Prairie Steward

Farming For Your Future Environment

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North America and the Carbon Markets

By Edgar Hammermeister, PAg
SSCA President

Climate change and its possible ramifications have certainly garnered the attention of the public and therefore the politicians. This is not only in Canada but also in the United States. In January, Doyle Wiebe and I attended a carbon market conference in Washington, DC. The meeting was very well attended, far exceeding the organizers' expectations. Almost 600 delegates attended (only 300 were originally expected). The delegates represented a very broad range of interests including academia, government (federal and state), industry, Non-Governmental Organizations (NGOs) and finance.

The carbon markets internationally are already huge and growing rapidly. The international market has grown from $400 Million US in 2004, to $10 Billion in 2005, and $30 Billion in 2006. It is no wonder that there is growing interest.

The drivers for the dramatic shift in American opinion seems to come from several fronts including:

1. Public opinion shift – now supportive of actions to combat climate change – driven in part by Hurricane Katrina, Al Gore's "An Inconvenient Truth" and the power of the Internet.
2. Key industry leaders (particularly electricity) are advocating for action by the federal government.
   - Approximately $30 Trillion needs to be spent on infrastructure projects over the coming decades. Industry needs to have policy guideposts set early to make prudent investment decisions.
3. State lawmakers (at least 12 States) are setting GHG reduction targets.

   - Of significant interest are California and the New England States forming the Regional Greenhouse Gas Initiative (RGGI)
4. US National Policy change imminent following recent US election and future Presidential race. However, most pundits suggest no real legislative framework for a national regulated market system will be in place before 2009.
5. Success of the European Union, Emission Trading Scheme.

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CARBON ISSUES ... CONTINUED FROM PAGE 1

- The pilot phase has been successfully tested and important knowledge and experience gained.

The US is beginning to develop its policy for a carbon constrained economy and is at a place Canada was at about 8 years ago. The general concepts brought forward in designing a system include simplicity, clarity, scarcity, and harmonization with other markets. They are behind right now but the US is very capable of catching up when an issue receives national attention.

Regarding the linking of markets, the EU could see linking with RGGI and California (significant discussions now happening with CA). No reference was made to the Chicago Climate Exchange (CCX).

Regarding the CCX, the CCX did make a brief presentation during the conference. It is the only functioning carbon trading market in the United States. It operates on a voluntary, but legally binding, agreement of members to reduce GHG emissions to levels commonly agreed to. Outside of the CCX presentation, the CCX was not referred to again.

The concept of "voluntary markets" was received favourably. As a result, there could be an evolution of tiered carbon markets. These include:

1. Regulatory market;
   a. Industry sectors falling under federal or state legislated emission reductions.
   b. Will have the tightest requirements on baselines, protocols, and verification.
2. Voluntary market,
   a. Will involve corporations not falling under regulation but adhering to "corporate responsibility" (i.e. banks, accounting firms, etc.).
   b. This may come about by companies being proactive for "good PR" or it may come from shareholder pressure for companies to become "green".
   c. Shareholder pressure should not be under estimated. As shareholder knowledge on climate change grows, so will their influence on the "social conscious" exhibited by corporations.
   d. Carbon offset integrity will need to be very high but will likely be less stringent than offsets for regulatory requirements.
3. Consumer market.
   a. There is a growing awareness developing. The internet will be a powerful information tool.
   b. Offset criteria will be less stringent but the volume could become huge. Examples include air travelers wishing to make their trip "carbon neutral" can voluntarily buy carbon offsets. The 2007 Academy Awards were also made "carbon neutral".

In Canada, work has resumed on policy addressing Climate Change. The government is feeling pressure to meet growing public pressure to take action. Unfortunately, the language used in public debate over-simplifies a very challenging problem for Canada. We have a large, northern country with a small population. We produce energy and products largely for export. The world wants what we produce. To arbitrarily apply Kyoto limitations will have severe impacts on the economy. Action needs to be taken to reduce GHG emissions but in balance with ultimately maintaining the economy. It is the economy that provides health care, schools and other social services.

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Blair McClinton, Executive Manager
Marilyn Martens, Office Manager
e-mail: **info@ssca.usask.ca**

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

Change, A Constant Opportunity

Edgar Hammermeister, PAg.
SSCA President

Change for most people is looked upon with apprehension. Questions around change often include how big, how fast and with what outcome. The SSCA is undergoing a period of change as our fundamental structure has been impacted by budgetary constraints. While it is hoped that this situation is temporary, the Board has begun the process to meet the new challenges with a strategic planning meeting in November, 2006 and a work plan initiated to meet specific goals and objectives.

An advantage for the SSCA is that we will be returning to the broader mandate the organization once held. The SSCA had become quite specialized on issues related to direct seeding but funding requirements drove this. Issues about agriculture and how it relates to the environment as a whole are now requiring attention. Ag production considerations will reflect increasing concerns over water quality. How, where and when we use fertilizers and pesticides will undergo increasing scrutiny. As is clearly demonstrated by the rapid evolution of public opinion on climate change, the drive for policy can evolve very quickly. It is crucial to maintain contact both with our elected representatives and the bureaucracy working for them.

To the public, the farmer is often thought of as "steward of the land". This image needs to be nurtured, protected and not taken for granted. We need to ensure we can continue the business of farming while balancing the demands of society.

Being a good steward does not come without cost. Establishing and protecting riparian areas and maintaining wetland/wildlife habitat does take time and investment. As GPS auto-steer technology becomes more prevalent, **the exact cost of maintaining such areas will become increasingly apparent.** These sensitive areas will come under increasing pressure as farmers try to become more efficient in production. In addition to the cost squeeze, there is the threat coming from the demand for bio-energy. The increased demand is beginning to push prices, perhaps to a new plateau. Will history repeat itself? **How much poor quality land was brought into grain production in the early 1970's when wheat had a price explosion?**

As society is beginning to put more value on the environment, discussions are being held about what are called "environmental goods and services". An opportunity is evolving that compensates the farmer for costs incurred for maintaining environmental assets and value generated by maintaining them. **The SSCA is working with our national association, the Soil Conservation Council of Canada (SCCC), to ensure that policy evolves in a manner incorporating a farmer's common sense.**

One possible tool may be the Alternative Land Use Services (ALUS) concept that the Agricultural Producers of Saskatchewan (APAS) supports. The SSCA has been working with APAS on a technical basis in developing a project for Saskatchewan. The knowledge and experience gained will compliment the overall effort to derive value for being good stewards of the land.

The SSCA will not do its work alone. We coordinate our efforts with numerous other provincial and national organizations to gain efficiencies and maximize impact. I thank all the men and women involved in these organizations for their passion and persistence. Time spent away from home and the business of farming also has its costs. This is often under appreciated.

Former Presidents Recognized by SIA

At the recent Saskatchewan Institute of Agrologists Annual Conference Awards Banquet, two former SSCA Presidents were recognized for their contribution to agriculture in Saskatchewan.

John Bennett of Biggar and John Clair of Christopher Lake (formerly farmed in the Radisson area) were presented with Honourary Life Memberships in the Institute. Honourary Life Memberships are "conferred out of respect and in recognition of achievement in and service to the agriculture industry".

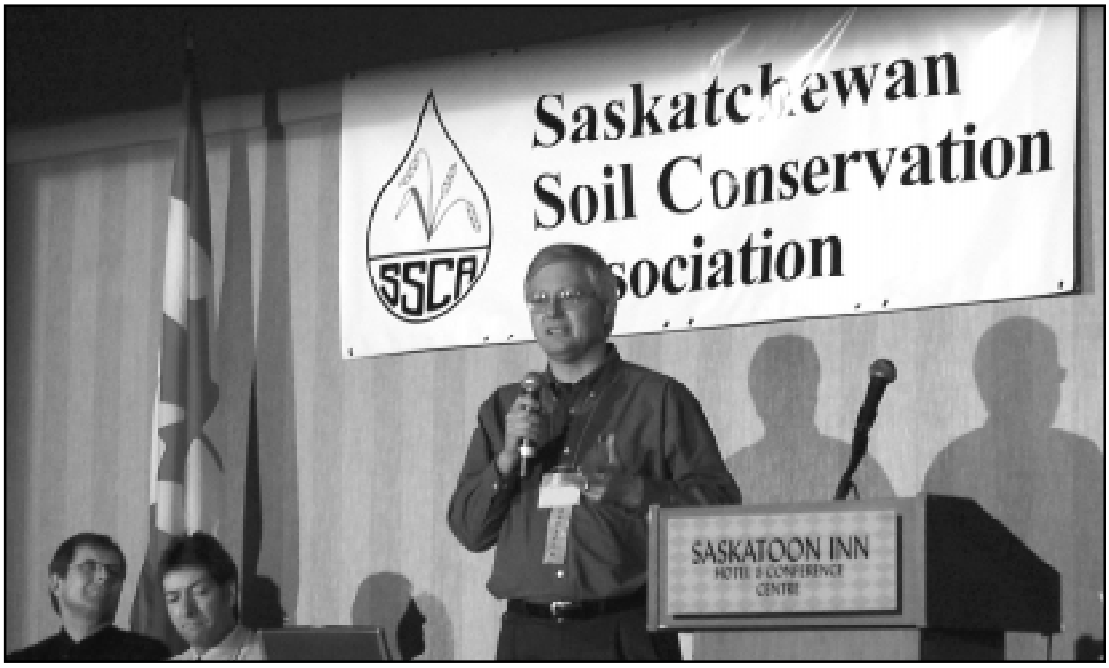
John Bennett's citation recognized his active involvement in the SSCA and in particular, his work on behalf of Canada's farmers in the area of carbon sequestration. John Clair was also recognized for his service to the SSCA and his involvement in the pulse crop industry and the Canadian Wheat Board.

Congratulations, John and John!

19th Annual Conference A Success

With a change in venue and format, the SSCA's 19th Annual Conference proved to be highly successful. Over 350 farmers and industry people attended the two day event that featured more than 30 speakers.

Key Note Speaker Dr. Christoph Weder challenged the farmers to change their attitudes about cooperation. He pointed out that part of the success in settling the prairies was due to the cooperation between settlers. Over the years and generations, however, we have become a much more independent lot. He suggested that if we cooperated with our neighbours a little more, we benefit personally and so do our individual operations.



Dr. Don Flaten, University of Manitoba, was one of 29 speakers at the 2007 SSCA Annual Conference. 350 attended this year's event.

The first session of the Conference focused on new Crop Technology. The remainder of the sessions on Day 1 featured speakers in the areas of Soil Microbiology and Crop Production; Forage and Livestock Management; and Reducing Ag GHG Emissions and the Effect on the Environment.

Following the Awards Banquet, two bear pit sessions were held. The Crop Management bear pit had a traditional format in that the floor was open for questions put to a panel. The session was well attended and proved to be a good forum for some open discussion on a variety of topics relating to soil and crop management.

The Cattle and Grain bear pit took a different approach. In this session, the panel each gave a presentation. Don Surminsky, Regional Business Planning Specialist with SAF discussed the Last Cattle Frontier initiative in east central Saskatchewan. Sandy Russell, SAF's Beef Economist talked about Grazing Arrangements. Greg Stokke, a producer from Watrous, relayed the reasons his operation is moving from primarily grain to cattle. Following the presentations, the audience had the opportunity to pose questions to the panel.

Day 2 began with a session on Alternative Uses for Prairie Crops. Sessions on Pesticide Management and New and Emerging Issues followed. Dr. David Schindler from the University of Alberta delivered a riveting presentation on western Canada's water resources and the immediate need to conserve them.

The conference ended with the Closing Address given by Dr. David Posen. Dr. Posen's presentation was filled with humour and anecdotes as he explained how striking a balance between work and family is good for both the farmer and the farm's bottom line.

Holding the Conference in a hotel meant that there would not be a full trade show. Instead, the Gold and Silver conference sponsors were each given the opportunity to set up a display booth just outside the doors of the main meeting area. The sponsors were happy with the traffic past their booths and the opportunity this afforded to speak to potential customers.

The Conference Proceedings are available for sale. Just call (306) 695-4233 and Marilyn will take your order. Or if you're trying to minimize the paper in your office, watch the SSCA's website for the proceedings when they are posted on line.

Planning for the 20th Annual conference has already begun. It will be held February 12 & 13, 2008 in Regina at Ipsco Place (formerly the Regina Exhibition Grounds). Watch the web site for more details as the planning progresses.

Awards Presented at SSCA's 19th Annual Conference

The SSCA Award of Merit and the Ducks Unlimited Canada – SSCA Conservation Farm Family Award were presented at the Awards Banquet during the Conference.

The Award of Merit is presented annually to an individual who has made an outstanding contribution to the advancement of the soil conservation cause. This year's recipient is Les Henry, Professor Emeritus, Soil Science Department University of Saskatchewan.

In his remarks prior to presenting the Award, SSCA President Edgar Hammermeister indicated that Mr. Henry is certainly deserving of such recognition. "His research into the areas of soil fertility and soil salinity and his dedicated extension efforts, have distinguished him as an outstanding researcher and teacher".

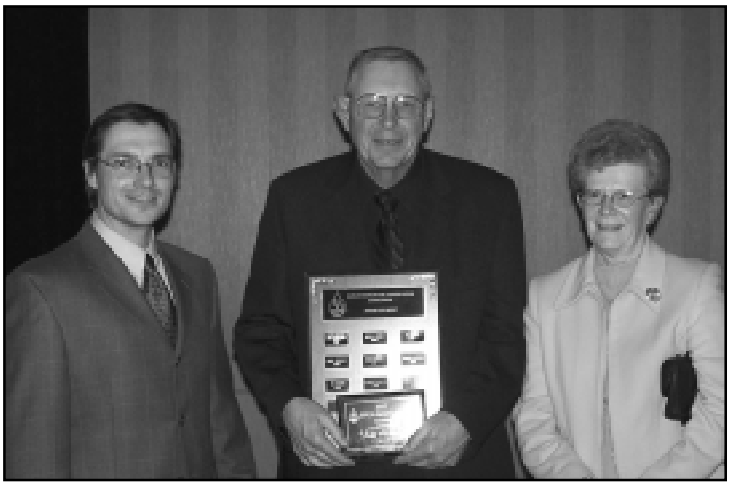
Les was raised on a mixed farm near Milden, Saskatchewan. From 1964 to 1996, Les was a researcher and professor at the University of Saskatchewan. His research focused on soil fertility, soil moisture and soil salinity. He prepared the province's first stubble soil moisture map in November of 1978. This has proven to be a valuable planning tool for farmers and its annual release is anticipated by the farming community.

As a professor, Les taught classes on soils and on public speaking. He's traveled every highway in Saskatchewan attending farm meetings, tours and demonstrations. He has the knack for delivering presentations that are informative and entertaining, making his points with humour and anecdotes. He has also been a regular columnist with Grainews for 30 years.

Les is an author of 2 books including *Henry's Handbook of Soils and Water"* and *"Catalogue Houses: Eatons and Others"*.

This was the first year for Ducks Unlimited Canada to co-sponsor the Conservation Farm Family Award. This award is presented annually to a farm family that has made an outstanding contribution toward promoting production systems that reduce soil degradation, enhance water quality and maintain economic viability.

Presenting the award to Garry & Marlene Lawrence and Stuart & Renee Lawrence of Rosetown, was Lee Moats, Marketing and Communications Specialist with Ducks Unlimited Canada. Lee described the several practices the family has implemented over the years that have served to reduce erosion and enhance the farm's bottom line.



Edgar Hammermeister presented Les Henry with the SSCA Award of Merit. Pictured are Edgar, Les and Inga Cariou.

Edgar Hammermeister (far left) and Lee Moats, DUC (far right) present the DUC/SSCA Conservation Farm Family Award to the Lawrence Family of Rosetown. Accepting the award are Stuart, Renee and Jakin Lawrence. Garry & Marlene Lawrence were unable to attend.

In the early 1970's, the Lawrences began the practice of continuous cropping and expanding their rotation. And for about 12 years, their fields were divided into 40 acre parcels. They began direct seeding in 1984. In the mid 1990's, winter wheat was added to the rotation which provided several agronomic benefits and late fall and early spring ground cover for upland birds.

In 1996, the Lawrences began their precision farming journey with the purchase of a combine that gathered yield and elevation data and software that allowed them to prepare yield maps. Garry and Stuart have spoken at several events about their experiences with direct seeding and precision farming and were active participants in a variable rate fertilizer application study through the Greenhouse Gas Mitigation project.

Congratulations to Les and the Lawrence Family!

Nutrient Stratification in Direct Seeding –

By Adrian M. Johnston, P.Ag.
Vice President, International Plant Nutrition Institute (IPNI)

UNDERSTANDING THE MOVEMENT OF SOIL NUTRIENTS

The total carbon (C) and N found in soils is critical to the soil tilth, physio-chemical properties, microbial biomass, water holding capacity, and the list goes on. However, when it comes to plant-available N in soil it is the potentially mineralizeable N, or 'active' fraction of soil organic matter, that is of interest to us. A reduction in tillage generally has been found to increase this active fraction of soil organic matter and plant-available N (NO_3-N and NH_4-N) after an initial transition period following adoption of no-till. During this initial transition period plant-available N is often actually lower in no-till as the soil microorganisms adjust (immobilization) to the surface placement of crop residues, rather than soil mixing. It is during this transition period that band placement of nutrients below the residue-covered surface becomes so important. After a few years the N immobilized in the surface residues begins to be released (mineralization) at a rate faster than the soil microorganisms can immobilize it again.

The majority of soil N is in the form of NO_3-N, which is soluble in soil water and moves with water in the soil. As a result all of the N that accumulates at the soil surface in the soil organic matter will not become stranded and unavailable to the growing crop. The same applies to the plant-available form of sulphur, SO_4-S. Soil P and K are less mobile nutrients due to their reaction with soil minerals (Ca and Mg), and/or soil charge (cation exchange capacity). This may result in an accumulation of these nutrients at the soil surface (0-2") in the absence of soil mixing by tillage. An understanding of how nutrients move and react in the soil is critical when planning fertilizer additions to correct nutrient deficiencies. While N and S may be applied in random bands in the soil due to the nutrient mobility in soil water, the placement of P and K close to the developing root system is critical for early season uptake by the developing seedling.

PLANT ROOTS – WHERE ARE THEY?

Plant roots grow out to the side and down from a germinating seedling, exploring the soil to a depth of 2-4', with peas and flax on the shallow end of the scale, and CWRS and durum on the deep end. Now, while the roots explore to this depth, the majority of the root mass is in the surface 4-8", especially for cereals. Work by Hurd (1968) evaluating root distribution of CWRS showed that roots did explore deeper in dry soils versus those that were wet (Table 1). However, even on dry soils there are very few roots below the 12" depth. Those that are deeper in the soil do help with water uptake, with the surface roots taking up most of the crop nutrients.

FERTILIZER NUTRIENTS – WHERE DO WE PLACE THEM?

When I started my career in agriculture in 1981 deep banding was a new technology being promoted to increase N use efficiency – more bushels per pound of N. I remember that I would regularly get asked how deep should I place my N fertilizer? There were even research projects that included banding depth, most of which showed that all depths gave pretty much the same results (Westco, unpublished). In long-term no-till studies where the distribution of nutrients has been evaluated the results generally conclude that for mobile nutrients like N and S, there is little stratification of NO_3 or SO_4-S. For the immobile nutrients like P and K, their accumulation in the soil is generally at the depth of fertilizer or crop residue placement. For crop residues this means more P and K in the very surface layer of soil, 0-2". As most no-till farmers are using some form of side or mid-row banding equipment they are placing the P and K fertilizer deeper than they likely did when seed placing the fertilizer. As a result, research projects report that P is found to accumulate at the depth of banding. So, yes we do see P and K stratification when we stop mixing the soil with tillage, and yes, it is in the surface layer. However, I would ask the question, how deep do farmers now till their fields? I doubt that many till deeper than 4" in depth, and as a result which mixed in the soil the P and K nutrients are mixed in that surface layer. So have we really changed much with no-till and in-soil banding of nutrients? My feeling is that no, we have not – in fact we likely get higher efficiency of nutrient use from bands in the soil rather than nutrients mixed uniformly.

Table 1. Root development of Thatcher CWRS (Hurd, 1968).

Depth (in)	Regina Heavy Clay		Weyburn Loam	
	wet	dry	wet	Dry
	mg/plant (% of total)			
0-4"	103 (71)	26 (42)	362 (63)	56 (33)
4-8"	16 (11)	11 (18)	127 (22)	66 (39)
8-12"	14 (10)	15 (25)	35 (6)	19 (12)
12-24"	6 (4)	3 (5)	15 (3)	7 (4)
24-36"	4 (3)	4 (7)	15 (3)	12 (7)
36-48"	2 (1)	2 (3)	15 (3)	8 (5)
Total	145 (100)	61 (100)	569 (100)	169 (100)

Is it a Problem?

WHAT IS THE RESEARCH IN THE NORTHERN GREAT PLAINS SHOWING?

Some of the original research evaluating nutrient dynamics under no-till was carried out in the corn belt of the USA. Research at Purdue University did find that P and K were considerably higher in the surface 3" of no-till treatments after 7 years, while the plowed treatments had uniform nutrient levels down to 9" depth. However, given the density of corn roots in this soil layer, it was noted that "The stratification may not be as big a problem as first thought, since by concentrating roots in zones of higher fertility, nutrient availability may increase".

Dr. Fernando Selles from Swift Current reported in 1999 the P distribution under tillage studies. They found that after 12 years, converting from conventional till wheat-fallow to no-till continuous wheat resulted in an accumulation of plant-available P in the surface 2" layer. However, this was not the case for the no-till fallow-wheat, or the conventional till continuous wheat. They attributed this specific treatment change to the accumulation of surface residue and lack of decomposition in no-till. However, it is important to note that in this study, where 15 lb P_2O_5/A were seed placed each year, the increased soil P in the surface of no-till continuous wheat fields did not result in increased plant uptake of P. The authors attribute the lack of any difference to the use of starter P at seeding, and the slow release nature of the soil P in the cool spring soils.

In Montana, Drs. Clain Jones and Chengci Chen evaluated soil P distribution under a 10 year no-till study at Moccasin. Using a fallow – winter wheat rotation they found that in fact soil test P was lower under no-till than conventional tillage, reflecting a lower pH in the no-till plots. Fertilizer N was broadcast in these trails, and over the study period they speculate that soil pH declined more in the absence of tillage. However, Jones and Chen grew wheat on these plots and found that there was no difference in P uptake by crops. So while the soil analysis showed some differences in soil P levels, the crop response did not.

In the Black soil zone work has been carried out by S.S. Malhi in Alberta, and by Cynthia Grant of Brandon at both Brandon and Indian Head. At Indian Head they found no effect of tillage system after 4 years of a rotation by tillage study in the distribution of P and K in the surface soil profile. With samples collected from the 0-2", 2-4", and 4-6" depths, no difference in P and K level in the soil was observed between conventional-, minimum- or no-till. In a tillage study near Vegreville, AB, Malhi also found no difference in soil P and K after 8 years. In the Vegreville study soil samples were evaluated for the 0-6" depth, without being divided into 2" increments like at Indian Head.

At Brandon, Grant and Bailey found that after 4 years they could pick up an accumulation of P at the depth of banding under both conventional and no-till, and on sandy loam and silty clay soil types. At this location they used 1" sampling depths down to 6". The P accumulated at the 4" depth where it had been banded. Soil K levels were found to be higher under no-till in the 0-6" depth on the sandy loam soil and 0-1" depth in the silty clay soil. The increased movement of K relative to P in the sandy soil is illustrated with the increased depth that K was found. They attributed the retention of K near the soil surface to lack of mixing of the crop residue in no-till.

A recent 2006 study by Alberta Agriculture at Three Hills, Alberta looked at the impact of tillage on soil nutrient accumulation after 11 years in no-till versus conventional tillage. They sampled the soil at 0-3" and 3-6" depths from each phase of a barley – canola – pea – wheat rotation. While N, P, K and S were higher under no-till than conventional tillage in the 0-3" depth, there was little impact in the 3-6" depth. An interesting observation in this study was that the accumulation was always highest on wheat stubble grown after field pea.

Newton Lupwayi from Beaverlodge Ag Canada has reported in 2006 on nutrient stratification in a trial at Fort Vermillion. He evaluated soils in conventional and no-till after 8 years and found that yes, there were accumulations of nitrate-N, ammonium-N and K in the 0-2" depth with no-till, but no difference below that. With P he found no difference in the 0-2" depth, but large differences with no-till being less than conventional till below that depth. In fact these differences in P concentration were due to the type of crop residue from the previous crop before sampling was carried out. However, Lupwayi did note that the next year, when wheat was sown on all treatments, uptake of N, P and K was greater under zero than conventional tillage. So while stratification was found, they were not reflected in the crop uptake the next year.

In summary, it would appear that the ammonium-N, P, K and S do tend to accumulate near the soil surface of no-till treatments, relative to conventional tillage. Could this pose a problem to future production on these soils remains uncertain. The research to date indicates it not to be a serious problem. The accumulation of surface crop residues does an excellent job of maintaining higher soil moisture levels at the soil surface. This will keep roots active and in a position to access these accumulated nutrients. However, under drying conditions, a deficiency of P or K may mean that plants cannot access these surface nutrients. This may place an increased importance on in-soil band placement of these nutrients.

The Challenge of Integrating Research into

Dr. Don Flaten,
University of Manitoba

Dr. Byron Irvine,
AAFC Brandon Research Centre

BACKGROUND AND OBJECTIVES:

Imagine that if every time a farmer used a crop input, whether it was better seed, more fertilizer, or more pesticide, they could add the yield increases that are claimed by the researcher, extension specialist or marketer that is promoting the product. If that were true, nearly every farmer would be able to grow a canola crop of at least 100 bushels per acre. In reality, of course, although the costs of those inputs stack up end-to-end, the yield increases do not and farmers are well justified in not using every input that appears to make a profit in research trials.

One of the biggest reasons why the results of typical research trials do not translate directly into increased profits and huge overall yields for farmers is that traditional agronomic research, extension and promotional information usually focuses on one input or management practice at a time. Research trials are rarely set up to measure the interactions among inputs. In typical, single input experiments we measure the impact of adding one input under conditions where all other inputs are applied at a constant, optimum level. For example, most nitrogen fertilizer responses are evaluated under conditions where the supply of other nutrients such as P and S are ample, a high yielding variety is planted for all treatments and no expense is spared to protect the crop against diseases, insects and weeds. At the end of such an experiment, the researcher may show a very attractive rate of return on investment in the N fertilizer, which ignores the yield benefit and input costs that should be credited to the other crop inputs and management practices that set the stage for a large N response.

To learn more about how to translate typical research trials into real life cropping systems, we examined the individual and combined effects of various levels of fertilization, crop protection and genetic yield potential on canola yield, quality and profitability. This three-year research project was supported by canola producers in Manitoba and Saskatchewan, plus Manitoba Agriculture's Covering New Ground Program, the Potash and Phosphate Institute and the Canada-Manitoba Agri-food Research and Development Initiative.

RESULTS AND DISCUSSION

As shown in Table 1, the rate of return to low, medium and high input cropping systems varies substantially with growing conditions. At the Brandon Research Centre in 2001, yield potential was excellent and intensive application of crop inputs resulted in a yield increase of 40 bushels per acre and a substantial improvement in economic margin. For 2002 and 2003, where yields were limited by adverse growing conditions, the agronomic response was modest and economic response was generally negative.

The difference between the yield and economic responses for individual crop inputs and the overall response to those inputs as part of a whole cropping system was substantial (Table 2). The

Table 1. Yield and economic returns from low, medium, and high crop input packages for Brandon site in 2001, 2002 and 2003 (canola priced @ $7/bu)

Year		Yield (bu/ac)	Revenue ($/ac)	Cost ($/ac)	Margin ($/ac)	Environmental Factors Affecting Grain Yield and Economics
2001	Low Inputs	6.1	$42	$75	-$33	Good growing season conditions
	Medium Inputs	25.5	$178	$191	-$13	
	High Inputs	46.5	$326	$269	$57	
2002	Low Inputs	0.2	$1	$75	-$74	Very dry conditions in spring. Germination was poor and weed pressure extremely high
	Medium Inputs	6.7	$47	$161	-$115	
	High Inputs	24.3	$170	$247	-$77	
2003	Low Inputs	6.6	$46	$75	-$29	Good growing conditions in May and June, followed by hot, dry weather in July and August that reduced yields
	Medium Inputs	18.6	$111	$170	-$60	
	High Inputs	23.4	$164	$236	-$73	
Average for All Years	Low Inputs	4.3	$30	$75	-$45	
	Medium Inputs	16.9	$112	$174	-$62	
	High Inputs	31.4	$220	$251	-$31	

individual yield responses to improved genetics, aggressive fertilization, and application of a complete set of herbicides, insecticides and fungicides were large. Each of the individual inputs appeared to increase in profitability; the responses to variety and fertilizer seemed especially profitable. However, when all the inputs were applied together, the overall yield was significantly less than what might have been expected from adding together the individual yield responses. And, of greater concern, the difference between the theoretical and actual margins for the high input cropping system was very large, resulting in little improvement to the profit margin, compared to the low input system.

Typical research results do not add up end-to-end; the benefits and costs for the whole management system should be considered as a package.

CONCLUSION

So, as farmers consider whether to apply more fertilizer to their crop or spray for various pests, they should consider the overall yield potential for the crop and the overall crop input package that they can afford. And as many farmers already suspect, the expected yield benefits and economic profits generated by typical research trials do not add up end-to-end; the benefits and costs for the whole management system should be considered as a package.

ACKNOWLEDGEMENTS

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Table 2: Average benefit of canola crop inputs when yield responses to those inputs are added individually or as a part of a complete cropping system at Brandon in 2001, 2002 and 2003 (canola priced at $7/bu)

Yield Source or Response	Yield (bu/ac)	Revenue ($/ac)	Cost* ($/ac)	Margin ($/ac)
Base Yield (med. genetics, no fertilizer or pesticide)	4.3	$30	$75	-$45
Variety Response (with all other inputs at high levels)**	4.9	$34	$0	$35
Pesticide Response (with all other inputs at high levels)	14.3	$100	$95	$5
Fertilizer Response (with all other inputs at high levels)	18.8	$132	$74	$58
"Theoretical" Yield If All Inputs Were Additive***	42.3	$296	$245	$52
"Real" Measured Yield With All Inputs at High Levels	31.4	$220	$251	-$31

* Costs for base yield include preseeding glyphosate, seed, machinery, fuel, repairs and other basic costs
** The higher expense for the high yielding canola variety was offset by planting at a lower seeding rate than for the medium yielding variety and using less seed treatment.
*** The benefit of the lower seed treatment costs for the high yielding canola variety is included twice in the theoretical addition of input costs, underestimating those total input costs, compared to reality.

Direct seeding creates opportunities for

By Sandra Taillieu

Farming is a family business for Kevin James and his wife Cindy. They have raised three children near Castor, Alberta, in the heart of dryland farming. Theirs is a farm in transition to the next generation. The move to a direct seeding system has been part of huge changes taking place in the last five years on the James' farm.

"We want a future for all of our children," says Kevin, "and we want to help create an opportunity here for them on the farm." It is this motivation that has governed many of the decisions the James' have made in their farming operation.

Prior to 2002, the James family farmed 2500 acres and ran 100 head of cattle. Their seeding system was three passes including banding fertilizer, seeding and harrow-packing.

"In 2002, we started direct seeding with our air seeder which reduced the workload down to one pass pre-seed burn-off and a one pass seeding operation," said Kevin. "This allowed us to expand our land base to 3500 acres.

"In 2003, our daughter Tara married and started farming. Along with her husband Greg, she took over half the cattle herd and we sold the remaining half.

"In 2004, our son Paul returned to the farm with an Ag Mechanics diploma from Olds College and 8 months of work experience with MacDon. This prompted further expansion to a seeded acreage of 6200.

"In 2006, Tara and Greg decided to grain farm and our farm has expanded again to 7100 acres."

"We had delayed upgrading our equipment through several years of drought and grasshoppers," Kevin explains. "When Paul returned to the farm, we knew it was time to make some investments in equipment." These investments would be the key in both the James' expansion plans and their change to a direct seeding system.

Kevin James with his modified air drill

"We started working with Reduced Tillage LINKAGES agronomist Rick Taillieu who helped us access lots of good information," says Kevin. "We decided to go ahead and co-operate on a demonstration of various seeding equipment on our land. We studied that field and we really liked the machines that left the least amount of disturbance. We liked the Bourgault but we also liked a couple of features on the John Deere. We wanted to reduce our tillage as much as we could without going to a disc drill because we didn't want the maintenance. In the end, we decided to retro-fit the Bourgault mid-row banders onto a John Deere air drill.

Bourgault mid-row banders mounted on a John Deere 1820 air tool

a farm in transition

We had seen a picture of this modification, so we knew it could be done. Paul masterminded the alteration to make a John Deere drill into the seeder we use today. The change from 37 feet of John Deere air seeder to a 53 foot John Deere air drill made a big difference.

"Last summer, we purchased a high clearance sprayer which we use in addition to the Computa sprayer we had before. We also upgraded one of our two John Deere self-propelled combines and put on chaff spreaders. This was a lot of investment at one time for our farm but it was required in order for us to expand our operation. By direct seeding, we now have the capacity to handle more acres, even with the same amount of labour."

The James' cropping choices are influenced both by marketing and agronomic opportunities as well as a need to make the best use of the equipment and time they have. "We grow canola, peas and wheat on our farm," says Kevin. "Barley isn't a great choice for us because we are in a drier area. We've tried triticale but we had difficulty marketing it. One crop we think has good potential for our farm is winter wheat."

"We need to target getting 25-30% of our acres harvested by the 1st **of September in order to cover the acres we farm with our current machines," says Kevin. "Winter wheat may be able to help us to do that."**

"We tried a little Polish canola because we wanted a crop that we could harvest early enough to get some winter wheat in the ground. I think winter wheat is going to be a good fit in our cropping system.

"Our experience growing Polish canola was fine but not great. The last two years we decided to grow a high erucic acid rapeseed on contract instead. We seeded this short-season canola early and hope to take it off in time to seed winter wheat. This year, we have 600 acres of winter wheat in on our canola stubble."

Harvesting canola & seeding winter wheat in 2005

Altering their cropping system to include a winter crop is one way the James' are hoping to spread their workload. "It is challenging at harvest time to be seeding and harvesting at the same time," says Kevin, "But if we work out the logistics, it definitely will take the pressure off next year."

Kevin James is happy about the changes in his farming system: "With our no-till drill, we are able to have superior trash clearance to anything we've had in the past," he says. "We straight cut and leave at least 1 foot of stubble on our wheat. We trap more snow this way and we utilize our moisture much better than we did before. The stubble also provides protection for canola and pea seedlings in the spring. Leaving the straw on the land has really helped our organic matter and I can see it will benefit our soil in the future."

"Years ago, crops used to really grow well on the land where we cleared off trees and brush," remembers Kevin, "I've never thought there was a way to repeat that, but with no-till, I really believe we can slowly start to improve our soil."

Kevin and Cindy's youngest son is in high school: "Craig also really likes the farm," says Kevin. "I'm hoping my children will have the opportunity to take over the farm entirely in a few years, if that is what they choose. I'd like to farm actively until Craig is ready to make his decision."

"I am excited about what we are doing," says Kevin. "With no-till, I can see nothing but opportunity ahead for our family farm."

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NIRS - A New Way to Market Grain for

James H. Helm
Plant Breeder/Head of Research, Field Crop Development Centre, Lacombe, AB

Table 1

Is what you see..what you get?

Barley Type	1000 KWT g	Bushel Weight lb	Protein ----- %	Protein Dig %	Gross Energy kcal/kg	Digestible Energy kcal/kg	Value of Grain* $/MT
6 Row Feed Barley	43.6	52.1	11.7	75.6	4000	2700	$120.00
6 Row Feed Barley	47.7	52.4	10.9	70.8	4000	2900	$140.23
6 Row Feed Barley	37.8	49.1	12.6	64.4	4000	3000	$155.80
2 Row Feed Barley	47.1	54.8	13.0	68.1	4000	3000	$155.80
6 Row Hulless Barley	32.2	64.6	13.2	75.3	4100	3600	$227.39
2 Row Hulless Barley	49.6	65.5	14.3	76.3	4100	3600	$227.39

*For this comparison canola oil (pure DE source) at $880/MT was used

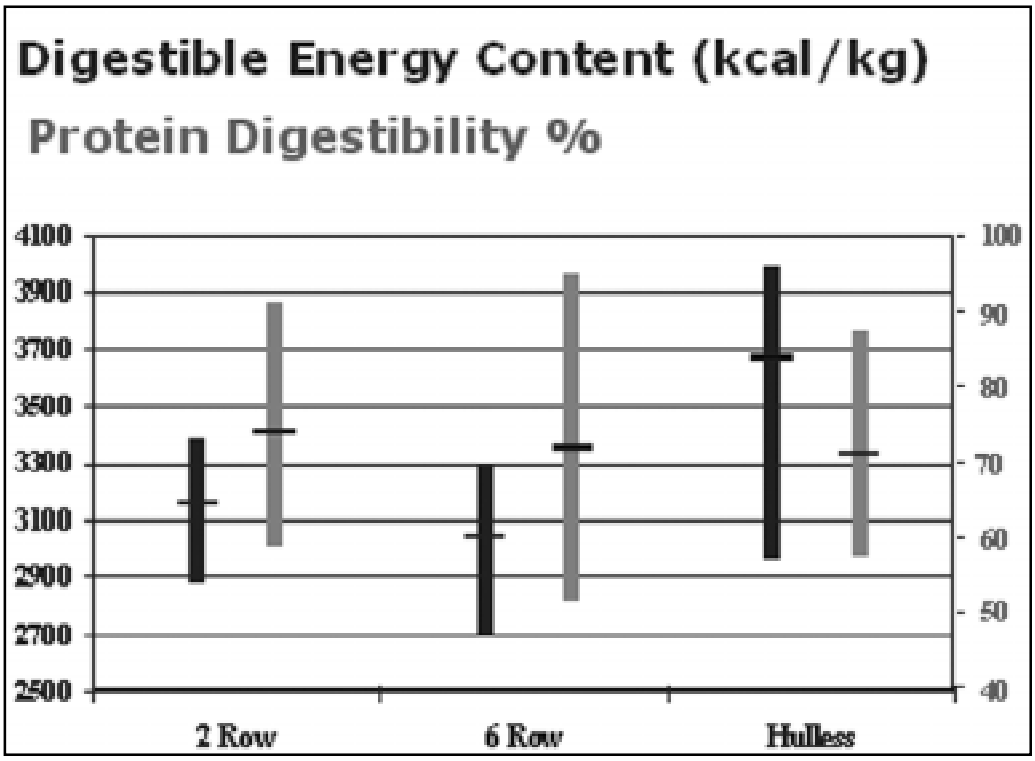
The most limiting and expensive traits to select for whether you are breeding new varieties or marketing/buying product are the quality traits. However, these are often the most economically important traits that we are using our grain for. Quality traits are not simply inherited; they have other physiological effects on the seed or end product and are significantly affected by the environment. Figures 1 to 4 show the variability of various quality characteristics found in Alberta grown barley. Simply measuring test weight (bushel weight) and kernel weight (seed plumpness) do not define see quality (Table 1).

Over the last 40 years, I have looked at many different techniques to rapidly screen breeding populations for many different economic quality traits. Most techniques are too expensive or unreliable to screen large numbers of samples. NIRS (Near Infrared Reflectance Spectroscopy) is accurate, repeatable and rapid as well as non-destructive to the sample, allowing breeding programs to screen large numbers of lines for multiple characteristics at the same time.

What is NIRS?

NIRS technology uses near infrared light to scan a sample and produce a light reflection 'fingerprint' of the sample. This data is then matched with data from traditional wet chemistry

Figure 1



End-Use Quality?

sources or to feed trial data to produce a calibration equation. This NIRS equation can then be used to analyze samples to predict feed quality characteristics such as protein and energy - all in just a matter of minutes.

New NIRS project

New funding received from the Alberta Crop Industry Development Fund has began the process of transferring the NIRS technology used in genetic development to commercial use, which will define the major feed quality components of feed ingredients into a standard format. This will allow both feed producers and livestock producers to price the ingredients according to their true feed value.

It will ultimately mean considerable savings for livestock producers and feed mills by giving quick reliable analysis of feed quality components and allowing them to formulate more accurate feeding rations. Feed grain producers will also benefit from NIRS by having their grain samples analyzed and then using this to market their grain according to its specific quality traits; and they will be paid for its actual quality.

Figure 2

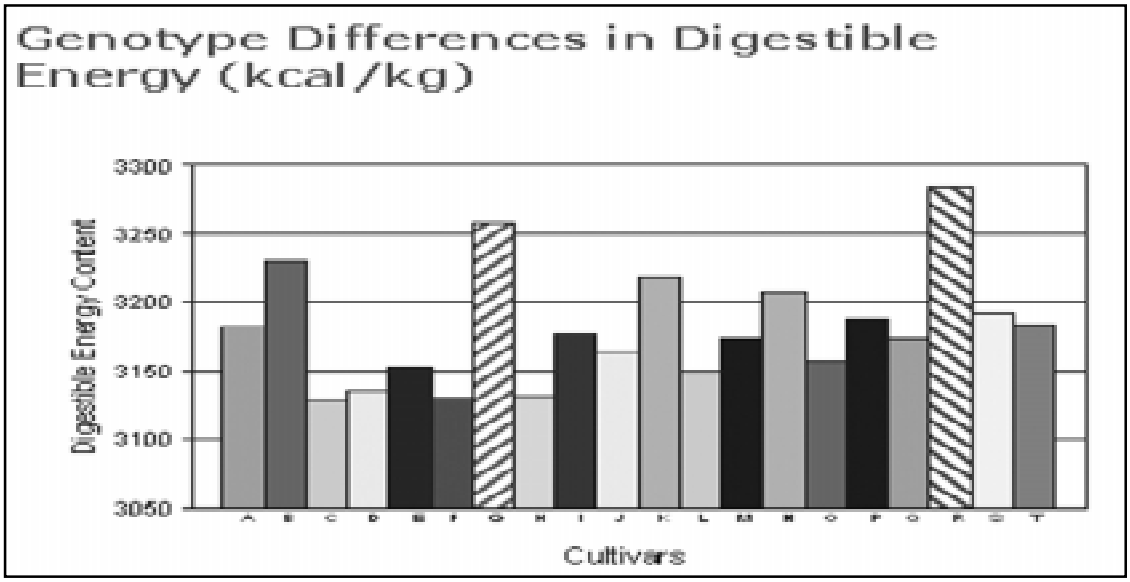


Figure 3

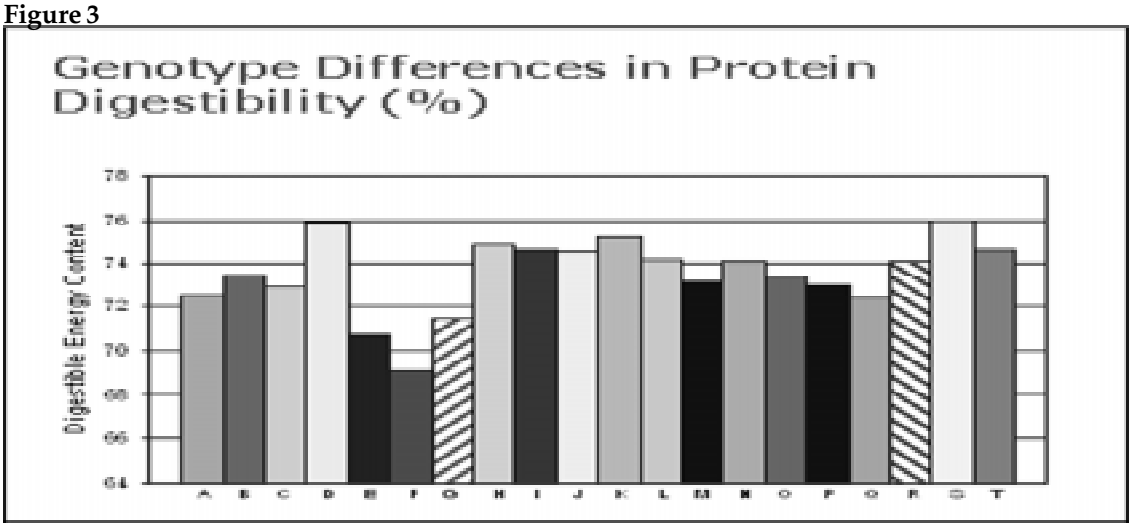
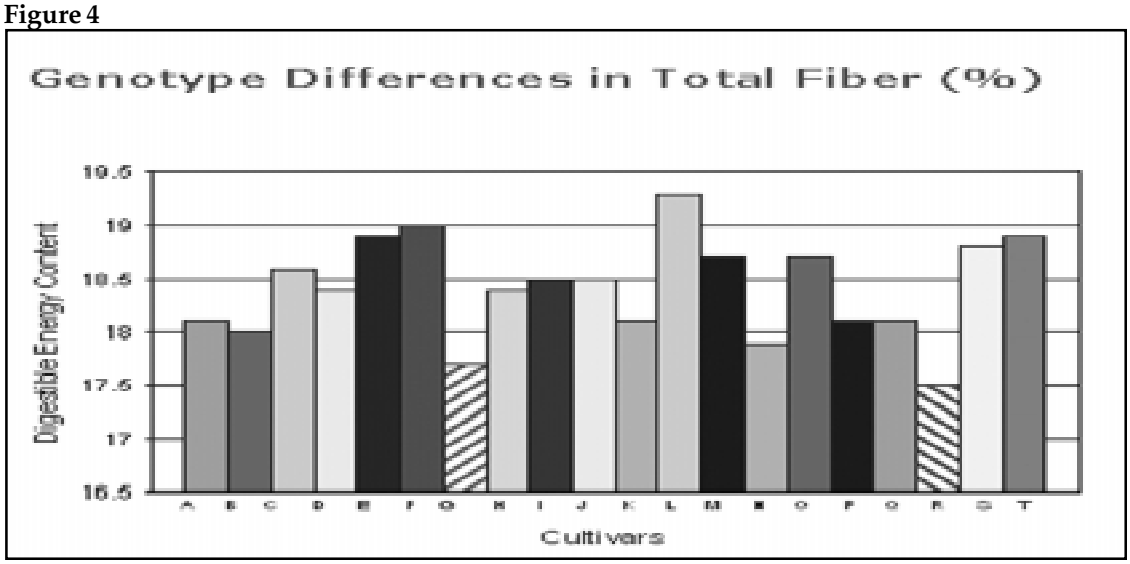


Figure 4



The SSCA Board Working For You

In conjunction with the Annual Conference, the SSCA Annual General Meeting was held in Saskatoon, February 14, 2007. Newly elected members of the Board of Directors include Laura Reiter of Radisson representing the North West; Daniel O'Reilly of Scout Lake representing the South West; and the new Director-At-Large (DAL) is Ken Abrahamson of Pelly. Daniel resigned as 2nd **Vice – President as his term on the Board will end the same year as Laura's. Garry Noble, DAL has accepted the position of 2nd VP. The Board then elected Edgar Hammermeister of Alameda to his second term as President.**

During the President's Summary, Hammermeister explained the future direction of the Association. "Carbon trading issues and policy continue to receive the Board's attention", he said. "The province's farmers, through their efforts to sequester carbon and reduce methane and nitrous oxide emissions, have the potential to make a significant contribution to the nation's commitment to address climate change."

Hammermeister also indicated that the Board will also focus on water quality and environmental goods and services. "Farming practices are under increasing scrutiny," he told the crowd. "We, therefore, must recognize the need to stay ahead of the curve addressing environmental issues".

The consensus of the members attending the AGM was that the SSCA remain a strong advocate for the province's farmers on issues related to soil and water conservation and air quality.

Since December 1, 2006, the SSCA Executive has been representing the SSCA at the following activities:

EDGAR HAMMMERMEISTER, PRESIDENT

- Dec. 7 - Ag Policy Framework (APF) II Consultation – Calgary
- Dec. 13 - ALUS Task Force meeting – Regina
- Dec. 21 - SSCA-SAF/PFRA meeting discussing Ag Env. Group Plan
- Jan. 9, 10 - Crop Week – Worked SSCA booth
- Jan. 10 - Agriculture in the Environment – Sask Pulse Growers Meeting
- Jan. 12 - Saskatchewan Stakeholders Advisory Committee on Climate Change in Regina
- Jan. 16-19 - North America and the Carbon Markets, Washington, DC
- Jan. 23 - SCCC Conference call
- In January we met with provincial government agricultural representatives, as well as PFRA representatives. This was an informational relationship building meeting. It went very well.
- Feb. 6 - APF II Consultation – Regina
- Feb. 7 - Speaker – Managing Climate and Weather Risks C-CIARN conference – Grande Prairie, AB. Topic - Climate Change Implications: Policy, Carbon Markets and the Farm.
- Feb. 12 - Speaker – Agricore United Spring Grower Meeting, Lloydminster
  Topic: Climate Change Implications: Policy, Carbon Markets and the Farm
- Feb.13 - SSCA February Board Meeting
- Feb.14-15 - SSCA Annual Conference and AGM

LAURA REITER, 1ST VP

- Dec. 21 - SAF/PFRA meeting in Regina - Bridge building and proposal discussion
- Jan. 11 - SSCA booth shift missed due to ridiculous amount of snow and wind
- Jan. 23-26 - Farm Tech in AB - PR with sister organizations.
- Feb. 9 - North Battleford APF II consultation meeting
- Feb. 13-15 – SSCA Board Meeting, AGM and Annual Conference

DANIEL O'REILLY, 2ND VP

- Jan. 23 -26 – Farm Tech in AB
- Feb. 13 – 15 - SSCA Board Meeting, AGM and Annual Conference

Much of my time spent with SSCA has been with meetings and almost daily correspondence with the carbon committee.

Dan's comments about Farm Tech:

I attended the Farm Tech Conference in Edmonton in January at the invitation of ACTS II. This event was very well put together with a wide variety of speakers, presentations and an excellent trade show. I would certainly encourage every one who is able to attend this event to do so. Here are some tidbits that I would like to share with you.

A farm manager, John Chapple, representing a foreign corporation spoke about his experience managing a 5000 ac farm in China. The obstacles in agriculture there are overwhelming.

David Govert from MachineryLink, Kansas spoke about their unique company. They lease combines, no header. They have over 200 units that cover most of the US farm area. They are looking to expand into Canada.

Rolf Derpsch gave an excellent presentation on agriculture in Chile. They have taken advantage of new technology and are a growing industry.

Anne Dunford, known to cattle producers as an excellent market analyst formally from Canfax gave an excellent presentation on the cattle industry. Although the outlook is not all that rosy, it is good to have a heads-up on what is happening and why.

Tillage and Phosphorus Availability

Tillage and Phosphorus Availability
Jeff Schoenau[1] and Guy Lafond[2]
[1]Department of Soil Science, University of Saskatchewan, Saskatoon, Sask.
[2]Agriculture & Agri-Food Canada, Indian Head, Sask.

It is recognized that adoption of the direct seeding system increases the ability of the soil to supply available nitrogen through mineralization after a few years. Part of this effect is no doubt related to the enhancement in organic matter. However, tillage system and its relationship to phosphorus availability have perhaps received less attention than nitrogen.

We would anticipate that reducing or eliminating tillage would increase phosphorus availability by reducing erosion, increasing soil moisture to allow phosphorus to move more easily to roots, and increasing biological activity, with greater infection of roots by beneficial mycorrhizal fungi that extend the root system and provide better access to soil phosphorus. However, another important consideration in how a cropping/tillage system can affect phosphorus fertility is the balance between P fertilizer addition and crop P removal. Regardless of the system employed, if more P is removed in crop harvest than what is replaced by fertilizer or manure, the P stores in the soil will be depleted. In long-term no-till systems, a phenomena commonly termed "stratification" is observed in the upper soil profile, in which high concentrations of immobile nutrients like P are found closer to the surface due to lack of mixing by tillage. Questions have arisen about the effect of this stratification on phosphorus availability.

In the last decade, research work conducted in Saskatchewan has provided answers to some of the issues brought forward. Work in the 1990's by a graduate student D. Adderley at the University of Saskatchewan showed that on pea stubble in the Brown and Black soil zones, the supply of available phosphorus to the following wheat crop was:

no-till ≥ spring till > fall and spring till. Since this was the first year of the tillage treatments, the higher supplies of soil phosphorus were attributed to higher soil moisture content under no-till that enhances the ability of P to move in the soil and also possibly greater release of P from surface residues than when incorporated.

To reveal the effects of adopting low disturbance direct seeding on P availability over a longer time frame, in early spring of 2006 we sampled and compared five year (short-term) and twenty-five year (long-term) no-till plots at Indian Head. The supply rates of available phosphorus and nitrogen in the soil were measured over a two week period using PRS probes.

This comparison revealed significantly higher supplies of available nitrogen as nitrate and also higher supplies of available phosphorus after 25 years of no-till compared to 5 years. These results were consistent with observations at this site that crops grown on the long-term no-till soil were not as responsive to added P fertilizer.

Taking soil cores to measure nutrient availability in short and long-term direct seeded fields.

Finally, phosphorus stratification at the surface in no-till appears to have little impact on P availability based on results of research work conducted in 2005 by graduate student C. Baan of the University of Saskatchewan. In this work, a cycle of tillage was imposed on long-term no-till soils at sites in the Brown, Black and Gray soil zones. The mixing by the tillage operation reduced the stratification, but had no large effect on P availability as shown by similar soil P supply rates and crop P uptake among treatments. A significant finding of the study was that the tillage operation did appear to reduce nitrogen availability in the short-term due to immobilization of available nitrogen from incorporation of large amounts of surface straw and chaff.

Overall, it is concluded that reducing or eliminating tillage and maintaining the nutrient balance contributes to a soil with good phosphorus as well as nitrogen fertility.

SSCA Bids Farewell to Four Staff

With the loss of funding, the Board was forced to lay-off four very capable and dedicated agrologists, effective September 30, 2006. As we bid farewell to these people, it's fitting to describe a little of the many ways they each contributed to the success of the SSCA.

Eric Oliver joined the ranks of the SSCA in August of 1994. Stationed in Swift Current, he served the SW region. He set up numerous demonstrations and spoke at countless meetings. In addition to his regional duties, Eric was responsible for setting up the newsletter and especially enjoyed working with the AV equipment at both the Conference and Crop Advisors' Workshop (CAW). Eric farms at Aneroid.

In October of '94, Garry Mayerle also joined the team. Garry farms near Tisdale and has tirelessly served the NE Region. He, too, delivered presentations and set up demonstrations all over the region. Garry contributed very detailed articles for the Prairie Steward and Fact Sheets. He was Conference Tradeshow Coordinator for several years.

Tim Nerbas arrived on the scene in November 1996. Tim has a mixed grain and cattle operation near Waseca. His headquarters were in Lloydminster until the SAF office was closed when he re-located to North Battleford. It was rare, however, to find Tim in an office as he always seemed to be traveling to meetings or demonstrations. Tim also helped with the AV duties at the Conference and CAW and he coordinated the award presentations at the Conference.

Tim Nerbas

Eric Oliver

Garry Mayerle

Rich Szwydky joined the Staff in September of 2001. Rich farms near Blaine Lake and has experience in the ag retail sector. He worked out of his home, first in Saskatoon and then Borden, covering the west central region. Due to his proximity to Saskatoon, he enthusiastically accepted extra speaking and tour engagements. He was the Tradeshow Coordinator for the past couple of years.

Rich Szwydky

The SSCA wishes each of these fellows good luck in all their future endeavours.

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