Prairie Steward

Farming For Your Future Environment

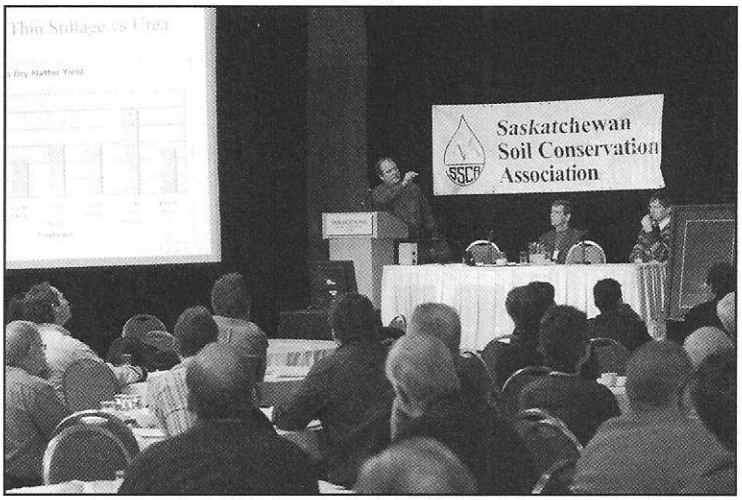
The Newsletter of the Saskatchewan Soil Conservation Association Inc. Winter Issue No. 58, 2010

Conservation Agriculture 2010 Conference

SSCA will be hosting the Conservation Agriculture 2010 Conference at Evraz Place in Regina on February 9 and 10.

There has been a major trend towards conservation agriculture around the world with the South Americans, Australians and western Canadians leading the way. In keeping with this theme, Argentine no-till expert, Roberto Pieretti is this year's keynote speaker. South American agriculture has embraced no-till systems to a greater extent than on the Canadian Prairies with over 80% adoption. While their farming systems are different than those used here, Roberto will discuss how we can incorporate some of their principles into our systems.

While cover crops were one of the original soil conservation practices they are not commonly used in modern agriculture. However, with the South Americans leading the way, incorporating green manure/cover crops into farming systems is a growing trend in conservation agriculture systems around the world. The year's conference includes two presentations on cover crops. Bill May will discuss his work using the annual legume, black medic, as a late-fall/early spring cover crop on the Prairies. Jim Thorson will talk about his experience using sweet clover green manure in place of chemfallow in his no-till system.



The Agronomy Session on the morning of the first day will also include topics on harvest management for canola and on how to use crop rotations with fall-seeded crops to spread out your work load at both seeding and harvest.

This year's conference includes research update session from six applied research farms located throughout Saskatchewan. There is a tremendous amount of research taking place at these farms. This session will focus on the priority area research with each research group.

The final session on the first day focuses on Nutrient management. Patrick Mooleki will focus on soil sampling strategies to optimize nutrient use. No-till pioneer, Jim Halford will discuss how fertility changes on his long-term no-till fields are changing his approach to nutrient management.

During the lunch hour, the authors of scientific posters will be present and available to answer questions about their research findings. During the evening award banquet, the SSCA Award of Merit and the Ducks

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In This Issue

President's Message

By Doyle Wiebe, PAg
SSCA President

Whew! Got it done - this may be the most common thought in grain farmers' minds over the last month or two as another lesson from Mother Nature is taught and hopefully learned from. So did your soil do you good? I know it is hard to pin down, but as much as my crop was no record, very limited rainfall was - I believe - better utilized than in the past due to the soil management I have employed over the past 2 decades. Hope it did good for you too.

In looking back over the summer in my role as President of the SSCA, I am reminded of that famous novel - A Tale of Two Cities. The good news for me was the sort of Eureka moment in July after attending two soil related field days - one in Manitoba along with the Soil Conservation Council of Canada (SCCC). We tagged along with the summer tour of the Manitoba Soil Society. One of the stops in particular just amazed me as it was quite sandy land and part of the largest potato farm in Manitoba. As part of the rotation, this field was in wheat and a hole was simply dug to show the soil profile. I suppose that since I have only seen really good soil in the black soil zone of Saskatchewan, it was quite amazing for me to watch as this whole was dug and for the first 18 inches on this level ground - not a low spot - the soil was black. Then - just as I would find on my farm about 3 inches down - yellow sand appeared.

The picture of black sand stuck with me when just two weeks later - as part of our summer board meetings - we took in the IHARF field day. Part of that day was a tour to Jim Halford's farm to see the results of years of no-till and continuous cropping compared to land Jim has more recently added to his farming operation. The differences in depth of dark soil was simply amazing. I may be just a slow learner since I know I have likely attended seminars that have talked about these soil benefits, but "Seeing is Believing". I now believe more strongly than ever that there are a lot more benefits to soil conservation than no dust storms.

"I now believe more strongly than ever that there are a lot more benefits to soil conservation than no dust storms."

Now, the bad news also comes from those summer board meetings. Your directors have determined that more affirmative action needs to be taken to deal with the financial situation we have found ourselves in. Yes, there are a number of project contracts we are still working on and some new ones are still possible. However, most of the funding sources severally limit the ability of core staff to perform the project activities and hence only small amounts go toward the overhead of the organization. The board has given staff notice that as of March 1, they will be shifting to half time positions. It is yet to be determined what impact this will have on our core services to and for members. Great effort will go into maintaining as many services as possible.

A member survey this winter will help us a great deal in determining priorities. In general, the top 3 priorities we have identified are: technology transfer, public awareness and policy development. Give me a call if you have any thoughts on this. Hope to see you all at the conference.

www.ssca.ca

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HEAD OFFICE

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Blair McClinton, Executive Manager
Marilyn Martens, Office Manager

SSCA's mission is "to promote conservation agriculture systems that improve the land and environment for future generations."

SSCA's Vision is "to be the recognised driver and facilitator of change that leads to conservation agriculture being practiced on prairie agricultural land.

Executive Managers Report

By Blair McClinton, PAg
SSCA Executive Manager

Organizations like SSCA exist because of their membership. The organization formed over 20 years ago because 200 Saskatchewan farmers saw the need for a group like SSCA to exist. Currently, SSCA has around 600 members. While this is a fairly large membership as far as farm groups go (with membership fees), revenue from membership fees don't go very far for covering the Association's expenses. However, without other funding sources, membership fees are our largest single source of revenue. Over the coming months, the Board will be look for ways to increase membership.

A couple of years ago, one farm leader told me that SSCA has made his farm more money than any other farm organization. SSCA membership is a bargain. Even with our higher fees ($100/year; $250/3-years). If SSCA gives you one idea for your farm, you have either made or saved enough money to cover your membership for a lifetime several times over. And chances are you have learned more than one good idea. However, it's not easy to sell memberships. There are too many "Free riders" who expect all our services for free.

If you have read the President's Message, you will have read that SSCA will be scaling back operations in March. This is a time of frustration and uncertainty for the Board of Directors and both staff members (myself included). You may wonder, what does this mean for the Association? That is not exactly clear, however, one thing is certain; Change!

However, you can help. We plan to survey our members this winter to find out more about you and how we can best serve you in the future. What your needs are? What services you expect from the SSCA? How could we attract more of your neighbours to join the SSCA? When the survey arrives, please take the time to respond.

In addition to completing the survey, with fewer staff resources, the Board will be looking for people who are willing to volunteer some of their time. We are always looking for good people to sit on the Board. It could also be something as simple as selling a SSCA membership to one of your neighbours or helping out with some future fundraiser.

On another sad note, the past few months have seen another conservation agriculture group fall as casualty to the funding axe. The Alberta Reduced Tillage Linkages (RTL) closed their doors at the end of August after 15 years of working to help Alberta farmers move to direct seeding. RTL was modeled on SSCA's staff program and they had a close working relationship with us. We routinely "stole" each others ideas. As a legacy, RTL produced a paper documenting all the benefits of using direct seeding systems from both an economic and environmental perspective. This paper is an interesting read for any farmers who direct seeds. This paper is a must read for anyone interested in agri-environmental policy. It is available at the RTL website: www.reducedtillage.ca.

CONSERVATION AGRICULTURE 2010 CONFERENCE ... CONTINUED FROM PAGE 1

Unlimited Canada Farm Family Award will be presented.

After supper, Dr. Wayne Lindwall, a retired Ag Canada scientist, will discuss the history of evolution of conservation tillage systems on the Prairies. Over this past year, Wayne has been working on a project along with other people in AAFC and the University of Saskatchewan to document this history.

Day 2 includes sessions on *Tall Residue Systems, Integrated Pest Management; You and Precision Agriculture.* The first session will focus on managing tall residue systems. Herb Cutforth will show his research results on how tall residues can benefit crop production on the Prairies. Rex Cunningham and Chris Vanderstoel will talk about their producer experiences seeding into tall residues left by stripper headers.

The second session will focus integrated pest management strategies issues. Steve Shirtliffe will provide an overview on using integrated weed management strategies to minimize herbicides use in conservation agriculture systems. Linday Coulthard, Manitoba Zero Till Research Farm, will discuss their work on using alfalfa in crop rotations and how it can help as an IPM strategy.

The final session is on Precision Agriculture. With the development of new technologies and approaches to decision-making, Precision Ag is gaining in popularity across the Prairies. Curtis MacKinnon, Precision Edge Consulting, will discuss different approaches for decision-making in Precision Agriculture. John Nowatzki, North Dakota State University, will give an overview of Precision Agriculture monitors and sensors. Keith Stephens will give a producer's perspective on managing and using Precision Ag data.

The Closing Speaker, Dick Wittman is a producer in the Palouse region in western Idaho who also happens to be a management consultant who specializes in high performance farm management systems. Dick is also a past-president of the Pacific-Northwest Direct Seeding Association. Dick's talk will focus on how with today's changing farming environment is challenging farm managers in ways we have not experienced in the past. Dick will discuss how producers can use high performance management systems to improve profitability, manage risk and maintain productive relations with family members, farm partners and employees.

The full conference agenda is found on the SSCA's website www.ssca.ca.

The website also features the SSCA's policy statements, past conference proceedings and Agronomic Fact Sheets.

Balance Plant Nutrient Application to Maximize Crop Fertilizer Returns

by Patrick Mooleki PAg, Soil Nutrient Management Specialist and Ken Panchuk PAg, Soils Specialist Saskatchewan Ministry of Agriculture

Plants need a balanced nutrient supply to produce expected yield and quality. In addition, a balanced nutrient supply will allow for the efficient utilization of applied fertilizers, to maximize nutrient use efficiency and minimize loss.

Nitrogen, phosphorus, potassium and sulphur are required in large quantities and are referred to as macronutrients. Other nutrients such as copper, zinc, boron and magnesium are needed in small quantities and are referred to as micronutrients. Regardless of the quantity required, each nutrient is important to the crop's performance. The crop's yield will be determined by the nutrient present in the most limiting quantity, as the plant will draw only a certain quantity from the other nutrients needed to balance the limiting nutrient. Mobile nutrients, such as nitrate-nitrogen, left in the soil are susceptible to loss and may contribute to environmental pollution by leaching.

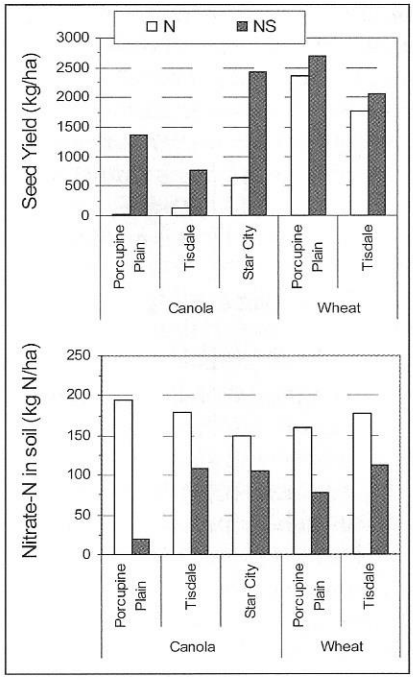

Fig. 1. Canola and wheat response to a balanced Sulphur and Nitrogen application.
Source: Malhi et al. 2009.

Soil processes such as mineralization of organic material and solubilization of minerals make nutrients available to plants. However, the amounts found in the soil may not be adequate to sustain a crop. Hence, fertilizers and manures are added to the soil to meet the shortfall.

In Saskatchewan, nitrogen and phosphorus are the two most limiting nutrients. As a result, producers tend to concentrate on nitrogen and phosphorus fertilizers. This has become routine for some producers, who in the process have inadvertently ignored other nutrients. Some producers are even eliminating phosphorus fertilizer, or limiting it to a minimum.

The consequences of such a practice are declining yields and quality as a result of an imbalance in nutrient supply. It may take a few years before the reduced yields become significant or deficiency symptoms become evident. Potassium, on the other hand, is abundant in most Saskatchewan soils.

With respect to sulphur, except for canola, mustard and alfalfa, sulphur is rarely applied as most soils have sufficient quantities. These crops require more sulphur and it is recommended that sulphur be routinely applied.

In Saskatchewan, despite the generally fertile soils, there are areas with low levels of some nutrients. In addition, crop production results in the removal of nutrients from the soil that, if not replenished based on soil test levels, may lead to a nutrient imbalance.

In a series of studies in northeast Saskatchewan, Dr. Sukhdev Malhi and colleagues showed that supplying balanced nutrient amounts to crops improved nitrogen utilization efficiency, leading to increased yield (Figure 1). Plots that received no sulphur also showed large amounts of nitrate-nitrogen left over in the soil after harvest. Left over nitrate-nitrogen is prone to losses via denitrification and leaching, thus contributing to environmental pollution.

At the Melfort Research Station, Dr. Jeff Schoenau and colleagues showed that the application of sulphur to either manure or urea-treated plots resulted in substantial yield increases (Figure 2). Although manure has other essential nutrients, the amounts present may not be enough to provide a balanced supply to a crop.

Dr. Malhi and colleagues' studies also show significant improvements in yield of various grain and forage crops and fertilizer utilization when other nutrients such as phosphorus, potassium and copper were applied. At Porcupine Plain, the addition of copper improved wheat yields from 1,032 kg/ha to 2,325 kg/ha with a nitrogen base rate of 120 kg nitrogen/ha. Nitrogen utilization increased substantially resulting in the reduction of leftover nitrates in the soil (23 vs. 46 kg nitrogen/ha, respectively). Similar advantages of nutrient balancing were observed in forages at Star City and Canwood (Figure 3).

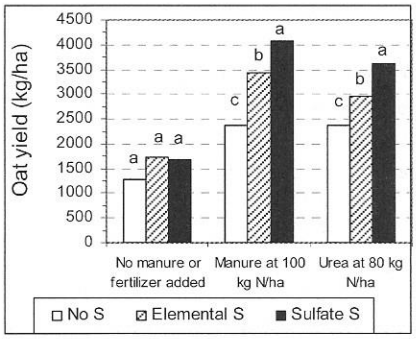

Fig. 2 Oat response to additional Sulphur.
Source: Schoenau and Davis, 2006.

A current soil test analysis is necessary to succeed in balancing nutrients. Guessing without a soil test will result in an imbalanced nutrient ratio, poor yields, low fertilizer utilization efficiency and less profit for

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Clubroot in Canola: A Management Plan

Brent Flaten, PAg, CCA
Integrated Pest Management Specialist
Saskatchewan Agriculture

The following is adapted from the Clubroot Management Plan developed by the Saskatchewan Clubroot Initiative, September 2009.

Clubroot affects crucifers worldwide. In Canada, clubroot is primarily established in vegetable-growing regions of British Columbia, Quebec, Ontario and the Atlantic provinces. It was first reported on canola in western Canada in 2003, when it was identified near Edmonton, Alberta. Since then, clubroot has been confirmed in more than 15 counties in Alberta.

Clubroot symptoms have not been observed on any of the Saskatchewan canola crops randomly selected for canola disease surveys. In 2008, 30 soil samples were tested using both DNA diagnostics to detect canola clubroot (*Plasmodiophora brassicae)* and a bioassay in which canola plants are grown in a sample of the soil and observed for clubroot symptoms after six weeks. One soil sample from west-central Saskatchewan was found to be positive for clubroot using these tests, despite the absence of symptoms in the crop.

What is clubroot?

Clubroot is a soil-borne disease caused by a microbe, *Plasmodiophora brassicae*. Clubroot affects the roots of cruciferous field crops such as canola, mustard, camelina, oilseed radish, taramira and cruciferous vegetables such as arugula, broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kale, kohlrabi, radish, rutabaga and turnip. Cruciferous weeds (e.g. stinkweed, shepherd's purse, wild mustard) can also serve as hosts.

What are the symptoms of clubroot?

Invasion of the interior of host roots alters hormone balance and leads to increased cell division and growth, resulting in clubroot galls.

Canola root with gall symptom

These deformed roots have a reduced ability to absorb water and nutrients leading to stunting, wilting, yellowing, premature ripening and shriveling of seeds. The cause of these above-ground symptoms can be confirmed by digging up suspect plants to check roots for gall formation. Clubroot affects canola yield and quality to a similar degree as other diseases affecting water and nutrient uptake, and its impact depends on soil conditions and the growth stage of the crop when infection occurs. Early infection of seedlings tends to result in great yield losses. Spore germination in *Plasmodiophora*, infection and disease development are favoured by warm soils, high soil moisture and low soil pH.

How does clubroot spread?

Infected roots will eventually disintegrate, releasing resting spores into the soil, which may then be transported by wind, water erosion, animals, clothing, vehicles/tires or earth tag on agricultural or industrial field equipment. Resting spore numbers will decline over time when non-host crops are grown, but a small proportion can survive in soil for up to 20 years. Clubroot is primarily a soil-borne disease; it does not infect seed but it may be found in soil attached to seed or other plant parts. Clubroot does not present any legal phytosanitary issues for trade.

Is there surveillance in place for clubroot?

A canola disease survey is conducted annually in the province by a collaboration of plant pathologists, agronomists and crop specialists from the Saskatchewan Ministry of Agriculture, Agriculture and Agri-Food Canada and private industry. The objective of the canola disease survey is to monitor the presence and severity of common canola diseases, as well as detect the appearance of new diseases such as clubroot.

What is the oil and gas industry doing about clubroot?

The Canadian Association of Petroleum Producers has developed a set of best management practices designed to promote the development of effective and achievable procedures to minimize the

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Surface Soil Organic Matter as an Indi

By Alan Franzluebbers, USDA–Agricultural Research Service, Watkinsville Georgia, USA (former Visiting Scientist at the Beaverlodge Research Farm in Alberta)

Soil is a precious resource. Those that have rich, friable soils know it and appreciate it. For how could we produce the enormous quantities of food, fodder, fiber, and fuel without the dark, fertile, vibrant skin of the earth? Those that have poor soil often seem to treat it like dirt – something that can be washed away and abused at will – a spiral of despair and abuse that requires examination, forgiveness, and development of opportunities for renewal. However, given a chance with diligent conservation practices, downtrodden soils can become productive once again.

Long ago when prairie soils were denuded of their protective cover of perennial vegetation, enormous reserves of biologically sequestered energy, nutrients, and microbial community structure were released to the environment with the swift passage of steel blades repeatedly scarring the surface. Initially the undressing of the prairie was a great boon to agricultural production and the vitality of the expanding North American economies. However, the same dissolution of the biogeochemical structure of soils with high organic matter under native prairie caused a fatal breakdown in several ecosystem processes, including water quality protection, greenhouse gas regulation, physical soil stability, and soil biological diversity. The loss of soil organic matter with clean cultivation techniques broke the linkage that helped engineer soil stability, that sequestered carbon in soil rather than released it to the atmosphere, that slowly mineralized and immobilized nutrients to keep them from washing into streams and groundwater, and that provided the smorgasbord of carbon substrates to feed the multitude of soil animals and microorganisms.

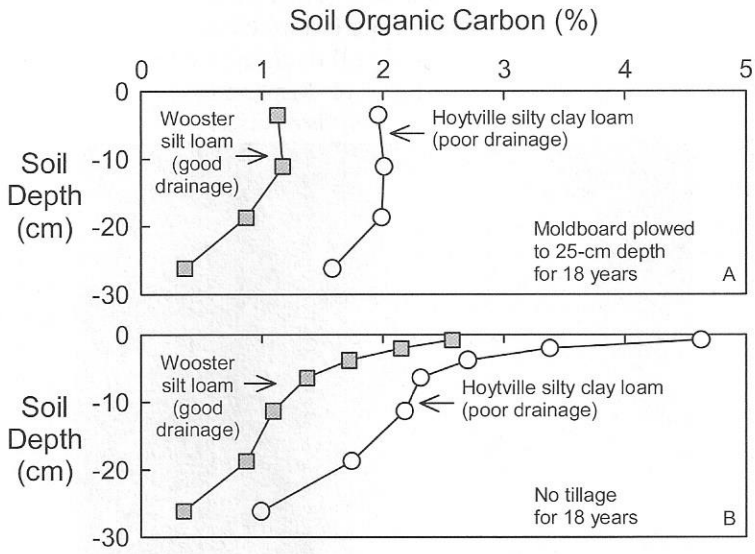

Figure 1. Organic carbon under conventional tillage (A) and under no tillage (B) in two contrasting soils in Ohio. Source: Dick WA (1983) Soil Sci. Soc. Am. J. 47:102-107.

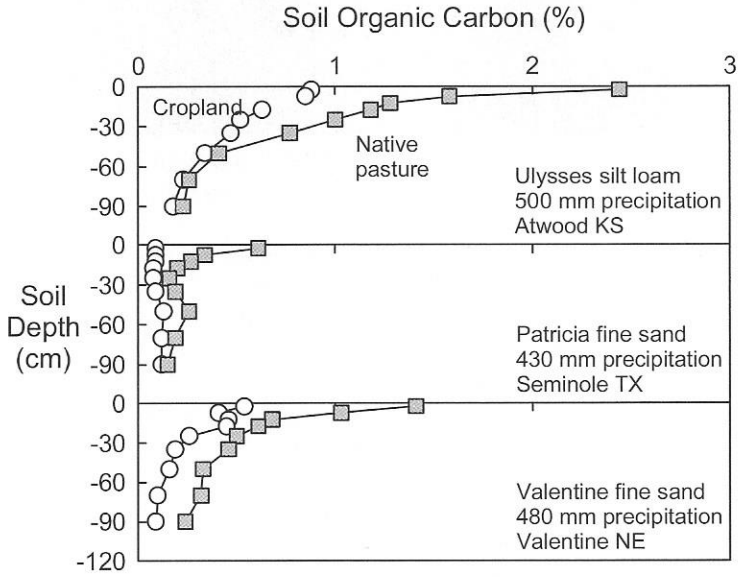

Figure 2. Depth distribution of soil organic carbon concentration under cropland and native pasture in the Great Plains. Source: Gebhart DL, Johnson HB, Mayeux HS, Polley HW (1994) J. Soil Water Conserv. 49:488-492.

Fortunately, the clever ideas of natural resource professionals to conserve soil and water resources have become manifested in a growing revolution of forward-thinking farmers engaged in the protection and rejuvenation of soil. Strategies to regain lost soil organic matter are now at the forefront of environmental stewardship – conservation tillage to reduce soil disturbance, crop rotations to diversify residue inputs and prevent pest outbreaks, perennial rotations to increase organic matter inputs, cover cropping to protect the soil surface, animal manure inputs to feed soil organisms, and rational nutrient decisions to stimulate crop growth and avoid environmental and social disasters.

Soil organic matter is at the core of any evaluation to determine the health of soil. Unless landscapes are bogged with excessive water, more organic matter is a key indicator of healthy soil. Since soil testing is a routine practice in agricultural soils, determining healthy soil should be an easy determination – yet such simple determination has been elusive. Soil is not soil is not soil – a great variety of soils exist. Just as some soils are brown, others black, and sometimes gray due to inherently different soil forming factors (climate,

organisms, relief, parent material, and time), soils vary in their inherent capacity to store organic matter. Sandy soils generally have lower organic matter content than clayey soils, upland soils tend to have lower organic matter content than bottomland soils, and south-facing hillsides often have soils with lower organic matter content than north-facing hillsides. Therefore, soil organic matter content alone may not be the best indicator of soil quality, and in particular with regards to how the health of soil may be improving with the adoption of conservation agricultural practices.

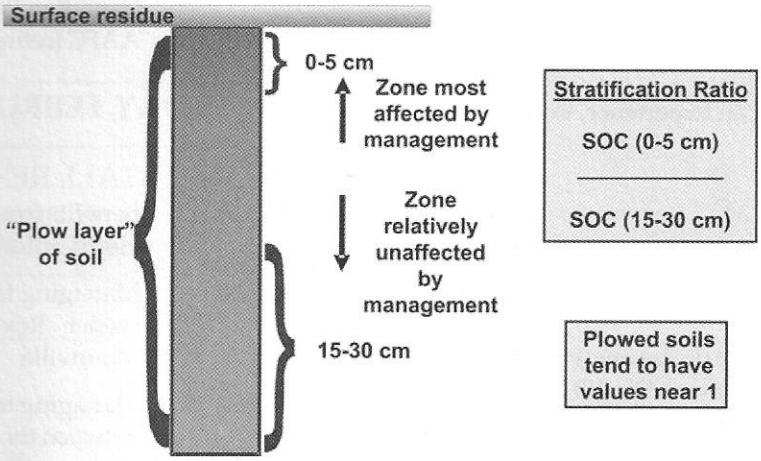

Figure 3. Conceptual diagram for the calculation of stratification ratio of soil organic matter.

How soil organic matter is distributed in the soil profile is proposed as a more telling indicator of soil quality, especially in soils that have been seriously degraded from decades of abuse with tillage disturbances and uncontrolled soil erosion. In highly disturbed soils with moldboard plowing, soil organic matter becomes uniformly distributed within the plow layer (Figure 1A). With adoption of conservation agricultural practices (that minimize soil disturbance consistent with sustainable production, that maximize soil surface cover by managing crops, pastures, and crop residues, and that stimulate biological activity through crop rotations, cover crops, and integrated nutrient and pest management), soil organic matter becomes more stratified with depth (Figure 1B).

Stratification of soil organic matter with depth in agricultural systems is a characteristic more closely resembling that in natural systems – thus allowing agricultural systems to work more closely with nature rather than against her (Figure 2). Why is this relevant? High surface-soil organic matter concentration controls many important soil functions relevant to a healthy soil ecosystem. For example, high surface-soil organic matter creates a more porous surface structure embodied in water-stable aggregates, which foster water infiltration and storage of water in soil rather than as runoff into streams and lakes. High surface-soil organic matter creates a bank of immobilized nutrients from which subsequent crops can draw interest through the process of mineralization. Concentrated surface-soil organic matter enriches the diets of organisms residing in soil, resulting in a diversity of bacteria, fungi, actinomycetes, protozoans, spiders, arthropods, and insects that interact to control pest and disease outbreaks and cycle nutrients more efficiently. Sequestration of carbon in soil helps reduce CO_2 flux to the atmosphere and this process is most effective at the soil surface, where conditions often limit decomposition due to more extreme fluctuations in temperature and moisture compared with deeper in the soil profile.

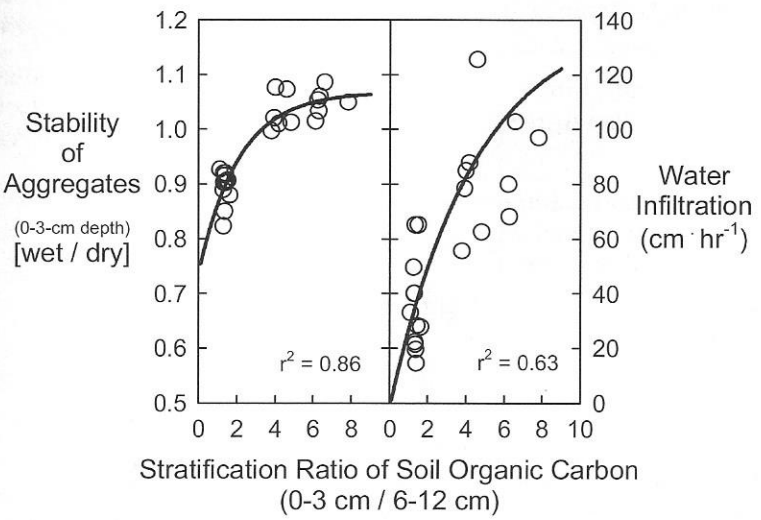

Figure 4. Relationship of water-stable aggregation and water infiltration to the stratification ratio of soil organic carbon in soils from Georgia. Source: Franzluebbers AJ (2002) Soil Tillage Res. 66:197-205.

Stratification Ratio of Soil Organic Matter

The concentration of organic carbon near the soil surface divided by the concentration of organic carbon near the bottom of the "plow layer" can be used to calculate the stratification ratio of soil organic matter (Figure 3). Values of stratification ratio of soil organic matter near 1 indicate that soil has been well mixed and that surface accumulation of organic matter has not occurred recently. Research continues to be conducted to (a) develop specific guidelines as to the exact sampling depths best suited for various soils and climates around the world, (b) develop quantitative relationships

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SSCA Annual Conference and Trade Show

February 9 & 10, 2010
Evraz Place, Regina, SK

TUESDAY, FEBRUARY 9, 2010

8:00 AM Registration

9:45 AM Keynote Address – Conservation Agriculture: the South American Experience, Roberto Pieretti, Argentina

SESSION 1 AGRONOMY

10:30 AM New harvest management technologies for canola – Jim Bessell, Canola Council of Canada

11:00 AM Self-seeding Medic (legume): Fertility enhancement or weed? – Bill May, AAFC, Indian Head, SK

11:30 AM Using rotations to manage time – Mark Akins, Ducks Unlimited Canada, Regina, SK

12:05 PM lunch

SESSION 2 APPLIED RESEARCH UPDATES

1:30 PM Cropping systems research - Judy McKell, IHARF, Indian Head, SK

1:45 PM Cropping system research – Mitchell Morrison, SERF, Redvers, SK

2:00 PM Harvest management – Bryan Nybo, WCA, Swift Current, SK

2:15 PM Direct harvesting canola – Kim Stonehouse, Saskatchewan Agriculture, Tisdale, SK

2:30 PM Fababean and Hemp Production – Sherilyn Phelps, Saskatchewan Agriculture, North Battleford, SK

2:45 PM Field Scale Precision Ag Research – Brent Casavant, NARF, Tisdale, SK

3:00 PM Coffee break

SESSION 3 NUTRIENT MANAGEMENT

3:45 PM Soil sampling strategies – Patrick Moolecki, Saskatchewan Agriculture, Moose Jaw, SK

4:15 PM Using Green Manures in direct seeding systems – Jim Thorson, Producer, Liberty, SK

4:45 PM Fertility changes in long-term no-till – Jim Halford, Producer, Indian Head, SK

6:15 PM SSCA Awards Banquet

8:00 PM Evolution of Conservation Tillage on the Canadian Prairies - Wayne Lindwall, AAFC (retired), Calgary, AB

WEDNESDAY, FEBRUARY 10, 2010

SESSION 4 TALL RESIDUE SYSTEMS

8:30 AM Benefits from seeding into tall stubble - Herb Cutforth, AAFC, Swift Current, SK

9:00 AM Managing tall residue using a disk seeder - Rex Cunningham, Producer, Mannville

9:30 AM Managing tall residue by seeding between the rows – Chris Vanderstoel, Producer, Pense, SK

10:00 AM Coffee Break

SESSION5 INTEGRATED PEST MANAGEMENT

10:45AM Integrate weed management strategies in conservation agriculture – Steve Shirtliffe, University of Saskatchewan, Saskatoon, SK

11:15AM Insect and disease update – Brent Flaten, Saskatchewan Agriculture, Moose Jaw, SK

11:45AM Using forages in direct seeded rotations – Lindsay Coulthard, Manitoba Zero Tillage Research Association, Brandon, MB

12:15 PM Lunch

12:30 PM SSCA Annual General Meeting

SESSION 6 PRECISION AG

1:30 PM Decision-making in Precision Ag – Curtis MacKinnon, Farmers Edge Consulting

2:00 PM Controllers and Monitors – John F. Nowatzki, North Dakota State University, Fargo, ND

2:30 PM Managing data on my farm – Keith Stephens, Producer, Balcarres, SK

Closing Address

3:00 PM Is your management system prepared for the future? – Dick Wittman, Producer and Farm Management Consultant, ID USA

2010 SSCA Annual Conference Registration Form

Fax to SSCA at (306)695-4236 or
Mail to: SSCA, Box 1360, Indian Head, SK S0G 2K0

Name 1: _____

Name 2: _____

Address: _____

City: _____ Postal Code/Zip Code: _____

Telephone: _____ Fax: _____

E-mail: _____

Representing:_____ RM#: _____

Producer: YES / NO (circle one) SSCA Member: YES / NO (circle one)

Conference Fees: **Check appropriate boxes**

SSCA Members				Non-Members		
Before/On February 01, 2010	$125.00			Before/On February 01, 2010	$175.00	
additional farm unit member	$115.00					
After February 01, 2010	$150.00			After February 01, 2010	$200.00	
additional farm unit member	$140.00					
Single Day	$100.00			Single Day	$150.00	
additional farm unit member	$ 90.00					

Additional Banquet Tickets	$ 40.00	
Proceedings	$ 15.00	
3 Year membership	$250.00	
Additional Farm Unit Membership (one time fee)	$ 25.00	

Total Enclosed $_____

GST Exempt (Reg.# 137200515 RT001)

Method of Payment: Check one

Visa ☐ MasterCard ☐ Cheque (Payable to SSCA) ☐

Card #_____ Expiry Date_____

Name on credit card (please print)_____

Signature _____

Midge Tolerant Wheat

NEW TECHNOLOGY CAN PREVENT $36 PER ACRE* IN LOSSES FROM MIDGE DAMAGE.

MIDGE TOLERANT WHEAT
Plant · Protect · Preserve

This spring, prairie wheat growers will be able to protect their crops from a devastating pest by planting a valuable new technology – midge tolerant wheat. Western Canadian losses from the orange wheat blossom midge are estimated at $40 million annually due to quality downgrading and yield reductions. For the average farm facing a wheat midge infestation, this can save an estimated $36 per acre.

Orange wheat blossom midge is a common insect pest across the Canadian Prairies. Adult female midge lay their eggs on the newly emerged wheat heads during warm, calm evenings. Upon hatching, the larvae feed on the developing wheat kernels causing them to shrivel, become deformed or completely abort. Damage may not be obvious, however the combination of damaged kernels and aborted kernels threaten grade and yield, as 40-50% of damaged kernels are blown out of the combine during harvest.

The new midge tolerant wheat varieties offer farmers a home grown solution to this damaging pest. This means more flexibility in crop rotations and seeding dates, and also reduced reliance on insecticide applications, the traditional method of midge control. Relying on insecticides for midge control is often challenging because it's difficult to assess which fields need spraying and the window for effective application is also short.

How it works

All the new varieties contain the *Sm1* gene which provides midge tolerance. When the insect begins to feed on the seed, this gene triggers an increase in naturally occurring phenolic acids in the wheat kernels – which causes midge larvae to stop feeding and starve to death. The mechanism that triggers the production of phenolic acids does not operate if midge larvae are not feeding on the seed, and in addition, these acids are reduced to normal levels by the time wheat reaches maturity, thus not affecting the quality or food value of the harvested grain.

The *Sm1* gene is only a single gene – which can become ineffective over time if insect populations change. This is why proper stewardship growing these new varieties is crucial to its success.

As shown in the illustration, an interspersed refuge system – planting a blend of a midge tolerant variety with a susceptible variety – is required to preserve this technology. Within the natural midge population, a small number of midge (referred to as virulent midge) carry a mutation allowing them to attack midge tolerant wheat varieties and survive. This quickly builds a large virulent population that feeds on tolerant varieties. The interspersed refuge system prevents the build up of virulent midge and can extend the life of midge tolerance from as little as 10 years to 90 years or longer.

It took more than 15 years and a huge financial investment for researchers to move this single gene for midge tolerance, *Sm1*, into spring wheat varieties. Currently, no other source of midge tolerance has been identified.

Protect fields for years to come

This new technology is supported by a vital stewardship program led by the Midge Tolerant Wheat Stewardship Team, a broad industry coalition representing plant breeders, government, seed growers, seed distributors and producer groups. The

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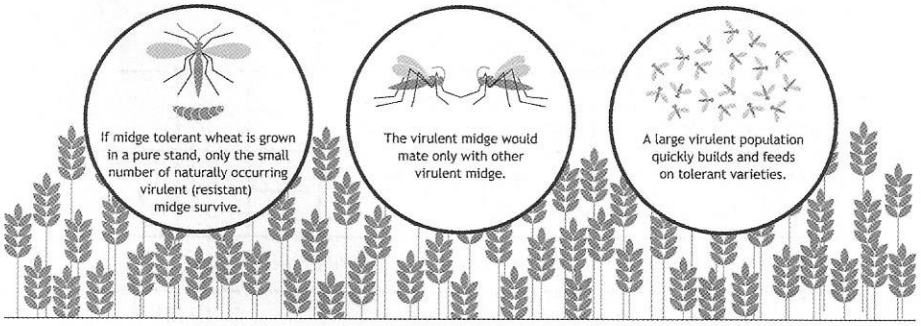
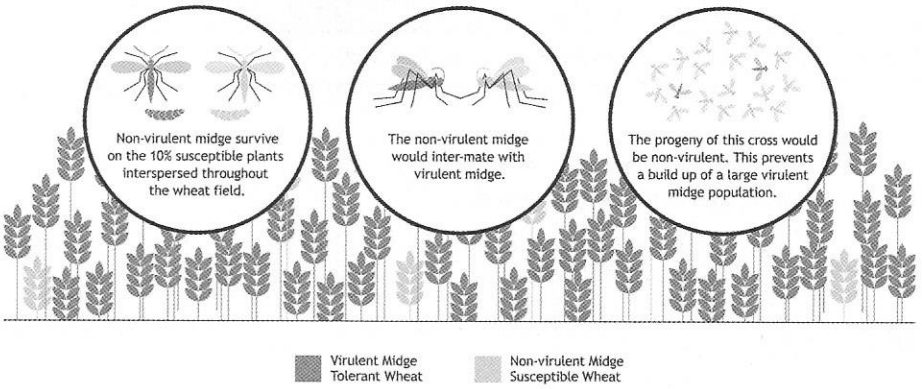
WITHOUT AN INTERSPERSED REFUGE SYSTEM, MIDGE TOLERANCE COULD BREAK DOWN WITHIN 10 YEARS.



AN INTERSPERSED REFUGE SYSTEM COULD EXTEND THE LIFE OF MIDGE TOLERANCE TO 90 YEARS OR LONGER.



team is committed to maintaining the viability of midge tolerant wheat by educating Western Canadian wheat producers on the importance of proper stewardship of the technology.

Farmers interested in planting a midge tolerant wheat variety will be required to sign a Midge Tolerant Wheat Stewardship Agreement. This agreement states that farm-saved seed must be limited to one generation past Certified seed. This limitation is critical to ensure that the refuge remains at the desired level of 10% of the plant population, as the refuge in farm-saved seed may change substantially over multiple generations. For example, under an extremely heavy midge infestation, the susceptible refuge variety could sustain up to 50% yield loss.

This is an exciting new tool for wheat growers in midge infested areas who want to see improvements in yields and grade. And with proper stewardship and seed management, midge tolerant wheat can be an effective tool today, and into the future.

Wheat midge fly

Visit www.midgetolerantwheat.ca to learn more.

#1: Three new midge tolerant wheat varieties will be commercially available starting in the spring of 2010 – AC® Unity VB from SeCan, AC® Goodeve VB from Alliance Seed Corporation and an extra strong variety, AC® Glencross VB, from Faurschou Farms. All varieties will be sold as a varietal blend (VB) which contains 90% midge tolerant variety and 10% midge susceptible variety (refuge).

#2: Benefits of midge tolerant wheat in your fields:

· Prevent an estimated $36 per acre loss from midge damage downgrading and yield reductions.

· Reduce reliance on insecticide applications, the traditional method of midge control.

· Gain more flexibility in crop rotations and seeding dates.

*Based on the economic threshold of one midge per 4 to 5 wheat heads at flowering = estimated 15% yield loss if not controlled. Higher midge levels can lead to greater losses.

15% x 40 bu/acre x $6.00/bu wheat = $36.00.

BALANCE PLANT NUTRIENT APPLICATION TO MAXIMIZE CROP FERTILIZER RETURNS ... CONTINUED FROM PAGE 4

the producer. The information obtained from the soil test results should be used to determine the right rates of nutrients to apply. Thus, balancing nutrient application is an integral part of the 4R concept of best management practices for fertilizers. The concept calls for using the right source of fertilizer, at the right rate, at the right time and in the right placement.

Producers must also determine how much stubble moisture is available in the spring, to establish a reasonable yield potential for determining the proper level and balance of nutrients to be added as fertilizer.

Research results in this article clearly show that proper levels and balance of nitrogen, phosphorus, potassium and sulphur is essential for best crop yields and efficient utilization of nutrients, while minimizing accumulation and leaching of nitrate-nitrogen in the soil profile.

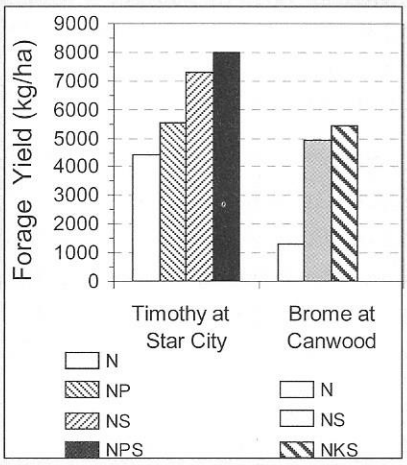


Fig. 3. Timothy and Brome response to balanced nutrient application.
Source: Malhi et al. 2009.

Data source

Schoenau, J. J. and Davis J. G. 2006. ***Optimizing soil and plant responses to land-applied manure nutrients in the Great Plains of North America.*** **Canadian Journal of Soil Science. 86: 587-595.**

Malhi, S. S., Schoenau, J. J. and Leach, D. 2009. *Maximizing N fertilizer use efficiency and minimizing the potential for nitrate-N accumulation and leaching in soil with balanced fertilization.* Poster paper 2009.

Conservation Agriculture Certification

By Blair McClinton, PAg
SSCA Executive Manager

Have you ever thought about being able to certify no-till farming systems? Over the years, various SSCA members and staff have asked this question. Currently, several initiatives are underway in various parts of the world to move in this direction. These include everything from no-till credits in carbon trading schemes to certified wheat production for a specific flour mill to an overarching certification system similar to the one used for organic production.

Two years ago, Fred Flemming gave a presentation at the SSCA conference on the Spokane-based Shepherd's Grain flour company that markets flour made from no-till wheat. This mill buys wheat from wheat growers in Washington State and Idaho for a premium. The flour is sold mainly into the Seattle – Portland markets. Their company was featured on CNN and the video is available on their website. Checkout their website at **www.shepherdsgrain.com.**

On a broader scale, Aapresid, the Argentinean no-till farmers association developed a certification system that released last August, at their annual conference. They call their program, "Certified Agriculture" (AC). Like the Canadian Prairies, Argentina is a major grain exporter. So, rather than taking the local approach used by Shepherd's Grain. Their certification standard is intended to help operate in premium markets like Europe. Website: www.ac.org.ar/index_e.asp.

The following is a brief description from their English language brochure.

"Have you ever thought about being able to certify no-till farming systems?"

"AC is the 21st Century agriculture

Certified Agriculture is a quality management system for the productive processes under No Tillage. It has been designed to improve the business management and to optimize the resources-use efficiency. As a result, we obtain greater productivity within an environmentally friendly and energetically sustainable context.

"The implementation of AC requires the fulfillment of a set of Good Agricultural Practices (GAP´s). It also needs the registry of the agronomic management and the measurement of soil chemical and physical indicators for subsequent audits and the productive process certification."

It constitutes a key step for the institutional life of Aapresid. It is supported by a 20-year experience in No Till practice –a productive system based on the absence of soil tillage, on crop rotation and the coverage of the soil surface with crop residues. This procedure allows to achieve a rational, sustainable and even reparative use of the agro-ecosystem basic resources like soil, water, air and biodiversity.

"This procedure allows to achieve a rational, sustainable and even reparative use of the agro-ecosystem basic resources like soil, water, air and biodiversity."

The implementation of AC requires the fulfillment of a set of Good Agricultural Practices (GAP´s). It also needs the registry of the agronomic management and the measurement of soil chemical and physical indicators for subsequent audits and the productive process certification."

The production standard revolves around six Good Agricultural Practices (GAP). These are:

* No Soil Disturbance / Presence of Soil Residue Cover.
* Diverse Crop Rotations.
* Integrated Pest Management (IPM).
* Efficient and Responsible Use of Crop Protection Products.
* Balanced Soil Nutrition.
* Livestock Information Management.

Over the past few months, Conservation Agriculture Systems Alliance (CASA) members, including SSCA, began a discussion on the potential to develop a conservation agriculture certification program in North America. In the limited discussion we have had to date, it is clear that developing a recognised standard will take a large amount of time and resources. Since this is limited for most farm groups, we will need clear direction from our members on how much effort SSCA should put on this. So, let us know what you think about the concept!

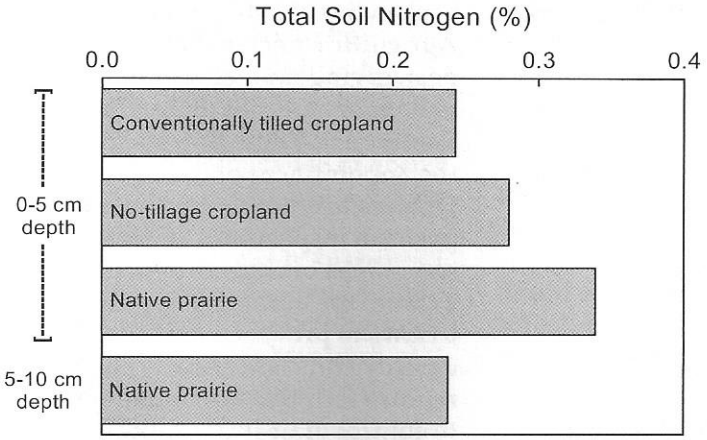


Figure 5. Total nitrogen in surface soils of cropland and tallgrass prairie in northeastern Kansas. Data from Mikha MM, Rice CW (2004) Soil Sci. Soc. Am. J. 68:809-816 and Grahammer K, Jawson MD, Skopp J (1991) Soil Biol. Biochem. 23:77-81.

between stratification ratio and various ecosystem functions (e.g. water infiltration, carbon storage, nutrient cycling, etc.), (c) develop quantitative thresholds for differentiating between low and high soil quality standards, and (d) determine the universality of the calculation and packaging with other procedures for robust evaluation of soil quality.

Some examples of how stratification ratio of soil organic matter relates to other soil functions have been isolated. With accumulation of surface-soil organic matter, soil becomes cemented into water-stable aggregates, which then allows water to infiltrate the soil profile (Figure 4). Because soil organic matter is a reservoir of a wide diversity of nutrients, including the vastly important nitrogen element, the accumulation of surface-soil organic matter leads to improved soil fertility so that nutrients can be supplied to crops even during periods when fertilizers have not been recently applied (Figure 5). In soils with high decomposition potential such as in the southeastern USA, a strategy to bury crop residues / organic amendments deeper in the soil would likely not contribute to appreciable soil organic carbon sequestration due to the continuously warm, moist environment that allows soil microorganisms to thoroughly decompose these substrates. In the cold climate of Canada, microbial decomposition of substrates with burial will likely be different. At least in the southeastern USA, data suggest that surface accumulation of soil organic carbon may be a highly viable strategy to sequester carbon in soil (Figure 6).

Stratification ratio of soil organic matter is envisioned as a way of comparing soils across different soil types, environments, and landscape conditions. It could also be useful on a particular farm or farms within a watershed to determine the rate of change in surface soil condition when sampling occurs over extended periods of time on different soil types (Figure 7).

In conclusion, soil organic matter under conservation agricultural management becomes increasingly stratified with depth over time. This stratification can be viewed as an improvement in soil quality, because several key soil functions are enhanced. Additional research is needed to validate the simple concept that stratification of soil organic matter can be effectively linked to various ecosystem services, including both productivity and environmental quality. But for now, stratified depth distribution of soil organic matter appears to be a general indicator of healthy soil.

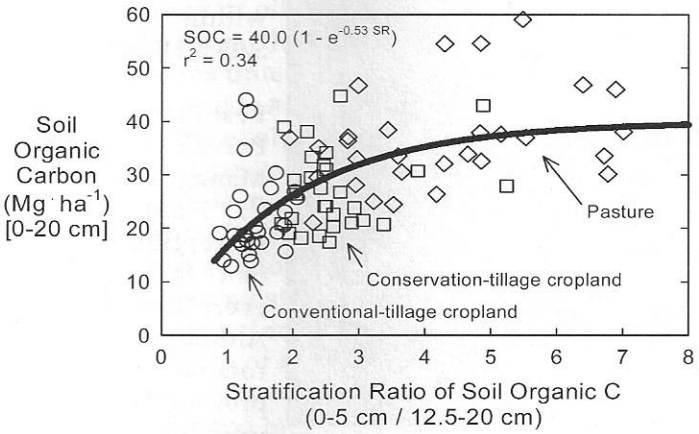


Figure 6. Stock of soil organic carbon to a depth of 20 cm in relation to the stratification ratio of soil organic carbon from a survey of 89 farms throughout the southeastern USA. Source: Causarano HJ, Franzluebbers AJ, Shaw JN, Reeves DW, Raper RL, Wood CW (2008) Soil Sci. Soc. Am. J. 72:221-230.

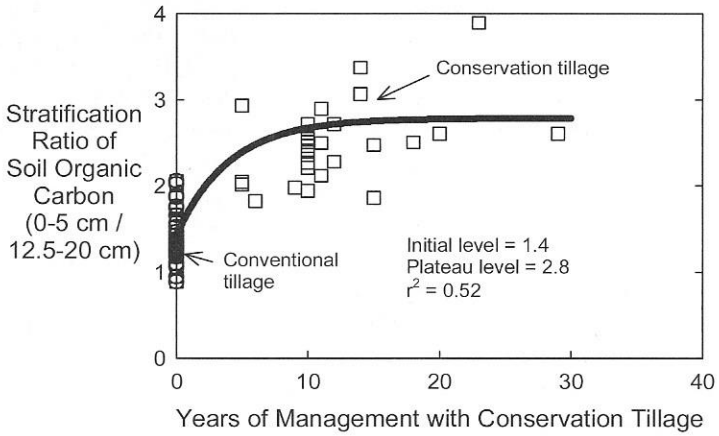


Figure 7. Changes in stratification ratio of soil organic carbon with time under conservation-tillage management in a survey of 89 farms in the southeastern USA. Source: Causarano HJ, Franzluebbers AJ, Shaw JN, Reeves DW, Raper RL, Wood CW (2008) Soil Sci. Soc. Am. J. 72:221-230.

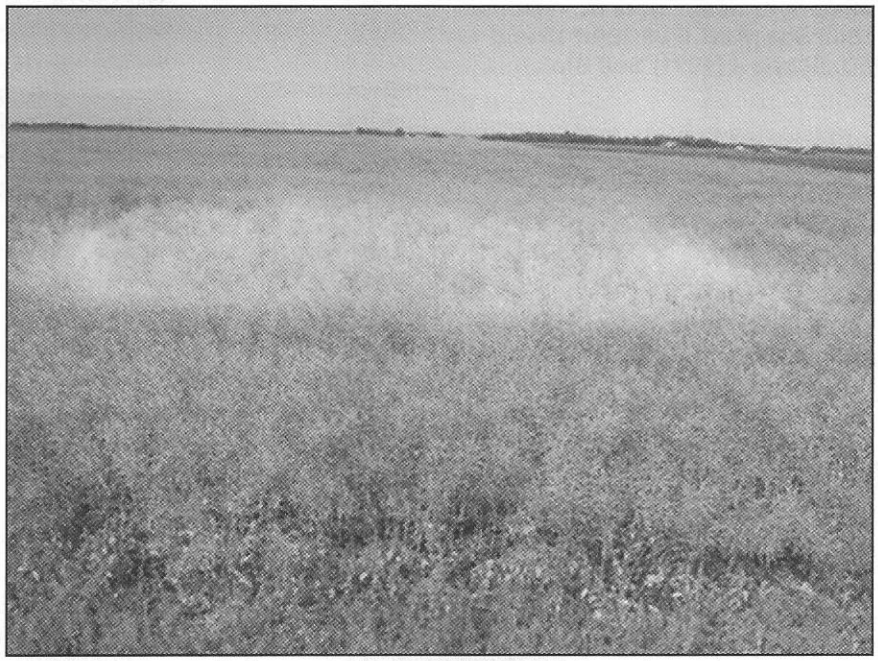
CLUBROOT IN CANOLA: A MANAGEMENT PLAN ... CONTINUED FROM PAGE 5

spread of clubroot pathogen spores in areas in which susceptible crops are grown.

What are growers doing about clubroot?

Those who grow susceptible host crops should follow the recommended best management practices. These include proper crop rotation and sanitation for prevention and management of clubroot. Growers are advised to scout susceptible crops diligently and contact the Saskatchewan Ministry of Agriculture if clubroot is suspected.

Currently, fungicides are not a practical solution for clubroot in canola and there are no foliar products or seed treatments registered for control of clubroot on canola in Canada. Most Canadian canola varieties are susceptible to clubroot, but resistant varieties are becoming available in the marketplace.



Foliar symptoms of club root in canola

Growers are also funding clubroot research through their canola levy. Saskatchewan researchers at Agriculture and Agri-Food Canada in Saskatoon are working in collaboration with the University of Alberta (U of A), Alberta Agriculture and Rural Development (AARD), the University of Guelph, and Ibaraki University in Japan to isolate, screen and discover indigenous microorganisms for biological control of clubroot on canola. The research is part of an integrated disease management approach supported by provincial canola development commissions and grower associations, and the Canola Council of Canada. Researchers at the U of A and AARD have also been studying the pathogen and control options, and both public and private research programs have been screening Brassica germplasm and developing clubroot resistant or tolerant canola lines for western Canada.

What are canola industry organizations doing about clubroot?

The industry organizations are assisting growers through education and awareness for the prevention of the spread of clubroot in Saskatchewan. The organizations help direct the canola levy to appropriate research initiatives which include the development of clubroot tolerant and resistant canola varieties. The canola industry organizations are also assisting the Saskatchewan Ministry of Agriculture through the Saskatchewan Clubroot Initiative.

What is the province doing about clubroot?

As part of a provincial clubroot management plan, the Saskatchewan Clubroot Initiative was established to promote awareness and identify priorities for clubroot prevention and management. In June 2009, the Saskatchewan Minister of Agriculture declared clubroot a pest, giving municipalities powers to handle clubroot under *The Pest Control Act*. These powers include the appointment of Pest Control Officers to enforce, enter land, perform inspections, collect specimens or issue orders to any person; the authority to pass bylaws to prevent, control or destroy clubroot; and the ability to require individuals to take actions to control or destroy clubroot on the land they own, occupy or control. Education and awareness continue to be a priority to help growers and industry members prevent the spread of clubroot into and within Saskatchewan.

Best Practices for Prevention and Management

1. Plant susceptible crops no more than once every four years. Although crop rotation will not prevent the introduction of clubroot to fields that are free of the pathogen, it will restrict clubroot development by limiting the increase of clubroot resting spores and preventing the increase of clubroot inoculum, as well help alleviate the impact of other plant pathogens.

2. Scout crops regularly and carefully.

a. Identify suspicious above-ground symptoms including wilting, stunting, yellowing and premature ripening of canola or other susceptible crops.

b. Wilting is likely to be more apparent in hot weather (usually afternoon).

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CLUBROOT IN CANOLA: A MANAGEMENT PLAN ... CONTINUED FROM PAGE 14

c. Field entrances and approaches are likely to be contaminated with clubroot spores first. Therefore, symptoms will often appear there first.

d. Confirm cause of above ground symptoms by checking the roots for galls.

e. If clubroot is suspected, inform the Saskatchewan Ministry of Agriculture by contacting your local Saskatchewan Ministry of Agriculture regional office or the Agriculture Knowledge Centre (1-866-457-2377).

3. Practice good sanitation by restricting movement of potentially contaminated soil to non-contaminated regions.

a. For Saskatchewan producers, this means restricting entry into their fields of vehicles, field machinery or oil rig equipment with earth tag from infested regions unless it has been properly sanitized. Ask questions about where the equipment is from and what sanitation measures have been used before the equipment left the infested area, dealer or auction site.

b. Cleaning steps may include: removal of crop debris and soil, washing of equipment with a power washer using hot water or steam and misting with disinfectant (one to two per cent bleach solution), followed by an additional rinse with water.

4. Clubroot spores may survive livestock digestion. Avoid use of straw, hay, greenfeed, silage and manure from infested or suspect areas.

5. The risk of spreading clubroot through contaminated seed or plant material is much less than through transporting contaminated soil on field equipment and vehicles. However, avoid seed with earth tag from infested areas to prevent introduction to clean fields.

In addition, in fields where clubroot has been confirmed through the observation of disease symptoms in a susceptible crop and the detection of the pathogen's DNA in a plant or soil sample, the following measures should be taken:

1. Plant susceptible crops, including clubroot resistant canola varieties, not more than once every four years. Resistance to clubroot does not mean full immunity to the disease. Tight rotations of resistant varieties may lead to propagation and spread of new clubroot pathotypes that the variety has no resistance to, breaking down the effectiveness of the clubroot resistance. Although the signs and symptoms of clubroot may not be present, plants may still host disease and propagate new spores, increasing the potential severity of the disease in the future. Therefore, a minimum of four years is required between susceptible crops.

2. Minimize traffic to and from fields and practice good sanitation by restricting movement of soil from the contaminated field to other areas. Any individuals or companies who may be accessing the land should be informed that clubroot is present on the land so they may limit traffic and/or ensure proper sanitation. Procedures for proper sanitation are outlined in point three of the previous section.

3. If infestation is only near the current field access, consider seeding perennial grass to that area and create a new access point as far from the contaminated area as possible.

4. Use direct seeding and other soil conservation practices to reduce erosion. Resting spores can be readily moved in soil transported by wind or water erosion. Reducing the amount of tillage will reduce the spread of the organism within the field and to other fields.

Where can I get more information?

For more information on clubroot, please visit www.clubroot.ca , the Saskatchewan Ministry of Agriculture's website at www.agriculture.gov.sk.ca (click on production under the resources tab, then click on crops-disease), contact your local regional services office or the Agriculture Knowledge Centre at 1-866-457-2377.

SSCA Conference Accommodation

Rooms have beenblocked for the conference under the Saskatchewan Soil Conservation Association's name. Rooms must be reserved before January 7, 2010 to receive the conference rate.

Hotel		Rate
Ramada Hotel *	(306) 569-1666	$119.00
Travelodge Hotel	(306) 586-3443	$109.95

* Conference Host Hotel

See you in February!

ATTENTION CCA'S

This conference has been approved for 12.0 CEU's: NM: 1.0; SW: 3.0; PM: 1.5; CM: 5.5; PD: 1.0

SSCA Membership Form

Fax to SSCA at (306)695-4236 or
Mail to: SSCA, Box 1360, Indian Head, SK S0G 2K0

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Cropland Acres: _____ Hayland/Pasture Acres: _____

Full Member (Farmers)	1-year - $100	☐	3-years - $250	☐
Upgrade to Farm Unit Membership	$25 (one-time fee)	☐		
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