a discussion on cover crops and corn on his Wingham-area farm: inter-seeding cover crops into corn and planting corn into cover crops. Jackie Clark, a Master's student from the University of Guelph, presented her research from the last two years of interseeding trials. He was also joined by fellow soil network-er **Christine George**, a soil biologist with Alpha Agri who ran soil demonstrations.



Alan Willits revealed the results of his "soil your undies" test

**Keith Martin** is an equipment manufacturer and farmer near Elmira and for the last three seasons, he has been hosting OSCIA's Roots Not Iron plot in which he is trialing 3 management systems side-by-side in his field. He hosted a Twilight Tour Sept 5 in association with Waterloo Soil & Crop to share his strip till, cover crop and fertilizer rate trials, along with a soil health demonstration run by OMAFRA's **Anne Verhallen**, another key player in the Ontario Soil Network.

Participants on the Ontario Soil Network leadership course are running field days and soil demonstrations for their peers, speaking to other farmers about their experiences with new management systems. Some of them are also working together to crunch their numbers and run the economics of healthy soil. Others will be participating in an upcoming media campaign in the farm press. Keep your eyes peeled for these farmers and their stories in the next month! ~submitted by Mel Luymes



# Heartland SCIA co-sponsors “Compaction Action” videos



On Thursday, September 7, the Innovative Farmers Association of Ontario (IFAO) hosted “Compaction Action” at Shawridge Farms near Arthur, Ontario.

The event featured Matthias Stettler from Bern University in Switzerland, who spoke to the crowd of more than 300 farmers about the effect of heavy equipment on farmland, demonstrated in “real-time” the measurement of the effects of weight and compaction from planters, tractors, grain buggies, sprayers, manure tankers and wagons equipped with various tire, track and inflation configurations.

Heartland Regional SCIA is pleased to partner with IFAO to produce a series of videos from the day, that will be shared broadly to help advance the knowledge of Ontario farmers on the impact of compaction on their farms. Funding for this project was provided by the Farmland Health Education Grant.

Once completed, the videos will be available to view on the Heartland Region SCIA website.

In the meantime, look for an interview with Stettler & Real Agriculture’s Peter Johnson:  
<https://www.realagriculture.com/2017/09/innovative-farmers-take-action-on-compaction/>



Gabrielle Ferguson @AggieFerg17 · Sep 7

How do u fix soil compaction? Biological-cover crop, rotation. Structural-ripper in dry August #compactionaction @tonybalkwill @IFAO123



1 4 6



RealAgriculture @realagriculture · Sep 8

Did you miss **Compaction Action** @IFAO123? We have a full wrap-up with Matthias Stettler & @WheatPete: [bit.ly/2vLx9UG](http://bit.ly/2vLx9UG)



3 2

Anne Verhallen @Anne\_Verhallen · Sep 7

Keep inflation pressure below 15 psi to reduce shallow compaction  
#CompactionAction sprayer comparison @IFAO123



1 4 7





September 2017

# OSCIA PROVINCIAL NEWSLETTER

## Message from the President - Mack Emiry



It seems to be particularly difficult to write a message this year without commenting on the weather. In much of Ontario, difficult planting conditions were followed by exceptionally wet and cool weather for haylage/hay making. Forage volumes have been high with considerable variation in quality. Despite weather challenges, I hear of record yields of fall wheat with good quality and we are also seeing above average yield in spring barley.

In July, the OSCIA Executive travelled to St. Clair Region for an outreach meeting. There is strong interaction between OSCIA and Conservation Authorities in this Region. This was evident in the work which is being done to reduce phosphorous loss and entry into the waterways. Cover crops and reduced, targeted, or no till methods are proven practices to achieve this objective.

Caring for our soil and understanding what is happening below the surface has become a major focus of our organization, as it is with good farmers (stewards of the land) everywhere. The Summit on Canadian Soil Health was held in mid-August and was organized by the Soil Conservation Council of Canada. The event was packed with excellent presentations on the measurement of soil health and sustainable management. Field visits with researchers, soil specialists, and farm operators focused on what can, and is, being done to mitigate and even eliminate soil degradation. While we are all conscious of water and wind erosion, have we considered tillage erosion? This provides another reason to use reduced tillage as much as possible.

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[www.ontariosoilcrop.org/news/](http://www.ontariosoilcrop.org/news/)

- Get all the latest media releases, upcoming events listings and much more...

An interesting comment was made by the representative of a crop input company at a crop tour I attended in Temiskaming District in July. We were looking at an excellent stand of corn and the statement was made that with the rapid advance in genetics it would not be many years before corn varieties available would mature even sooner than required for the area. This is an area where growing corn was rarely attempted only a few years ago.

Until the next time,

*Mack Emiry*

Mack Emiry, OSCIA President



A QUARTERLY NEWSLETTER, ISSUED  
ALONGSIDE 11 REGIONAL NEWSLETTERS AND  
OMAFRA CROP TALK, TO UPDATE SOIL AND  
CROP MEMBERS

## In this Issue

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- Farmers, Conservation Authority  
Spearheading Water Quality Improvements
- Sparking Membership Engagement
- Skills Development Workshops
- The Summit on Canadian Soil Health
- OSCIA Summer Meeting 2017 – Ottawa-Rideau  
Region

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1 Stone Road West, Guelph ON N1G 4Y2  
Phone: (519) 826-4214 or 1-800-265-9751  
Fax: (519) 826-4224

Website: [www.ontariosoilcrop.org](http://www.ontariosoilcrop.org)

OSCIA Provincial Newsletter • We are farmers actively seeking, testing, and adopting optimal farm production and stewardship practices



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## Farmers, Conservation Authority Spearheading Water Quality Improvements

Farmers in Essex County's Wigle Creek subwatershed are working closely with the local Conservation Authority to help improve water quality in the region.

The algae bloom in nearby Lake Erie has made phosphorous reduction a key priority, according to Katie Stammmler, Water Quality Scientist with the Essex Region Conservation Authority. She credits local cash crop farmer Henry Denotter with helping to bring a Priority Subwatershed Project (PSP) to the Wigle Creek area.

Funded through the Great Lakes Agricultural Stewardship Initiative (GLASI), the project offers eligible farm businesses up to 80 per cent cost share to a maximum of \$75,000 to establish specific agronomic and soil health Best Management Practices (BMPs) on the land they farm.

"We want to show what we are doing and what we can do to reduce phosphorous levels through BMPs and Henry was a big advocate for this program coming to our region," said Stammmler.

To date, almost half of the 30 farmers in the watershed have launched on-farm projects in the subwatershed. Wigle Creek was chosen for the program because it is representative of the greater Lake Erie watershed area: cash crops grown on Brookston clay soil, flat topography, and high in-stream phosphorous concentrations.

Projects involving cover crops, in-field erosion control structures, conservation tillage, phosphorous management and crop nutrient plans have been particularly popular. Through a partnership with the local co-operative AGRIS, for example, nine farmers have completed five-year crop management plans for their land and most of the watershed has been grid soil sampled.

Funding has also gone to support new equipment purchases by farmers, including strip tillers and technologies to incorporate fertilizer into the ground or do variable rate nutrient application.

Denotter, who has about 450 acres in the subwatershed area, feels that ensuring fertilizer is placed in the ground is an excellent way of keeping phosphorous out of water courses.

He used PSP funding to help buy a new fertilizer and seeding air cart and then worked to modify it for better performance and integrate it with his existing equipment.

"The air seeder helps control the fertilizer placement because it's all going directly into the ground," he explained, adding that he also used the program for cover crop trials. "The funding has been a big help."

And he's pleased with the outcomes to date—strong plant root systems, good earthworm populations and marbled earth are signs that soil health is improving.

His farm often serves as host to twilight meetings and farmer information sessions, as well as tours led by Grain Farmers of Ontario, Farm & Food Care and others so people can see conservation tillage and 4R nutrient use strategies (application at the right source, right rate, right time and right place) in action.

"I've learned from other people over the years and I enjoy the networking and having people coming out to look at what we're doing and asking questions," Denotter said. "And we need grassroots involvement in these types of initiatives."

For Stammmler and the Essex Region Conservation Authority, a significant benefit of the project has been being able to build positive relationships with local farmers. The organization has an agricultural technician on staff, but the water quality staff members aren't farmers, so being able to learn from local landowners who have been invaluable.

"It's very beneficial for us to have more on the ground knowledge and get a better understanding of what we're asking them (the farmers) to do, their challenges, and why they may be hesitant to do something—it's mutual respect building," she said. "People who aren't farmers have to understand the risks of what it takes to do BMPs."

Funding is still available for projects in 2017, the final year of the program. Eligible BMPs include cover crops, alternative phosphorous application practices, crop and field nutrient management plans, drainage and water management, buffer strips and conservation tillage.

To participate in the program, eligible landowners have to be willing to share historical land use data for their fields in the area, including crop types and yields, fertility and tillage practices, and field characteristics like drainage, tile spacing or soil sample results.

"We'd love to see more people try cover crops or complete a crop management plan, for example," Stammmler said. "It's also a good source of funding to help buy equipment."

GLASI is funded through *Growing Forward 2*, a federal-provincial-territorial initiative, and is delivered by the Ontario Soil and Crop Improvement Association.

More information is available from <http://www.ontariosoilcrop.org/oscia-programs/glasi/priority-subwatershed-project/>

Written by Lillian Schaer for OSCIA



## Sparkling Membership Engagement

During the skills development workshops earlier this year, members were encouraged to provide their input on resources that could be used to assist their local and regional associations. All suggestions were documented, and compiled into an "Association Wish List". Many great ideas were brought forward that could be used to spark membership engagement and provide added value. With Executive Committee approval and consideration of available budget, two ideas have been implemented now.

First, OSCIA is offering membership gate signs at a reduced rate of \$7.50 for a limited time. In the past, the provincial association has been offering the signs on a cost-recovery basis of \$15.00, but for a limited time will be absorbing the difference.

Our second item addresses one of the most attractive aspects of joining an association: the sense of belonging and the feeling that you are a part of something bigger. So, OSCIA developed a promotional window decal. The decal is affixed to your vehicle or shop window by static and not only showcases OSCIA's new branding, but provides a way for members to show their association pride. Decals can be purchased for a reduced rate of \$1.00 each.



For members interested in purchasing a farm gate sign or window decal, please contact your local secretary.

*Written by Brittany Roka, Association Development Advisor*



## Skills Development Workshops

With several new skills development resources in place and membership engagement growing, OSCIA is eagerly gearing up to launch the next round of workshops. After asking several local/regional secretaries and treasurers through scans, many common challenges were identified. To address those challenges, the workshop will focus on clearly identifying roles and responsibilities, reporting requirements, ways to recruit and retain new members, grant applications and more. Although training is not mandatory, many secretaries and treasurers have expressed their desire to participate.

During OSCIA's Summer Meeting in August, Regional Communication Coordinators (RCC) participated in a skills development workshop. The training was a good opportunity for RCCs to share best practices, brush up on their presentation skills, provide input on primary responsibilities, establish new skills and network. Many great ideas were brought forth during the table discussions and several RCCs have already expressed their excitement to start implementing those ideas.

OSCIA is continuously working to increase skills development resources and amplify membership engagement, so we as an organization can keep moving forward to reach this goal that was set out in our 2015 Strategic Plan.

This project was funded in part through *Growing Forward 2 (GF2)*, a federal-provincial initiative.

*Written by Brittany Roka, Association Development Advisor*



## Ontario Soil and Crop Improvement Association SOIL CHAMPION

Awarded annually to recognize  
**outstanding contributions** to  
**soil management** that directly  
influences **soil health**  
**and crop production**  
**sustainability** in Ontario

**Nominate your friend, mentor,  
or yourself by:**

**NOVEMBER 1, 2017**

*Associations can ask their RCC for help*



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## The Summit on Canadian Soil Health

Sponsored by the Soil Conservation Council of Canada (SCCC), the Summit on Canadian Soil Health emphasized the urgency of improving soil health. According to keynote speaker, Dr. Don Reicosky, Scientist Emeritus at the USDA, good soil health includes:

- a) soil particles that bind to each other (aggregates) with adequate pore space between the aggregates for retention and exchange of air and water, and
- b) sufficient living organisms ideally making up 5% of the organic matter.

Dr. Reicosky emphasized that “soil fauna and microbial action is the equivalent of grazing two African elephants per acre.” (Source: Jerry Hatfield, the director of USDA’s National Laboratory for Agriculture and the Environment in Ames, Iowa.) Tillage destroys soil micro-organisms and releases carbon dioxide. According to Dr. Reicosky’s research, after a 24-hour period, tillage with a moldboard plow releases close to 160 cumulative grams CO<sub>2</sub>/square meter versus no-till planting which releases only 7.2 gm CO<sub>2</sub>/square meter.

Don Lobb, coordinator of the conference, emphasized the importance of urgent action, with a summary of key points below:

Soil restoration is contingent on the increase and protection of aggregates, organic matter and biota;

Landscape restoration and stabilization is a necessary counter-measure to tillage erosion and pre-empts the highly promoted precision crop management;

Perennial forage production is critical to maintaining and improving food productivity on fragile and degraded land. Ruminant use of those forages results in large volumes of nutrient rich, biologically active water being returned to pasture and rangeland. This is critical to reversing the degradation curve;

Industrial and fuel use of crop materials and grains exploits organic matter and nutrients that are needed for soil re-generation. We need to be careful with this!

Water availability can be enhanced by strategic use of trees, soil cover, and strategic wetland protection. We can have a precision water management and cycling system through systematic combinations of sub-surface drainage, irrigation, surface water management and containment reservoirs. Water use efficiency may be measured by calories produced per volume of water used. This would be important for food production priorities.”

(Lobb, Don, Challenge Presentation: Who is Responsible? August 23, 2017).

With urgency to address soil degradation and a growing population, Mr. Lobb emphasized that we are all responsible for soil care: farm organizations, farmland operators, landowners,

crop advisors, agricultural support businesses, conservation professionals, the food processing and retail community, the science community, government, and society.

Full conference proceedings can be obtained from the SCCC website: <http://www.soilcc.ca/>

*Written by Harold Rudy, Executive Officer*



## OSCIA 2017 Summer Meeting

The OSCIA Summer Meeting is an annual event hosted by the 1<sup>st</sup> Vice President. This year, that was Peter McLaren representing the Ottawa-Rideau Regional Soil and Crop Improvement Association in Lanark County. This is a great way for the 1<sup>st</sup> Vice to show off their farm as well as their local community. A tremendous amount of work goes into the event by the host’s family, the local associations, and a few key Guelph office staff! The Summer Meeting is an opportunity for the Board and some staff to meet face to face and draws in many past presidents, spouses and dignitaries. It’s a time to tend to association business, and to reminisce and catch up with friends. This year, the event started in Lanark, about a 1.5-hour drive north of Kingston, at the McLaren Farm. The beef and cash crop farm has been in the McLaren family since 1839 and is operated by Peter and Suzanne.

After a reception at the farm, the group went on a tour of Tatlock Quarry followed by dinner and entertainment at the Civitan Hall. While the Board and staff met for the formal business meeting on Monday, the other guests enjoyed the sights and sounds of the Region. The tour led to the RCMP horse stables, John Nanne test plots, the Barry Dean Museum, Carleton Place Museum, and Wheelers Pancake House, Sugar Camp, and Museums. Tuesday, traditionally, is the day the entire group tours together. This allows the Board, staff and other guests to enjoy a few additional sites, and enjoy one another’s company. This tour began with a visit to the processing plant of the Tatlock Quarry, then to the Rideau Canal Museum, and ending at Tackaberry’s Museum.

All the tours were informative, interesting and provided a wonderful opportunity to mingle with members and staff. Next year’s summer meeting will be held in the Georgian Central Region, hosted by Les and Mary Nichols.

Visit our website for more information on our association. <http://www.ontariosoilcrop.org/association/>

*Written by Guelph Office staff*





# CROP TALK

Volume 17, Issue 3 OMAFRA Field Crop Specialists — Your Crop Info Source

September 2017

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## Phosphorus: An Essential Nutrient for Soybean Production

**Horst Bohner, Soybean Specialist, OMAFRA**

When fertilizing soybeans the emphasis is usually placed on potassium (K). Soybeans have a reputation of not responding to phosphorus (P) fertilizer. This idea comes in part from the fact that beans remove large amounts of K and much less P. There is now a growing body of evidence that phosphorus is vital to achieving high yielding soybeans. When soil test levels are low for P, soybeans can show a substantial yield response to added  $P_2O_5$ .

### Why is P important?

Phosphorus along with nitrogen and potassium is a primary nutrient required by plants to complete their life cycle. It's especially important during the early stages of growth and development. One important role of P in plants is to store and transfer energy produced by photosynthesis which is then used for growth and reproduction. If P is limiting, plants cannot grow adequately, which limits their ability to cope with stress. Slow root and shoot development results in delayed maturity and reduced yields. Phosphorus is also a component of cell membranes and is part of the structure of DNA. A 50 bu/ac soybean crop will take up as much as 50 lb/ac of  $P_2O_5$ . Relatively large amounts of P are required by plants compared to most other nutrients.

### Soybean yield Response to P

Traditional thinking has been that soybeans do not show a significant yield response to P fertilizer unless soil test values are very low. Recent trials have demonstrated surprising yield responses to P in soybeans. Visual P deficiency symptoms are rare and difficult to identify even when present. In extreme cases the plants are slow to grow, spindly, and the leaves remain smaller and lighter in colour. Most of the time these symptoms are subtle and usually overlooked unless there is a good side by side comparison. Soil compaction limiting root growth will also cause weather induced deficiency. Ontario trials conducted over the last 5 years by the University of Guelph and OMAFRA have shown that when soil tests are less than 20 ppm for P and less than 120 ppm for K the application of potash by itself only raised yields by 1 bu/ac. When both P and K were applied yields increased by 4 bu/ac. When P soil test levels were low but soil test levels for K were adequate the application of P increased yields by 3 bu/ac. This is strong evidence that phosphorus is a critical component to high yielding soybeans. If soil tests were adequate for P and K additional fertilizer did not increase yields.

One of the most important findings of the study to date has been that applying fertilizer to low testing soils produces lower yield than a soil that



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was built in P and K. Building soil test levels to reasonable soil test values (20 ppm for P and 120 ppm for K) appears to be a good long term strategy to maximize soybean yields.

### **What about Environmental Concerns and P?**

Soil erosion is a major concern for phosphorus loss from land to water. However, P can also leave fields in the form of soluble P, either in surface runoff or through tile drains. Best management practices that limit soil erosion will go a long way to reduce field losses, but should also be paired with fertilizer placement and timing practices that minimize risk of loss. Summer (after wheat harvest) is an excellent time to apply fertilizer since the risk of loss is lower at that time. If applying phosphorus in the non-growing season (e.g. October), it should not be left unincorporated on the soil surface.

There is no reason to believe that excessively high soil test values through over fertilization will lead to economic returns. Very high soil test levels can lead to increased environmental risks. On the other hand, not building soil test values to reasonable soil levels will lead to lower yields in the long run. So, clearly a balanced approach is necessary. This includes the right amount of  $P_2O_5$  for soybeans at the right time, which appears to include building low soil testing fields over a number of years. Building soil test levels to moderate values does not necessarily increase the risk of loss to the environment, but it is critical that best management practices are followed.

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## **2018 Disease Management Begins Now!**

**Albert Tenuta, Field Crop Pathologist, OMAFRA**

Winter wheat harvest is complete across the province and yields have been good to above average in the majority of areas, with good quality and very little *Fusarium*/DON reported. Stripe rust, especially in Essex/Chatham-Kent, did not have a big impact this year in those fields planted with a susceptible variety due to lower inoculum (spores) coming in from the US, increased scouting and well timed foliar fungicide applications. Remember to consider disease ratings for *Fusarium* head blight, leaf and stripe rust, etc. when making your wheat variety choices this fall. Ask your seed dealer or check the Ontario winter wheat performance trial report for more information on specific varieties.

Growers frequently ask, “if I had stripe rust this year does that mean I will have stripe rust again next year?” The easy answer is NO since wheat rust diseases need living green plants to survive and as long as we have winter we start clean each year. The mild winters the past two years have resulted in a larger geographical area in the southern US where stripe rust can overwinter as well as more spores than normal coming into Ontario, and arriving earlier than normal. The cereal rust network, which OMAFRA is a part of, will continue to monitor the overwintering status of leaf and stripe rust this winter and spring.

Regardless of whether conditions have been wet or dry, the soybean crop can face disease issues. The weather in some regions has favoured soybean cyst nematode (SCN), and sudden death syndrome (SDS), and in others has favoured white mould. White mould is easy to identify but SCN and SDS can be misdiagnosed for other common problems. For SCN, dig plants with a shovel and gently remove soil and examine roots for the presence of the small white to yellow cysts. If you see no or very few cysts on the roots this is a good indication you have a low population or a highly resistant variety. If you have 50 or more cysts, you are looking at a less tolerant variety or your SCN population is changing to SCN types that can reproduce on the PI88788 SCN resistance source. In many areas of the US Midwest such as Iowa, Illinois, Missouri and other states, SCN populations which can reproduce on the PI88788 SCN source are very common (50% of tested fields or more). In Ontario, these SCN populations do occur but to a lesser extent. They have been found in 25% or more of the fields tested by Dr. Tom Welacky at AAFC in Harrow.

So how do we keep SCN populations down or delay population shifts? SCN management includes rotation with non-host crops such as wheat and corn, rotating resistant varieties as well as rotating between PI88788 and Peking SCN resistance genes. Consider SCN seed treatments, scout for cysts, and take an SCN soil test to monitor nematode populations. When it comes to SCN, remember that regardless of the conditions, SCN will steal yield every year. If anything, SCN is consistent and that is why it is called the “silent yield robber”.

For sudden death syndrome (SDS), symptoms on the leaves appear as yellow and brown areas between the veins while the veins remain green, which can be confused with manganese deficiency. Leaves will drop but the petioles (leaf stalks) will remain on those plants infected with SDS. To confirm SDS, cut open the root and stems and look for rotting roots and brown discoloured streaks in the stem. With SDS the center pith will remain white.

As we are approaching the end of the 2017 growing season, it is the perfect time to reflect on the season and note areas in your fields which were problematic and did not perform as well as expected. They may have had visual symptoms or had reduced yields which stick out on the yield monitor. Take what you learned and observed this year and include this information into your plans for next year. Plan to conduct pre-harvest scouting or post-harvest sampling of your fields. What you observe now in terms of diseases, insects, weeds, and other problems will assist you in selecting the appropriate varieties and management strategies not only next year but for future years as well.

Start by taking a soil sample for soil issues such as pH, fertility, etc. and make plans to correct those issues in 2018. If you plan to plant soybeans in these fields next year, the soil sample could be split into two to allow for SCN testing. An SCN test should be taken every 4 to 6 years to determine changes in SCN population. Remember, DO NOT grow the same SCN variety year after year in a field as this could cause a shift in the SCN population, making that variety's resistance package ineffective and resulting in increased SCN population levels in a field.

Selecting the right genetics for 2018 is critical to high yields and it is important to remember to include disease tolerance or resistance characteristics of your hybrid/variety in the decision process. Diseases such as corn ear moulds, Northern corn leaf blight, soybean cyst nematode, *Fusarium* head blight, rusts in wheat and oats, *Phytophthora* root rot, sudden death syndrome and many others pose a risk across the province each year. Remember, each field is different and start by selecting hybrids/varieties with resistance or tolerance appropriate for each field based on disease risk potential (high levels of crop residues, short rotations such as corn/corn, soy/soy) and especially those with a history of disease. Remember the best defense is a good offense!

Reduce your disease risk next year and make selecting the appropriate hybrids/varieties for those diseases part of your must-have list! Check the Ontario Performance Trials for corn, soybean, and cereals and talk to your local seed dealer for more information pertaining to specific hybrids/varieties. Do not take this important decision lightly!

Ontario variety performance trial websites:

[www.gocorn.net](http://www.gocorn.net)

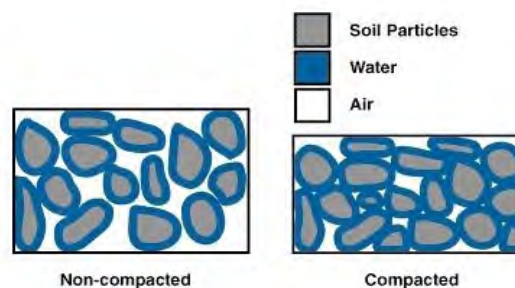
[www.gosoy.ca](http://www.gosoy.ca)

[www.gocereals.ca](http://www.gocereals.ca)

## Compaction: A Management Decision

**Ian McDonald, Crop Innovation Specialist, OMAFRA**

In the way that we decide as farm managers what crop and variety to plant, when and how to plant it, and how to support it through the season, we decide to have or not have compaction! Compaction in its purest sense can be defined as “an applied pressure/force exerted on a landscape that reduces pore space within the soil matrix” (Figure 1). It's more complicated than this, but it gets the point across. If we were to do nothing on our fields they would not be compacted. But that is impossible since we need to plant the ground to have a crop! However, the decisions we make impact the occurrence and severity of compaction.



**Figure 1.** The difference in porosity between compacted and un-compacted soils (Jodi DeJong-Hughes, University of Minnesota, 2001)

One of the biggest learnings from this spring to remember is that the goal of achieving early planting dates has to be coupled with the requirement that the soil is “fit” for those field operations to occur. Otherwise you may be setting yourself up for compaction and potentially a multi-year impact on crop productivity. There are ways to reduce the risk and severity of compaction by deciding when the soil is “fit”, and then what equipment configuration will minimize the risk of inflicting compaction (size, tire technology, inflation pressure, weight distribution, etc).

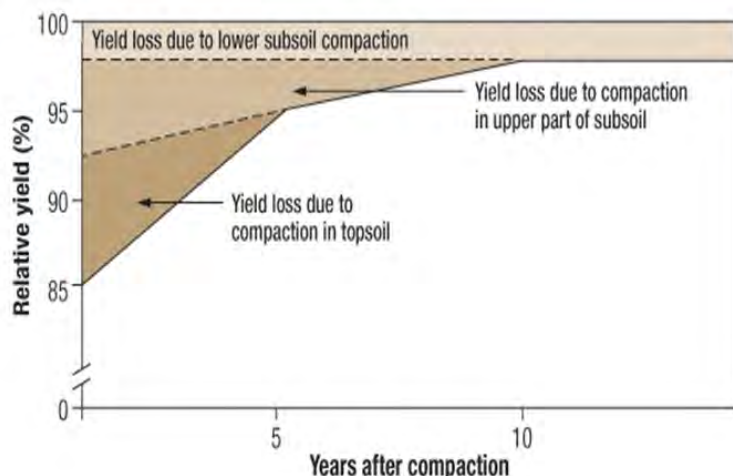
Compaction has always been troublesome. We know we have it but we do not know how to deal with it. Compaction has likely accelerated in the last couple of decades and the ease with which we can deal with it has become more complex. Things have changed dramatically in farming in Ontario and across the continent. Some of the big changes have been shifts from mixed livestock and crop operations to more specialized farms, increasing farm and field sizes, fewer acres of perennial forage, fewer acres receiving manure, and increases in the size and weight of equipment.

As a result of these changes in farming, the fields are under more stress from compromised soil health and the intensity of equipment use and traffic across fields. To manage this effectively we have to work towards continually building our soil health through tillage management, longer crop rotations, incorporating cover crops and other soil amendments, and choosing the right equipment that is configured in the best way and is used when conditions are suitable. As an example, after considerable investments are made on combines, headers and grain buggies, which place a very heavy weight on the field as per Table 1, we should be ensuring we spend the money to equip them with the best tires (size, technology, and inflation pressures) that allow us to lower our risk of compaction. Tied to this is finding the patience to put the equipment on the fields only when the conditions are suitable. Being almost ready is not the same as being really ready. The damage done by working in fields that are too moist can have long term consequences as shown in Figure 2. Depending on soil type and weather, waiting for “fit” soils can range from a few hours to several days. That can be frustrating, but the damage we can do can stay with us for a long time.

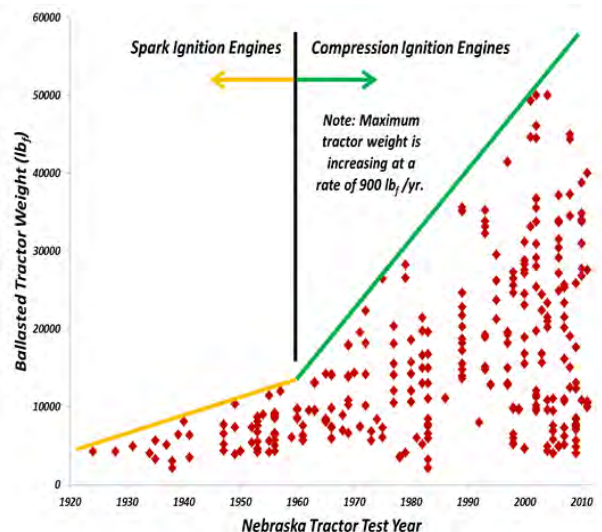


Figure 2 suggests that once soil compaction is driven down into the subsoil, that loss, although small (3-5%), may never be recaptured. Even compaction into the upper portion of the subsoil may take upwards of 10 years to recuperate the additional 5% or more of yield loss, and the figure does not account for accumulative compaction. Therefore the goal should be to avoid compaction, or at the very least to minimize it.

A look at the historical results of the Nebraska Tractor Test Laboratory program shows how the size and weight of equipment has increased (Figure 3). Tractor weights have increased by, on average, 900 lbs/year for tractors purchased on North American farms. The weight and capacity of equipment (thus loaded weight) has reached astounding levels. Ironically when you look at these weights in relation to the 10 ton/axle limit on Ontario roads, a purpose built infrastructure to withstand weight and excessive use, it seems peculiar that we don't give more thought to putting much greater weights onto our delicate farm fields.



**Figure 2.** Relative Yield Impact Level and Duration from Soil Compaction. (Hakaansson and Reeder (1994) and Duiker (2004).

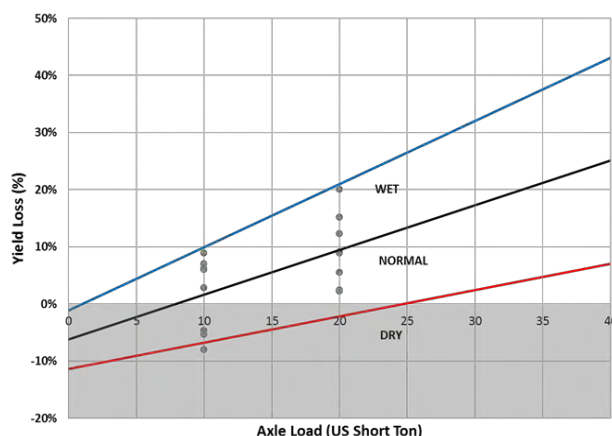


**Figure 3.** Increase in average tractor weights over time (Shearer, Ohio State University, Columbus OH)

Table 1 and Figure 4 show the typical weights of equipment being put into the field these days, and the impact of that equipment on crop yield resulting from compaction under different soil conditions. These trends make it difficult to manage compaction since many exceed the 10 tons/axle threshold that in general leads to soil compaction under moist soil conditions, and the judgement on what constitutes moist soil can vary widely.

**Table 1.** Typical weights of current farm equipment (Jodi De Jong - Hughes, University of Minnesota)

Common Field Equipment Axle Loads	
Equipment Type	Tons/Axle
4WD tractor, 200hp, Front Axle	7.5
4WD tractor, 325hp, Front Axle	13
4WD tractor, 530hp, Front Axle	18
TerraGator, Rear Axle	12-18
Slurry Tanker, 4,200 gal.	10-12
Slurry Tanker, 7,200 gal.	17-18
Class 9 Combine, 590hp, 360 bu tank	20
12 - row Combine, full with head	24
Grain Cart, 720 bu, full 1 axle	22
Grain Cart, 1,200 bu, full 1 axle	35-40
Loads greater than 10 tons/axle will cause subsoil compaction when the soil is wet.	



**Figure 4.** Impact of compaction resulting from various axle loads under different soil conditions at time of operation (Shearer and Fulton, Ohio State University, Columbus OH @ CompactionSmart 2017)

When you compare the equipment axle weights in Table 1 to the impact on yields shown in Figure 4, it is very telling how important soil “fitness” is when equipment is put on the soil. At 20 tons/axle the yield impact is in the 20% range on the crop the following year.

While we do have to plant the crop, the when, where, and how we do that has a direct impact on the occurrence and severity of compaction. Other management decisions also contribute to compaction or alleviating it, including rotations, cover crops, reduced and timely tillage, etc.

Using this spring as an example, most farmers felt constrained by the weather delaying field work and the long history of being encouraged to achieve early planting dates to capture optimum yield potential. It was difficult to remain patient to get into the fields when conditions were suitable. This decision along with the selection of equipment and its weight dictates whether we avoid compaction or at least lower its severity. One of the biggest learnings from this spring is to remember that the goal of achieving early planting dates has to be coupled with the requirement that the soil is “fit” for those field operations to occur. Otherwise you may be setting yourself up for compaction and potentially multiyear impact on crop productivity. There are ways to reduce the risk and severity of compaction by deciding when the soil is “fit”, and then what equipment configuration will minimize the risk of inflicting compaction (size, tire technology, inflation pressure, weight distribution, etc).

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## Diagnosing and Addressing Ponding Problems in the Field

**Sebastian Belliard, Soil Management Specialist, OMAFRA**

One of the most visible consequences of an extremely wet year like we’ve seen in Central and Eastern Ontario is standing water in fields. Standing water has obvious consequences for production: wet conditions can delay planting, result in crusting that impedes seedling emergence and infiltration later in the season, and increase the risk of deep compaction. What isn’t always so obvious is why some fields pond more than others, and what we can do about it. This article will address some of those reasons, explain how you can evaluate which ones might be present in your field, and point out some strategies to solve or avoid the problem in the future.

### Balancing Flows

At the most basic level, soil saturation and ponding occur when water input is greater than water output. There’s not a whole lot we can do about input... How about output? We want to minimize runoff to decrease the risk of erosion, so our other options for output are evapo-transpiration and infiltration. In Ontario, our spring climate makes evaporation a painfully slow process. In a wet spring, over-wintered cover crops can get transpiration going to dry out soils faster, but that’s a topic for another article. That leaves infiltration, water entering the soil and percolating through the profile to deeper soil where it is less damaging to crops and field operation timing, or can enter tile drains. Infiltration is a function of soil structure, specifically porosity.

### Infiltration and Porosity

Efficient infiltration relies mostly on macropores, large enough ( $\geq 0.08\text{mm}$ ) to allow water to move freely by the force of gravity. Macropores are most prevalent between aggregates in rounded, granular surface soil structure, but also in good blocky structures. Pores created by organisms like plant roots, earthworms, and other burrowing creatures also fit the bill.

Macropores need to be connected to the surface for water to easily drain into them. Open or continuous macropores drain water up to 100 times faster than closed pores (Shipitalo et al., 2000; Zhou et al., 2012). Compaction, crusting, and macropore and soil aggregate destruction from excessive tillage are the most important causes of reduced infiltration.

### Compaction

Macropores are the first to go when soil is compacted, leaving smaller pores that hold water more tightly. That’s clear to see from the big, blocky clods that are often present in the 5-30 cm depth range in compacted soil (Figure 1a). Compacted layers might also exhibit platy structures that break horizontally (Figure 1b). While there are some large pores between the clods and plates, they are far fewer and in the wrong orientation for facilitating infiltration. Plow pans in loamy or clay soils where tillage equipment has smeared the soil will create a thin but impermeable layer that keeps water sitting over top.



**Figure 1a)** Big, dense, blocky structure caused by surface compaction in a loamy sand.



**Figure 1b)** Platy structure in this clay loam is another sign of surface compaction

Depending on the strength and moisture of the compacted layer, a cover crop with a good taproot can break through, and fibrous-rooted grasses or cereals will help make it crumbly again. Chisel plowing can also help to break this layer,



but it will be easily re-compacted by the next pass unless the breaks are filled and fortified with roots. Make sure the soil is dry when attempting to mechanically bust a plow layer so that it will shatter and not smear. Chisel sweeps will increase the amount of loosened soil, but also increase smearing risk.

## Crusting

Crusting happens when surface aggregates are destroyed by water and disperse into smaller particles that fill pores and harden when dried, and it can be a problem on any soil finer than sandy loam. Crusting can be avoided by protecting the soil from the destructive force of raindrops, and by increasing the stability of surface aggregates. Both of those goals can be achieved with organic matter, either in the form of living cover crop canopy, or crop residue. The pictures in Figure 2 and 3 illustrate that well.



**Figure 2a.** This bare part of a clay loam field has crusted.



**Figure 2b.** Not two feet away, the same soil under residue cover (removed for the picture) has a rougher surface and evidence of earthworms. This is how infiltration happens.

You might think that figure 2a actually looks drier than 2b, until you see exhibit 3:



**Figure 3a.** Only the top 5mm are dry, and the crust keeps deeper soil moisture from evaporating.



**Figure 3b.** Evenly distributed moisture, and earthworms actively making more macropores for drainage.

## Tillage

Tillage can decrease infiltration and lead to crusting and ponding in several ways. First, tillage buries residue that would otherwise protect the soil from rain and feed earthworms. Second, excessive tillage destroys aggregates, which makes the soil more vulnerable to crusting and compaction. Lastly, tillage disrupts macropores, making them less effective at draining water. The literature can be somewhat confusing on the effect of tillage on porosity because researchers often measure total porosity without paying attention to whether those pores are connected to the surface or each other. Reduced tillage favours earthworms and keeps pores made by previous crop roots intact, though the full benefits of no-till may take up to a decade to manifest. Cover crops can help ease the transition to no-till by accelerating improvements in soil structure and organic matter levels, as well as transpiring excess water early in the season.

## Conclusion

If you noticed ponding on your fields, first check for compaction. The type of compaction you find will determine the approach for remediation, but ultimately the root causes - uncontrolled traffic, soil structure disruption, and low organic matter - need to be addressed. Crusting can be resolved by keeping residue cover as much as possible, and potentially adding organic amendments to problem areas. More important than sand, silt, or clay content is the pore space between those, especially the larger macropores that rapidly channel water into the profile. Crop residue, organic amendments, and living roots feed the soil organisms that create and maintain soil aggregates and pores, and over-wintered cover crops have the potential to transpire moisture faster than it would evaporate.

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## Soil Fertility Benefits of Wheat in Rotation

**Jake Munroe – Soil Fertility Specialist, Field Crops, OMAFRA**

Before long, the 2018 winter wheat crop will be seeded across the province (Figure 1). Long-term research at the University of Guelph's Ridgetown campus shows that winter wheat in rotation provides an additional 10 bushels per acre to corn and 5 bushels to soybeans. At current crop prices, that means an extra 107 dollars per acre over a rotation.

**What other benefits does wheat provide? And how might having wheat in rotation be positive from a soil fertility perspective?**

First, **wheat in rotation improves the nitrogen use efficiency of corn**. Recent research from the long-term rotation and tillage system trial in Ridgetown demonstrates that winter wheat in rotation reduces the maximum economic rate of nitrogen, or MERN, for corn. Between 2009 and 2013, the average MERN was 16 to 30 lbs/ac less with wheat compared to a corn-soybean rotation. In other words, it took less nitrogen to produce more corn.



**Figure 1.** Winter wheat



**Figure 2.** Red clover

Wheat also **provides an opportunity to seed a cover crop**. In the case of red clover (Figure 2), the economics are clear: a full stand of red clover provides a nitrogen credit of 65-80 lbs per acre to the following corn crop. If red clover establishment is difficult, another cover crop, such as oats, can be seeded. Although oats will not provide any nitrogen, its fibrous root system will set up the next crop with improved soil structure – this is particularly helpful in dry years, where a good root system is critical for nutrient uptake.

Winter wheat in rotation is also **beneficial from a soil organic matter standpoint**. Ontario research has generally found that the more frequently a small grain like wheat is in rotation, the higher the soil organic matter. Roots and belowground residue tend to contribute more to stable organic matter than aboveground residue, which may explain the positive effect of deep-rooted wheat. Organic matter is an important source of nutrients such as nitrogen, sulphur, phosphorus and boron.

Finally, having winter wheat in rotation **provides an excellent opportunity to address soil test levels**. Use the period after wheat harvest to take soil samples. If you have soil test levels that have slipped in the last number of years, post-wheat harvest is an excellent time to make a nutrient application.

A recent review of decades' worth of Ontario research has shown that when soil test phosphorus is within the range of 12-18 ppm (Olsen), starter fertilizer rates (i.e. 20-30 lbs  $P_2O_5$ /acre) achieve the most economic response for field crops. The same is true for potassium when levels are between 100-130 ppm. More recent research from OMAFRA/University of Guelph long term P and K trials suggest that slightly higher soil test values (e.g. >20 ppm P and >120 ppm K) may be worth pursuing in some circumstances.

Regardless of your fields' soil fertility status or your fertility plan, broadcast fertilizer applications made in the summer after wheat harvest are at much lower risk for environmental losses relative to applications made in the late fall.

There you have it – a few more reasons to keep wheat as a regular part of your crop rotation.



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## Simple Soil Health Measurements

**Adam Hayes, Soil Management Specialist, OMAFRA**

Is my soil healthy? That is a question many growers ask. It is not always an easy question to answer. Some will say a soil is healthy if it produces a good crop, has good drainage, readily breaks down crop residues, has higher organic matter levels and holds water for the crop. Others want specific measures or tests to have a number to indicate the health of their soil.

The three components of soil health are physical, chemical and biological. Researchers use very detailed techniques in the lab and in the field, often to measure a single soil health indicator. These measures are not practical or cost effective for the field. Some labs in Ontario and neighbouring states offer soil health tests. The cost for these is low for simple tests and significantly more for a more complex suite of tests. Many of these tests are hard to interpret as more research in Ontario is needed to relate them to our soils.

You may already be taking some samples from your field that can provide a measure of soil health. Soil fertility tests can indicate the health of a soil for the chemical component. If nutrient levels and pH are adequate for the crops grown in the field then the chemical indicators are good. Soil organic matter level, often included in a soil fertility test, is a reasonable soil biological indicator. Adequate organic matter levels for the soil texture can indicate good soil biological activity. See the organic matter level rating of different textures table in to the Managing for Health Soils chapter of the OMAFRA Agronomy Guide – Publication 811.

There are a number of simple low cost tests that can be done in the field to give an indication of soil health.

### 1. Earthworm Counts

- Dig up a shovelful of soil and count the number of earthworms, if there are 10 earthworms that is a good number
- Count the number of earthworm middens in a quarter metre square (50 cm x 50 cm) area, if there are 10 to 15 middens/m<sup>2</sup> that is a considered good

### 2. Water Infiltration

- Insert a ring (i.e. coffee can with both ends cut out) into the ground far enough so water cannot seep out from underneath the sides of the ring, avoid tire tracks
- Lay a piece of plastic down in the ring covering the soil so it will contain the water
- Pour 800 ml of water in the ring on top of the plastic, this represents about one inch of water
- Remove the sheet of plastic and start timing the amount of time it takes for all the water to drain, repeat a second time and use that time as it is more representative
- If the water is slow to drain, the amount of water left after 30 minutes can be measured with a ruler and recorded along with the time
- Repeat in several areas of the field
- An infiltration rate of 3 to 10 minutes per inch is considered rapid, 30 to 100 is considered moderate and 300 to 1000 minutes per inch is considered slow.

### 3. Soil Compaction

- Choose a time when the soil is moist but not wet ( a few days after a rain)
- Insert a tile probe or penetrometer into the soil at a constant pressure down to approximately 50 cm
- When using a tile probe feel where there is more resistance and note the depth. If using a penetrometer note where the readings exceed 350 psi and record the depth
- Repeat in several areas of the field
- An alternate method, if there is a growing crop, is to dig up some plants and examine the roots, look for flattened roots or stub ended roots, also look at the rooting pattern
- For more detailed information refer to the Managing for Health Soils chapter of the Agronomy Guide

### 4. Bury Underwear

- Burying cotton underwear is an easy do it yourself way to assess soil microbial activity.
- Visit the Innovative Farmers Association of Ontario website [www.ifao.com](http://www.ifao.com) for detailed instructions
- The underwear have to be buried for 2 months so it is best to bury them in the first half of the growing season

Another good indicator of a healthy soil is the yield of a corn crop without nitrogen. The healthier the soil the higher the yield will be. Leave a short strip of corn without nitrogen and do a yield check.

For more information on soil health see the Managing for Health Soils chapter of the Agronomy Guide.

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## New Publications to Increase Soil Health!

The Ministry of Agriculture, Food and Rural Affairs' (OMAFRA) has developed new soil health publications. The publications provide best management practices to help farmers preserve and conserve soil while improving soil health and crop production. Visit the OMAFRA [Soil Health in Ontario web page](#) to learn more about the first twelve titles:

- Adding Organic Amendments
- Erosion Control Structures
- Cropland Retirement
- Soil Health in Ontario
- Field Windbreaks
- Soil Erosion by Water
- Winter Cover Crops
- Wind Strips
- Subsurface Drainage
- Rotation of Agronomic Field Crops
- Buffer Strips
- No-Till for Soil Health

These are just the beginning. OMAFRA is rolling out a total of 21 new publications over the coming year, so check the Soil Health in Ontario web page regularly for new releases.

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## Schedule 1 Begins for the Phase-In of Professional Pest Advisors

**Tracey Baute, Field Crop Entomologist, OMAFRA**

Fall is a great time to scout for wireworms and grubs if you require a Pest Assessment Report (PAR) for the purchase of Class 12 Pesticides (neonicotinoid treated corn and soybean seed) for next year's growing season. A PAR is valid for 12 months from the time the assessment was completed. Anyone certified through the IPM course at <https://www.ipmcertified.ca/> can conduct the PAR each year until the year that their farm property lands within one of the schedules, at which time a Professional Pest Advisor (PPA) is required to complete the assessment.

Schedule 1 begins on August 31, 2017 until August 30, 2018. Those farm properties that are in the counties listed under Schedule 1 will require a PPA to conduct their next Pest Assessment Report (see Table 1). This does not change the expiration date of PARs that were completed prior to August 31<sup>st</sup>. It means that once the PARs do expire after 12 months, the next PAR must be completed by a PPA. Also beginning on August 31, 2017, the regulation requires that the professional pest advisor be financially independent. This means he/she cannot receive a specific financial incentive (above and beyond their salary or commission) to promote the sale of Class 12 pesticide-treated corn or soybean seed over the sale of non-Class 12 seed.

Who qualifies as a Professional Pest Advisor?

To act as a professional pest advisor under the regulation defining pesticides classes, [O. Reg. 63/09](#), the advisor must meet one or more of the following criteria:

- certified as a Certified Crop Advisor (CCA) by the American Society of Agronomy and be a member in good standing of the Ontario Certified Crop Advisor Association
- registered as a member (e.g. a professional agrologist) under the *Ontario Institute of Professional Agrologists Act 2013*, with a field of practice relating to pest control or the production, processing and protection of agricultural, horticultural and related products and supplies
- hold an authorizing certificate issued by an out-of-province regulatory authority in respect of a field of practice similar to a professional agrologist or CCA
- have qualifications equivalent to a CCA or professional agrologist as determined by the Ministry of the Environment and Climate Change.

Beginning on August 31, 2017, [subsection 8.2 \(8\) of O. Reg. 63/09](#) requires that a professional pest advisor be financially independent. This means he/she cannot receive a specific financial incentive (above and beyond their salary or commission) to promote the sale of Class 12 pesticide-treated corn or soybean seed over the sale of non-Class 12 seed.



**Table 1:** Professional Pest Advisor Requirement Phase-In – Excerpt from the Integrated Pest Management Course for Corn and Soybeans

#### Professional Pest Advisor Requirement Phase-In

Date	Schedule	Counties or Regions
Aug 31, 2017	Schedule 1	Dufferin, Frontenac, Halton, Lambton, Middlesex, Muskoka, Prince Edward, Stormont, Dundas, Glengarry, Toronto, Wellington
Aug 31, 2018	Schedule 2	Bruce, Elgin, Grey, Haldimand, Hamilton, Huron, Nipissing, Norfolk, Ottawa, Oxford, Peel, Sudbury, Waterloo
Aug 31, 2019	Schedule 3	Algoma, Brant, Chatham-Kent, Cochrane, Durham, Essex, Haliburton, Hastings, Kawartha Lakes, Kenora, Lanark, Leeds and Grenville, Lennox and Addington, Manitoulin, Niagara, Northumberland, Parry Sound, Perth, Peterborough, Prescott and Russell, Rainy River, Renfrew, Simcoe, Thunder Bay, Timiskaming, York

There are several resources available on how to conduct an Inspection of Soil Pest Assessment and scout for wireworms and grubs including:

Ontario Neonicotinoid Regulation Website: <https://www.ontario.ca/page/neonicotinoid-regulations#section-4>

Integrated Pest Management Course for Corn and Soybeans: <https://www.ipmcertified.ca/>

Field Crop News: <http://fieldcropnews.com/tag/inspection-of-soil/>

Guide to Early Season Field Crop Pests: <http://qfo.ca/Portals/0/Production/Production%20Resources/Field%20Guides/CropPests.pdf>

## New Fee for Integrated Pest Management (IPM) Training

The Integrated Pest Management (IPM) Course for Corn and Soybeans was announced in September 2015, with courses initially offered free of charge to provide an incentive for early certification and help farmers with the new rules. Over 11,000 participants have already taken the course for free, which is the bulk of the expected participants.

As of September 1, 2017, the cost for the IPM Course for Corn and Soybeans is \$73.00 upon registration. The fee will increase by 10 per cent annually until September 2020.

Successful completion of the IPM training course is one of the requirements to purchase and use neonicotinoid-treated corn and soybean seeds. Training provides knowledge of pest assessment methods, as well as best management practices for neonicotinoid-treated corn and soybean seeds and pollinator protection from neonicotinoid exposure. After successfully completing the course, certification is valid for five years. In addition, one certified person can supervise up to seven people in the field.

Revenue from the fee will go towards recovering the costs of providing the training and certification such as salary for the trainers, room rentals and course development.

For further information, or to sign up for the course, please contact the University of Guelph, Ridgetown Campus at [www.ipmcertified.ca](http://www.ipmcertified.ca) or call 1-866-225-9020.

Agricultural Information Contact Centre:  
1-877-424-1300

E-mail: [ag.info.omafra@ontario.ca](mailto:ag.info.omafra@ontario.ca)  
[www.ontario.ca/omafra](http://www.ontario.ca/omafra)

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