The Newsletter of the Saskatchewan Soil Conservation Association

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Carbon Corner

By John Bennett,

SSCA 1st Vice President

Recent developments in having soils accepted as part of the Greenhouse Gas Reduction Plans are generally positive.

There has been a lot of activity south of the border. At a conference near Washington, D.C., it was apparent the US Administration is very favorably disposed to agricultural soils playing a role in the US response to Kyoto. Americans signed the Kyoto Protocol at the Buenos Aires round of negotiations. This agreement must be ratified before it becomes official. My understanding is that the next US Presidential campaign may well have a strong environmental component. Democrats favoring ratification, Republicans opposed. It would appear that the prolonged impeachment process in the senate is favoring the Democratic side and Clinton, which might favor soils. The Congress, Senate, US Administration and World Bank officials as well as scientists were in attendance. Mike Dyck from MANDAK Zero Till Association and myself were the only farmers in the crowd. We made a presentation that stressed farmers are indispensable if the full contribution of soils as a biological scrubber is to be achieved. We were very well received and our message was accepted.

Since that time the USDA (US Dept of Agriculture) called a meeting of it's research scientists to be sure the policies being developed would have a sound science base.

Weeks later I spoke to a farm organization that was considering a carbon trade and they were quietly lobbying to have Agricultural sinks included in national policy and all carbon sequestered since 1990 to have same value. A representative from the US Treasury Department suggested that early US policy would be based on the Credit for Early Action Provisions.

At the Buenos Aires round the text in section 3.4 of the Kyoto Protocol was changed from "Land Use Change and Forests" to "Land Use, Land Use Change and Forest" to be included as sinks. Some legal minds suggested that the original "Land Use Change" referred to changing some land use to forestry. With the change in text it should make it easier to include agricultural soils as sinks. Canada's negotiating team who at one time were the only ones pushing for agricultural soils have gained international support from Japan, Australia, New Zealand plus many other smaller players. When (rather than if in my judgement) the Americans come solidly on side, soils will probably have a bright future as sinks. There appears to be some cracks in the European opposition so soils as sinks are on a much sounder footing than at last report.

The International Panel on Climate Change (IPCC) Special Report on sinks has chosen several members with Henry Janzen, Agriculture and Agri Food Canada (AAFC) being one of the authors. This special science report is due to be finished by the fall of 1999. Some of the authors I've heard mentioned have played positive roles at the Soil Water and Conservation Society

(SWCS) meeting in Calgary last May and at the "Carbon Sequestration in Soils: Science Monitoring and Beyond", meeting in Washington, DC, December, 1998.

The Canadian Sinks Table has released its Foundation Paper and it should be on the Internet. If you are interested you could call the SSCA office (306-695-4233) and get the Website or even ask for the pertinent sections to be mailed to you.

The Saskatchewan Soil Conservation Association (SSCA) has put in a lot of effort to stay on top of this issue.

We worked with the Soil Conservation Council of Canada (SCCC) to discuss the implication of Carbon Trading and Sequestration issues. This workshop was attended by farmers from across Canada and resulted in a Discussion Paper. If you are part of a market or production club or just interested, contact our office and get a copy of the Paper.

It must be remembered that we use fossil fuels on our farm operation so we are a source of Greenhouse Gasses. Properly managed soils can more than offset our emission since it allows soils to be a sink.

Like it or not our Greenhouse Gas Management will likely impact the success at our farms. We must work to see that policies will be favorable to our farms.

President's Message

By Bernie Niedzwiedz,

SSCA President

Another year has come and gone. It seems like only yesterday that I first occupied the president's chair and now I am leaving. It is due to the great staff and board that the time has gone by so quickly and smoothly for me. Thank you to everyone for the help and support you have given me over the past year. A special thank you to Claire, who is always pleasant and very helpful whenever anything is asked of her at the head office.

This has been a busy year for everyone; with several directors being very active in the soil carbon sequestration issue. John, Clint and Perry: stay focused and be persistent. Several of the staff have been asked to travel to various parts of North America and share their expertise in direct seeding. We feel confident that we are going in the right direction when we are looked at as leaders in these areas. Keep up the good work!

It has been a pleasure to serve you as president this year and I wish the new SSCA president, Greg Kane all the best as he leads the SSCA through another year. May your stubble fields fill with snow and the seasons stay in alignment this year. Thank you and Goodbye.

1999 Direct Seeding Conference a Major Success

By Blair McClinton,

SSCA Assistant Manager

1200 farmers from across western Canada and northern U.S., met at the Saskatoon Prairieland Exhibition, February 17 and 18, to attend the Saskatchewan Soil Conservation Association's annual Direct Seeding Conference. The success of this year's conference reflects the growing trend towards direct seeding in Saskatchewan and that farmers recognize the value of attending our conference.

"The purpose of the conference was to bring farmers together to get the latest information on direct seeding and how to implement these practices on our farms," says SSCA president Greg Kane. "Farmers had the opportunity to have their questions answered by researchers, industry experts and other farmers," says Kane.

This year's conference featured keynote speaker was Val Farmer, a psychologist and columnist on rural issues. Dr. Farmer talked about strategies to successfully balance farm and family life in these tough economic times.

The conference had seven sessions, which offered a mixture of farmers and researchers to provide both experience and first hand information. This year we also held two concurrent sessions each day providing a greater variety of information. This year's sessions covered topics on direct seeding pulses, direct seeding on a budget, precision farming, direct seeding small seeded crops, direct seeding forages, seed growers and emerging issues in direct seeding. Speakers talked about how to integrate all this information into a successful direct seeding system.

Once again, the informal evening "Bear Pit" sessions were well attended. There were four concurrent "bearpits": How to Start Direct Seeding, Crop Management in Direct Seeding, Precision Farming and Conserving the Family. These sessions provided farmers with the opportunity to have their questions answered by experts in less formal, smaller groups.

The trade show had 80 exhibitors showing the latest in crop production technology and information related to direct seeding. The trade show continues to be a major attraction of the conference.

Extra copies of the conference proceedings for sale for $10 through any SSCA staff member. We also plan to have the proceedings available at our web site *http://paridss.usask.ca/consgroups/ssca/sscahome.htm* soon. Plans are already under way for the 2000 annual meeting and conference in Regina.

Fuel Use Survey Favorable to Direct Seeders

By Doug McKell,

SSCA Executive Manager

If you look at recent Statistics Canada's reports you will find that despite advancements in agriculture technology, farm fuel use is increasing. You would think the opposite. Why is fuel usage increasing? Are there not more fuel efficient tractors, trucks and combines out there today? And what about the trend to low disturbance seeding (LDS), a system that reduces total fuel consumption? These are questions that were asked by TransAlta Utilities in their efforts to determine if their support for LDS systems will help reduce C02 emissions by storing carbon in the soil. To help answer these questions, they commissioned a survey in cooperation with Prairie Agricultural Machinery Institute (PAMI) and the Saskatchewan Soil Conservation Association (SSCA) to determine the effect direct seeding has on overall fuel consumption.

The survey involved several producers, identified through SSCA contacts, who had information for both LDS systems and conventional farming systems over the period 1992-1997. The data analyzed included the amount of conventional and direct seeding acres, fallow acres, grain produced, fuel used and grain hauling distance. Three different seeding practices were investigated. These included LDS, high disturbance seeding (HDS), and a combination of the two where a producer used some of each practice in a given year. Data collected was then compared with average data obtained from Saskatchewan Agriculture and Food's Statistics Branch to determine the producer's total fuel cost.

Although the results of this survey did not provide enough data to show statistical significance, trends in fuel usage were obvious. **Figure 1** shows the results of fuel cost per seeded acre. In all but one year, LDS had a much lower fuel cost per seeded acre than HDS. The year this trend was reversed could be due to that year having only one data point for the LDS system.

Sask Ag and Food data shows a higher fuel consumption rate per seeded acre than the data from this study. It is not clear why this is the case but the fact there are only 20-25% of the seeded acres in Saskatchewan under LDS may suggest the larger percentage of conventional seeding systems acres is outweighing the more fuel efficient LDS acreage.

Figure 2 shows the fuel cost per tonne of crop produced. Again the clear advantage is toward the LDS system. In fact the HDS system appears to have nearly double the fuel cost per tonne of crop produced of the LDS system. Survey researchers suggest that even with the limited data obtained in this study, there is a large enough difference to conclude that LDS, as practiced by the survey participants, can be used as a method to reduce fuel costs compared to HDS conventional seeding practices.

Aside from the above analysis, other parameters were surveyed that could affect fuel consumption. **Figure 3** shows the breakdown of gasoline and diesel consumption for both

seeding systems. It appears producers in the LDS system not only use less total fuel, but their proportion of gasoline consumption was also much lower as compared to producers using HDS systems. It is also important to note burning gasoline results in a larger proportion of green house gases released to the atmosphere than burning diesel fuel. The contributions from HDS systems to atmospheric green house gases are, therefore, even higher, notwithstanding the higher amounts of fuel burned in the HDS system.

Further investigation revealed that in this study the producers using HDS represented a smaller seed acreage per capita than those using LDS. Larger diesel trucks and tractors are likely being used more on the LDS farms, which would lower their relative gasoline consumption. Given this trend, the agricultural industry should exhibit lower gasoline consumption as farm size increases.

Another factor that undoubtedly contributes to higher farm fuel consumption is the distance to grain delivery points. This study found the average hauling distance from the farm to delivery point is increasing over time for all farmers. This alone could be a significant factor in the overall observed increase in fuel consumption over the time period studied.

The researchers concluded that LDS results in a lower fuel cost per seeded acre and per tonne of grain produced, compared to HDS. This is consistent with what many direct seeders have found after switching to the LDS system. Despite this fact, and a decrease in fallow acres, fuel consumption in Saskatchewan continues to rise. This could be largely due to the increased hauling distance, and it could also be due in part to the increased use of farm vehicles over longer distance for both farm and personal business. A further study should look at fuel cost, as well as other costs and savings due to direct seeding such as equipment cost, operating costs and labour. This type of study should be conducted on an ongoing basis rather than retroactively to improve the sample size.

In any case, the LDS system has shown, and continues to show efficiency when it comes to burning fossil fuels.

Anyone interested in further information on this report should contact the Prairie Agricultural Machinery Institute, P.O. Box 1900, Humboldt, SK S0K 2A0, Telephone: (306) 683-2555.

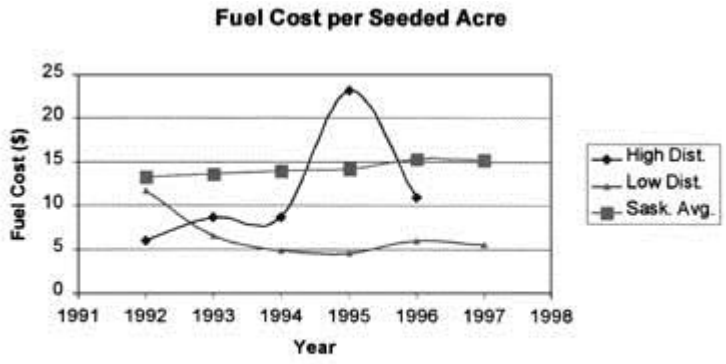

Figure 1. Fuel Cost per Seeded Acre.

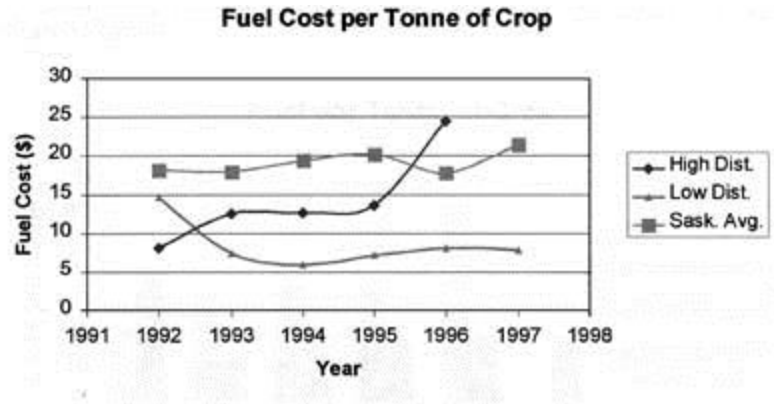

Figure 2. Fuel Cost per Tonne of Crop.

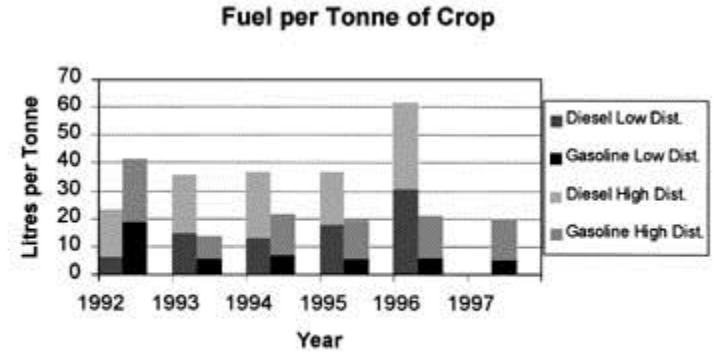

Figure 3. Gasoline and Diesel Consumption.

CLC Education Program Overview

By Garry Brad,

CLC School Program Co-ordinator

Over the past four years, the Conservation Learning Centre's school program has become a major activity and a high profile event. The number of students visiting the CLC has steadily increased: 1995 - 461; 1996 - 732; 1997 - 926; 1998 - 1005. Each year demand outweighs available tour and coordinator time. Because of the increasing interest in the Conservation Learning Centre's school program, we submit a more in-depth overview of the school program to better inform our sponsors, members, educators and readers.

The Conservation Learning Centre's Education Program offers students from grades 3 to 9 and 11 practical hands-on activities which supplement and enrich each grade's science curriculum with special emphasis on conservation.

Each April and August, letters of invitation are sent to surrounding schools inviting students and teachers to take advantage of our in-school presentations (currently grades 5 and 6 with plans to expand to grades 7 through 11) and our activity-related tours at the CLC. Classes are booked on a first-to-phone basis.

Objectives of the tours vary with curriculum requirements, age of student as well as season. A variety of methods are used to introduce and develop the concepts of conservation with relation to agriculture. In-school presentations begin with a general introduction of the topic, including terminology and skills. This is developed through games, quizzes, demonstrations, experiments, charts and slide presentations. Students are given worksheets specific to the upcoming field trip to the CLC. Worksheet answers are provided to teachers upon request.

Areas of study enhanced or supplemented by activities provided by the CLC include:

Grade 3 *Food chains*: Food chains and nature's ecosystem. Food chains and the relationship between animals and their environment. The importance of conserving wetland habitat.

- What is a food chain?
- Why is it important to conserve our wetland habitat?
- With the help of your teacher, create a diagram of a wetlands food chain.

Grade 4 *Weather*: Predicting weather: air quality, plant diversity. The importance of water conservation. The effects of changing weather on habitat.

- How does a change in our weather pattern (from wet to very dry) affect our wetland habitat?
- How do the changing seasons affect the wetland, woodland and grassland habitat?

- How do soil temperatures affect plant growth?
- In what ways can farmers protect our soils against extreme weather conditions like wind, heavy rains, blowing snow, hail?

Grade 5 *Plant growth:* Structure and functions. Saskatchewan soils - causes of erosion and degradation. The importance of soil in food production. The importance of soil conservation.

- What are three causes of soil erosion or degradation?
- What good conservation practices can farmers employ in order to reduce erosion from wind, flowing water or heavy rains?
- How do annual, biennial and perennial plants differ? Consider life span, root structure, hardiness and plant size in your answer.
- What is the relationship between soil quality and food production?

Grade 6 *Ecosystems:* The interrelationships of plants, animals and soils. Soil textures. The importance of conserving soils, water and wildlife habitat**.**

- "The potholes, sloughs, and marshes are absolutely essential to the survival of the wetland ecosystem." What can farmers, ranchers, and property owners do to conserve the wetlands for future generations?
- What perennial plants create ideal "dense nesting" cover for birds and animals in pastures, transition areas and in hayfields?
- Why is dense nesting cover important to nesting birds such as ducks, grouse and doves?
- An ecosystem may be defined as "the combination of a community, its physical environment, and all the interactions between them." What happens when one element (for example, the physical environment) within an ecosystems is destroyed?

Grade 7 *Plant reproduction / Microorganisms:* A close look at life, reproduction, and survival environment of plants and animals. The relationship between microorganisms and soils. The relationship between weathering, soil erosion and plant sustainability. Conservation issues.

- How do microorganisms help to create nutrients for plants?
- Discuss: "Can agriculture and wildlife co-exist?" What can farmers do to ensure that wildlife habitat is not destroyed on their property? What part do the various species of wildlife play in creating a "balanced" ecosystem in farm communities?
- How does physical weathering, chemical weathering and acid rain affect our soils and our environment?

Grade 8 *Managing plant growth:* Nutrients, soils, hardiness, plant reproduction. Soil, water, and technology. Environmental interactions. Changes in agriculture in the 90's.

- Compare the quality and quantity of plant life near a pond to the quality and quantity of natural vegetation on a barren hill in the same vicinity. Using soil samples from near the pond and from the hill, explain how these samples compare in regard to the amount of topsoil in each of the sample areas.

- What relationships exist between the amount of topsoil in a given area and the quality and quantity of vegetation in that same area?
- How have farmers in your vicinity improved soils for better plant growth in the past ten or fifteen years?

Grade 9 *Diversity of living things:* Classifying, adaptation, reproduction and survival. *Environmental quality:* Sustainability of plant and animal life. Air quality, water quality. People and the environment.

- Scientifically determine the quality of pond, stream or river water by measuring the amount of dissolved oxygen in each sample and by using invertebrates (pond monsters) as indicators.
- How can you determine if phosphates or nitrates are present in a sample of pond or river water?
- What can farmers do to ensure that animal and/or human wastes, fertilizers, herbicides and petroleum products do not contaminate the ground water in their vicinity?

Grade 11 *The evolution of land use choices:* Soil management.

Technology and farming: Application to today's agricultural challenges.

- Explain the relationship between LDC (low disturbance cultivation) and greenhouse gas emissions.
- What effects does sunlight, soil pH, volatilization, soil moisture and the amount of organic matter in the soil play in the disappearance of herbicide in soil?
- "Modern farming requires up-to-date, precise agricultural information." What relevant information might farmers access from the Internet that might help them keep pace with the many new challenges which agriculture presents?

The field presentations and activities begin with a background of the CLC, its partners (SSCA, Ducks Unlimited, Royal Bank of Canada, PFRA, etc.) and their role in the programs at the CLC. Concepts are introduced or reviewed. Students participate in relevant games developed for the program. The groups tour the facility, worksheet in hand, and participate in field activities that vary from a scavenger hunt to a walk along the Wetland Wonder Trail. Findings are discussed upon return to the field classroom and summaries are completed at the CLC or later in the school.

Evaluation

All visiting educators are asked to evaluate their students' reactions, identify benefits and comment on the general usefulness of the in-school and/or field. Responses to the evaluation have been very positive and useful as they are instrumental to the planning process for an expanded school program.

In assessing the Autumn 1998 evaluations, all respondents indicated that they would visit the Conservation Learning Centre again in the near future. Most felt the time spent at the CLC was

adequate for their class while a few thought that 2.5 hours was too short for the activities covered. Respondents indicated that the activities were "age and grade appropriate" and that "the students could now see relationships, understand plant succession and the importance of habitat." Others commented on the "scavenger hunt" and how it kept the students focused. Most agreed that "games were an excellent way of teaching about conserving our wetlands".

When students and teachers were asked what they found the most interesting, participants replied: "everything, especially finding the different scavenger hunt articles, the bones"; "the animal remains"; "the Wetland Wonder Walk"; "looking for insects and wildlife"; "they loved the games and nature hunt check sheets"; "the hands-on approach, being actively involved".

When respondents were asked to suggest changes to activities, most indicated they were very satisfied with the current format. One comment summed up the general feeling of the respondents: "Why change a good thing!?!"

The Future

Providing children with in-school presentations and hands-on curriculum-related activities are excellent methods of educating children to the importance of the conservation of soil, water and wildlife habitat. These methods are extremely popular at the present. As word spreads about the effectiveness of our program, demand is increasing rapidly. There is room for growth in both numbers and scope, given increased input of information, delivery of hands-on curriculum-related activities and access to necessary materials and services.

If you have any questions about our school program or are interested in booking a tour, please contact us at 306-764-3345 (Garry) or 306-953-2796 (Laurie).

Don Horsman: New East Central Region Director

I grew up on a family farm south of Fort Qu'Appelle. I attended a one-room school for 9 years, high school in Regina for 3 years, and then 4 years of University in Regina and Saskatoon. I taught school for 6 years in Regina and 4 years in East Africa. When my parents retired in 1974, my wife and I started farming the one section of land. We have four children, the oldest, a daughter, is married and teaches, the two oldest boys are working in Prince Albert and Saskatoon and the youngest is attending the College of Agriculture in Saskatoon.

I have been active in a number of organizations; Saskatchewan Wheat Pool as a committee person and delegate, member of the Fort Qu'Appelle Crop Club since its inception 10 years ago, ADD Board, Save our Soils, Sherwood Credit Union Board (president for 2 years), 4-H and minor hockey.

Our farm is now 11 quarters, mainly grain with a large selection of crops: pulse, oilseed, and cereals all direct seeded. Carol and I do most of the work except when the boys can get home (which they usually do at harvest). While some of the land is Indian Head clay (level without stones) most is rolling with potholes and stones. It was easy to see that our land was eroding and through involvement in the ADD board Save our Soils program that there were better ways to manage the soil. I attended direct seeding conferences put on by both SSCA and Man-Dak that helped make the final decision to direct seed; this will be the fifth year of direct seeding all of our crop.

I look forward to serving on the board of SSCA. There are a number of important issues facing agriculture--economic squeeze and environmental (carbon sequestration). I see this as an opportunity to promote soil conservation and thus in a larger sense to be able to play some role to improve the lot of the farm community.

IHARF Precision Farm - a Year in Review

Has it already been a year?

Last year at this time IHARF, the Indian Head Agricultural Research Foundation, and SSCA announced the joint precision farming venture on a half section of land just east of Indian Head, Saskatchewan. The farm, known as the Centre of Excellence for Precision Farming Research, has successfully completed its first crop/research year.

Previous farm management involved a cereal-fallow rotation and starting in 1998, the farm will be continuously cropped using direct seeding techniques. The farm has been divided into eight fields, all similar in size. The crop rotation sequence will be: canola-cereal-pea-wheat. Crops seeded in 1998 included Carneval peas, InVigor canola, AC Barrie spring wheat and CDC Teal spring wheat. In 1999, the crops will be canola-oat-pea-wheat. The same varieties will be used. The variety of oat is yet to be determined.

Since this was the first year for the precision farm project, a great deal of baseline information had to be collected. This included remote sensing and infra-red pictures, soil samples on the one acre grid according to a design established by Dr. Alan Moulin, AAFC Brandon, detailed digital elevation maps, as well as yield and economic data. Saskatchewan Water Corporation did a detailed map of the entire farm using an EM38 for surface and deep salinity. In the absence of salinity, which is the case here, it provides a measure of soil moisture and soil texture

The agreement between IHARF and SSCA is such that IHARF is responsible for overseeing and conducting the research part of the project, and SSCA will be involved in delivering the information and providing feedback from farmers.

The organizational structure that has been put in place to manage the Centre includes:

- A Management Board that provides overall direction and is responsible for approving budget, proposals and communications strategies.
- A Research Advisory Committee that establishes research priorities and protocols and develops funding proposals.
- An Operations Committee that is responsible for the day to day management of the Centre.
- Directors and Management from both IHARF and SSCA sit on the board and on the committees.

The Centre has attracted a number of high profile partners which provide equipment, chemicals, new technologies and expertise. These partners include Agriculture & Agri-Food Canada, Royal Bank, AgrEvo Canada Inc., Monsanto Canada Inc., Pattison Bros. Agro Ltd., Saskatchewan Agriculture & Food, Saskatchewan Wheat Pool, Simplot Canada Limited, Westco, Zeneca Agro, Markusson New Holland of Regina Ltd., Flexi-Coil Ltd. and New Holland North America.

One of the unique features of the Centre is that all Precision Farming research will be conducted on a farm scale basis. The present goal of the Centre is to find cost effective ways of assigning management units and from there vary inputs in order to derive the full economic potential of each management unit.

The vision for the Centre of Excellence for Precision Farming Research is as follows:

"We are a unique partnership of farmers, scientists, industry and government whose goal is to evaluate precision farming concepts on a farm size scale in an unbiased, practical and environmentally responsible manner for the benefit of all producers".

Both the board members and committee members are pleased with the first year activities and are presently working on many new initiatives for 1999. We will keep you informed in following issues. In the meantime, if you have any questions about the Precision Farm project you may contact:

Josef Boersch,

Farmer, IHARF Director

306-695-2693

Judy McKell,

Extension Agrologist,

306-695-4200

Doug McKell

Executive Manager,

SSCA

306-695-4234

New Director-At-Large: Lyle Larsen

I have lived on the farm in Aylsham all my life, 44 years, and have actively farmed for 27 years now. The last 21 years with my wife and partner, Kim. We have two children, Landon 16 years old and Tara 13 years old.

We are blessed with flat land and no rocks on our farm. We currently farm 4500 cres of a mix of owned, rented and custom worked land which ranges from clay loam to sandy loam. We grow wheat, barley, oats, canola, flax and peas on 3800 acres and have 700 acres in dehy alfalfa each year. We are also Pedigreed Seed Growers and operate a farm based seed cleaning and processing facility on the farm.

Wind and water erosion over the years, as well as the increased machinery and labour costs led us to move from 1/3 summerfallow to continuous cropping and finally to direct seeding which we have done for the past 5 years.

I have been interested in the work the SSCA has done over the years and had expressed to Greg Kane that if an opening came up I would be interested in being involved. As far as what I hope to accomplish as a director, I hope that I can contribute some of my experiences over the years to the association as well as the opportunity to interact and meet with progressive people in the agriculture community.

I currently sit as a director for National Alfalfa Processors, our local dehy plant and am currently the Reeve for the RM of Nipawin #487. In my spare time I enjoy snowmobiling, fishing and boating as well as riding my motorcycle.

The Top Ten Reasons Why You Shouldn't be in Direct Seeding

(as suggested to Bob Linnell at a Kitchen Table Meeting)

10. Don't want to show up the neighbours.

9. Government workers are starting to promote it.

8. They're gonna keep making discers and drills for ever, so I won't have to change.

7. Only a third of Saskatchewan farmers have adopted it so I guess the majority believe it doesn't work.

6. Afraid of change.

5. Would rather spend the money on a new pickup truck.

4. Can't afford fertilizer anyway, if all I ever grow is spring wheat.

3. My crops already look good from the road.

2. Wife won't fit through the air tank opening if I have to clean it out.

1. Can't stand being in management.

Corn, Hemp, Echinacea, and other Wonders.

By Bob Linnell

SSCA Soil Conservationist

Desperate for a farming income? Join the club. There must be more research being done by the average farmer out there in Premier Roy's kingdom on how to grow some kind of crop that nobody else is growing, or even better, ever heard of, than has ever existed in a developing nation ever before. My guess is that a lot of farmers are between a rock and a plow share when it comes to disappearing income and just how the farm is going to survive. Being "your own boss" has its limits and certain downsides. The kids can't eat their old sneakers, but they darn well may have to get mighty used to them, at least for a while yet. But maybe we might be lucky to live where we live after all. Before you turn the page, consider this:

I have a farmer friend that lives, farms and works pretty hard in Zimbabwe. They grow some field crops and livestock. But I would bet most of the readers have never heard of "Tuley" cattle. They are a breed that is able to withstand a fair bit of heat and rather dry food base. They look a lot like a cross between a Brahman, and a Santa Gertrudis, and may be able to graze at about 30 mph. There is a problem in their country, however, and it's not with the cattle or the crops. It's the damn government.

It seems that a goodly number of farmers are being deposed from their farms, because the government feels they have to have a suitable land base to control internally. They need this land base to give to their First Nations people. Problem is, you see, they are not compensating the farmers for their land at all. Nyett, Nada, Nothing. Period.

Meanwhile, their military are off in another African country, upholding the greater good of another country, while draining the Zimbabwe coffers. Beginning to sound familiar?

In conversing with him on the Internet about "farmers rights" and land ownership tenure, he was polite enough to point out that through their farmer organization research group, they had looked at other countries. He informed me that no male farmer in Canada has the right to own land, according to the way our constitution reads. Females, handicapped civilians and native people are enshrined in our constitution, however. Makes you think, doesn't it? I suddenly feel vulnerable and maybe a little exposed.

I like to think there is a place for reasonable thinking in the world today and that direct seeding is playing a significant part in responsible stewardship in the operation of agricultural lands in this part of Canada and the world. Maybe we are lucky after all, or are we merely deceived? As much as we continue to educate the farming public about the merits of low disturbance seeding as a responsible thing to do, it really doesn't matter how much disturbance you do if you don't have a plot to disturb.

I remain positive.

And to think this whole thing started by my trying to impart a little knowledge of how he could get into direct seeding on a low budget. Wow.

CLC Preharvest Residue Management Day

By Garry Mayerle,

SSCA Soil Conservationist

The second annual Preharvest Residue Management Day hosted by the Saskatchewan Conservation Learning Centre late last summer was a success with over 200 farmers in attendance.

Featured was Monsanto's new Fast Forward. This product continues to give excellent perennial weed control with better dry down capabilities than Roundup Original. An excellent demo of dry down comparisons between the Original, Transorb, and Fast Forward was set up by Russ Popoff Monsanto's territory manager for the region. He also demonstrated the importance of staging for application of Fast Forward. Five days too early can certainly give more shriveled kernels in the sample. Rob Neyedley, one of Monsanto's product development personnel, was on hand to present the technical side of Fast Forward and answer questions. Gary Thiel, a farmer in the Shellbrook area explained how he makes good use of preharvest on his direct seeded acres.

The Conservation Learning Centre seeded Fleet barley May 8 to have a field ready to run some combine demonstrations before fall harvesting got into full swing in the area. Laurie Hayes the farm manager was very happy with the interest in the farm the field day generated. She welcomes all back for a crop tour next summer and to take in the preharvest demo next season.

The barley crop being harvested only ran about 45 bu/ac due to a lot of net blotch and a very dry spring. There certainly were a lot of green patches in the field at harvesting but the sample was dry. Last growing season the Centre direct seeded most of its acres with an Edwards Hoe Drill. They side inject liquid fertilizer with this drill. This particular field was preseed sprayed with 0.5 liters of Transorb. The barley was seeded into standing canola stubble with 60 lb/ac of 12-51-0 seed placed and an additional 40 lb/ac of N applied as liquid with this side dribbler or injector. Laurie says that this particular field was heavily infested with thistle so next season will be a good time to rate Fast Forward's perennial weed control.

The field was preharvested by Ag Depot. High clearance sprayers on display were: Willmar, Rogator, Spraycoupe, Patriot, John Deere, and Walker.

Residue management and harvesting was demonstrated by four different combines with straight cut headers. A John Deere combine was also in the line up but was not able to run in the field. The Case IH combine featured a stripper header so attenders could evaluate the residue management techniques associate with this type of harvesting system. Gleaner and Massey were busy filling Bourgault's 1100 bu grain cart. Caterpillar had their new combine in action as well. They were doing a good job of demonstrating one of the residue management cautions Garry Mayerle the regional soil conservationist had emphasized in his residue management presentation. The Cat combine was running a 36 ft. MacDon draper header. Their machine was

creating quite a storm of residue behind with good spreading capabilities but it wasn't quite getting the residue out over the whole 36 ft. width of cut. The point Mayerle was making was in a direct seeding system harvest cutting width may have to be restricted to the width that residue can be spread!

Both Bourgault and Flexicoil had their heavy harrows on display. In areas of the province where large quantities of residue are often grown aggressive harrowing does have a fit for many direct seeders.

On this, our second annual, the weather was hot and hotter - great for harvesting. At our first annual event the combines ran between rain clouds. Come on out this next season to see what the day will bring and how you might beef up your harvesting system.

Paired Row vs. Side Band Openers

By Garry Mayerle,

SSCA Soil Conservationist

Why do so many direct seeders continue to use paired row openers when sideband double shoot openers give better separation? Many producers still have several reasons for wanting a wider seed row and are ready to sacrifice a degree of separation for that spread. In the northern grain producing belt of Saskatchewan a lot of producers still swath some or all of their cereals and they want plenty of stubble to hold up their swaths. A good question to ask is how much better are paired row openers at holding up swaths?

At first glance most paired row openers look like they would give you a seed row 2 to 3 times wider than a side band opener. The typical side band opener looks like it should place the seed in a tight 1inch band. Your typical narrow paired row opener looks like it should give you 2 neat 1 inch rows of grain 2 to 3 inches apart. In actuality we have observed that most of the paired row openers give you more of a scatter across their width of cut. This is of course a generality and maybe there is a paired row opener out there that will leave 2 defined rows in all of the types of soil that you farm. However, our observations are that under at least some conditions you do not get that neat well defined split row with most paired row openers. Some of the seeds are landing in the middle of the row where higher concentrations of fertilizer are also being placed. In fact in some situations 2 well defined rows may be produced because this high concentration of fertilizer is keeping the seeds in the middle of the row from growing. Different soil conditions and soil flow around the opener probably affect the type of separation any opener gives. It only stands to reason however, that if you are only disturbing the soil off to one side of the fertilizer band you have a lot less chance of getting seeds falling in the fertilizer row. In addition many of the side band openers place the seed a little further away from the fertilizer band because they have a longer wing.

To evaluate how your openers are doing it is a good idea to do some plant counts several weeks after emergence. When you are out checking your crops for spraying take along a yard or meter stick throw it down on 5 different rows and count the plants. Take the numbers home do the math and compare them to researcher Guy Lafond's recommendations to see how you are doing. It sounds onerous but once you are setup it is really not that bad.

TARGET PLANT POPULATIONS

CROP	PLANTS/M^2	PLANTS/FT^2
Barley	150-200	14-19
CPS Wheat	200-250	19-23

HRS Wheat	200-250	19-23
HRW Wheat	200-250	19-23
Durum	200-250	19-23
Flax	300-400	28-37
Canola	80-180	7-17
Field Pea	75-85	7-8

Guy Lafond - Indian Head Research Farm

For the last three growing seasons SSCA has been running Direct Seeding Do's & Don'ts Demonstration Plots. At about half our sites this year we compared 3 Stealth heavy soil paired row openers on 12 in. row spacing to Stealth side band openers. We also had one treatment at these sites with the Stealth 3 in. spread tip. To evaluate the ability of the stubble to hold up a swath I compared the average width of the row of stubble seeded with the different openers. The width was measured at the cut height after harvesting and all the trials were spring wheat. The two plots that I looked at were from our Naicam site and the Conservation Learning Centre site (CLC). Measurements were not taken at the Melfort site because there had been a lot of lodging and harvesting was done with a plot combine leaving a lot of tracking.

The Naicam plot was cut at about 7 in. high. In photo 1 see the stubble row from one side band opener on the right side of the picture and then the stubble from three paired row openers on the left side. At this height the paired row opener was leaving a stubble row width of 3 - 5 in. In comparison the side bander was leaving stubble 2 - 4 in. wide.

The other two photos were taken at the CLC. In photo 2 the 3 rows on the right side of the meter stick were seeded with the paired row opener and to the left of that was the side band opener. These plots were cut shorter at 4 - 5 in. high. Average width of the stubble row at this height seeded with the paired row opener was 5 in. while the side band opener stubble row width was 4 in. In the photo there certainly isn't much difference between the rows. Photo 3 shows the treatment with the 3 in. spread tip. This trial was cut 5 - 6 in. high and average width of the stubble row was 4 - 5 in.

In conclusion from observations made last fall the paired row opener gave a 1 inch wider stubble row. Average stubble row widths for the paired row were 3 - 5 in. wide and for the side band opener were 2 - 4 in. wide. The stubble coming out of that narrow side band row is spreading out very close to the ground. The paired row opener is on average giving you a 30% wider stubble row than the side band row but certainly isn't doubling or tripling the width of that row.

Agriculture Trends in the New Millenium

By Doug McKell,

Executive Manager

Somebody asked me the other day, "What crop should I grow this year?" I gave my standard answer for that question, "I dunno, what do you think?" This pretty well sums up the feeling of most Sask. farmers these days as we face one of the most puzzling outlooks for agriculture in decades. Attitudes are quite pessimistic. We keep being informed that someday the world will be short of food, which would suggest higher crop returns. This would seem to be a paradox as right now prices are low due to an apparent oversupply. Is this a short-term trend? It's not just our attitudes that are pessimistic. In the northern states it's even worse I was told by a senior machinery manufacturer executive. This might explain the low turnout of American farmers to the Man-Dak workshop held at the end of January. Organizers of that workshop were left scratching their heads wondering why there were so few Yanks. After all, why would a farmer pass up the chance to get some top-notch information when it only costs you forty cents on the dollar? Is there a trend developing here? How does this affect our conference planning?

No doubt there are going to be some tough times to get through in the next year or so. But what should we look forward to down the road for the next five years? What about ten years down the road? Are there any trends we should watch that will give us any indication as to how to manage our farms after the year 2000?

I guess the point I'm trying to make is that we, as farmers, need to consider some possible long-term trends before we develop our management plan. If we had looked at the early zero-till experience of the late seventies to make our decision about whether or not to adopt the practice, we would still be using the discers. However, the trend to lower priced glyphosate, better seeders and more weed control options materialized and zero-till now doesn't look as it did twenty years ago. Who would have thought in the seventies that someday wheat would be considered as a "filler" crop between oilseed and pulse crop rotations. If twenty years ago you suggested wheat was not going to last as king and proposed to grow crops like coriander or hemp, you would have probably been branded as the village idiot and thrown out of every lodge of which you were a member.

So maybe we ought to start thinking about some trends that have developed or are developing that may help us in our long-term plans. With that in mind, here are my suggestions for some long term trends and remember, you didn't pay me for this advice so don't come looking for me if these trends never come true!

1. Prices for crops will improve slowly but remain subject to quick drops due to supply pressures. The EEC will continue, for the next couple of years anyway, to subsidize their farmers. Until this practice is stopped through trade sanction pressures, there will be oversupplies of grain crops, especially in years when one of the major producers has

good growing conditions. Compounding this situation is the US tendency to compete in the subsidy war. The only strategy here is to be willing to follow the markets closely and be ready to jump in and out of niche markets.

2. Machinery companies, grain handling companies and crop input companies will continue to merge until a very few hands control these businesses. This will mean the end of small farm business and independent farm supply outlets. Unless an oligopoly situation develops (this is where our governments probably would step in as they did with the banks. Oligopoly is one step below monopoly, which is bad news for everyone except the monopoly) there should still be enough competition to keep prices from getting excessive. We will, however, face longer distances for service and less chance for local price competition. Advantages will accrue to the farmers located closer to service centers and grain terminals on mainlines. There should be no danger of anyone controlling the food supply unless big business integrates down to owning the farmland. I can't see this happening. Who would want to buy farmland when there are countless landowners now willing to provide product at minimal or negative margins?
3. Transgenic crops will continue to be developed and eventually will form the basis of agriculture. We think of transgenic crops now as a strategy for weed control. In the future, crops will be developed for resistance to disease, quality traits or to fit into specific market niches. Eventually the Europeans, Japanese and other foreign markets will accept this technology and transgenic crops will become as common place as hybrid corn or soybeans. More advantages exist here than disadvantages.
4. Global warming trends will cause the weather to be variable and unpredictable. Periodic production problems due to drought will affect those farming in the center of the Palliser Triangle. Those who have adopted low soil disturbance practices will fare better than conventional tillage operators as they will be better able to retain and make use of soil moisture.
5. For those who seek it, crop production information will be offered in greater volume, come faster and, be more tailored to individual needs. Crop and soil analysis will become more advanced with technology such as; yield monitors, Global Positioning Systems (GPS), Geographic Information Systems (GIS), protein monitors, satellite imagery, infra-red photography and remote sensing. Computer technology will soon allow us to tap into this information on the farm.
6. Sequestered soil carbon will become another crop for prairie farmers. Governments in the developed nations of the world are going to be under the gun to meet their global warming Green House Gas emissions targets. The concept of offsetting CO_2 emissions by storing carbon in the soil is starting to be taken seriously by federal policy makers. Farmers practicing direct seeding will benefit from this trend through either: direct cash payments, industry support for conservation organizations or, tax credits if a carbon tax becomes a reality.

There will be other trends coming down the road at us but we probably can't even imagine them right now. Who in the seventies could have predicted GPS systems for farms?

The best advice one can offer is that times and situations will change. It is not as significant that we accept change but that we recognize change is occurring and adjust our strategies and attitudes to fit the trends.

One final trend. The Roughriders will become the strongest team in the CFL. Unfortunately the rest of the league will, by this time, go the way of the dodo and Taylor Field will be taken over by Great Plains auctioneers. By then I hope I'm retired and living on some tropical island with good fishing and great beaches.

Herbicide resistance - What are you doing?

By Tim Nerbas,

SSCA Soil Conservationist

Weed resistance is growing. That's right, the resistance of wild oats to groups 1, 2 and 8 herbicides is growing. 70 samples of wild oats were taken from elevator screenings across Saskatchewan in 1998. Of the samples taken, 63% had group 1 resistant wild oat seed, 23% had group 2, and 24% had group 8. Most of the positive results to herbicides in these groups are from the Dark Brown, Black and Grey wooded soils. This is likely because wild oat spraying is done on a much more frequent basis in these areas than in those of the Brown soil zone.

What does this mean to the producer? Well, if you have not developed an action plan for dealing with this growing problem maybe this is good time to start.

The first step toward becoming weed-smart is to rotate your herbicides. Don't rely solely on groups 1 and 2 herbicides and now even group 8 (in 1999 we have also lost use of a group 25 herbicide in this battle). However this is simply a first aid measure against weed resistance. In the long-term, being weed-smart means shifting your cropping system towards an integrated pest management system.

Make use of any and all cultural and crop management techniques at your disposal. That does not mean abandoning chemical weed control, but rather relying on it less. It could be changing the timing of when individual fields are seeded, having a diverse rotation, making use of both post and pre-emergent chemicals for in-crop weed control in your rotation, growing spring seeded and fall seeded crops or possibly including a short-term forage into your cropping plans.

The key is to not rely on any one chemical or cultural method as the total solution. With excessive dependence on any particular management technique, the producer is selecting for a particular weed spectrum. Using an integrated approach to weed control helps keep weeds off balance - hitting them with different management techniques when they least expect it.

Recently a partnership between provincial and federal agricultural departments and industry, comprised of weed experts from the prairie provinces, formed a group called WREAP (Weed Resistance Education and Action Program). The group's goals are: 1) to achieve a harmonized approach in providing information related to herbicide resistance, and 2) to motivate farmers to take action in either preventing weed resistance from occurring or dealing with the resistance problem on their farms. It will include fact sheets as well as an essay writing contest for grade 12 students from the prairie provinces.

The "Managing the Farm for the Future" essay contest is open to grade 12 students whose parents actively farm for a living in Manitoba, Saskatchewan, Alberta, or the Peace River Region of British Columbia. The contest asks students to describe in 800 to 1000 words, how to manage

weed resistance and still pay the bills. According to Neil Harker, member of the WREAP group, "we are looking for essays with the power to influence farmers to take action. The messages must balance the need to generate farm income today with the importance of protecting the farm's value for future generations. And what is first prize? A $10,000 scholarship! As well, one runner-up from each province will receive a $2,000 scholarship.

Entries should be mailed to: WREAP ESSAY CONTEST, 122-15 Innovation Boulevard, Saskatoon, Saskatchewan, S7N 2X8 and must be received no later than March 15, 1999. Winning essays will be chosen by a panel of judges comprised of representatives from the agricultural print media, scientists specializing in weed management, farmers, and educators. For more information contact: Margaret Thibeault at the AdCulture Group, (905)875-0370, ext. 303.

Now that's how to make an integrated weed management system profitable!

No-till Management Requires Proper Fertilization

C.A. Campbell, G.P. Lafond, R.P. Zentner, and T.I. Roberts

Reprinted from the "Better Crops with Plant Food" 1998 Number 4 (Published by the Potash and Phosphate Institute)

Producers switching to a no-till cropping system must maintain adequate fertility. Otherwise, yield could suffer, and in time soil organic matter may decline. This is evident in a long-term crop rotation study initiated in 1957 on a fertile Black Chemozemic clay soil at Indian Head, Saskatchewan, in which tillage was changed from conventional to no-till in 1990.

Figure 1 shows that from 1953 to 1989, while conventional mechanical tillage was practiced wheat grown on fallow required very little nitrogen (N) fertilizer (Figure 1d). Consequently, there was no difference in yields due to fertilizer (Figure 1a). Once we changed to no-tillage in 1990, soil N mineralization in the 20-month fallow period was suppressed, so that fertilizer N requirements for fallow crops was markedly increased (Figure 1d) and the yield advantage of the fertilized system over the unfertilized system became quite substantial (Figure 1a).

Fertilizer N requirements for wheat grown on stubble have not changed much with the change in tillage (figure 1d). This is because, prior to 1990, these systems received only one preseeding tillage compared to an average of four tillage operations on the fallow-wheat. Thus, for the stubble crop systems we see a gradual upward trend in yields of fertilized systems and a slight downward trend in yield of unfertilized systems (Figures 1b and 1c).

These results suggest that by curtailing the frequent soil stirring associated with tillage during the fallow period, we severely reduced the amount of N released from organic matter during this period. The resulting lower soil tests led to the greater requirement for fertilizer. The degrading affect of fallowing, compared to he aggrading conditions of continuous cropping has been reflected in greater N fertilizer requirements for the stubble crop in fallow-wheat-wheat (F-W-W) than for continuous wheat (Cont. W) in recent years (1987-1994).

The problem does not end with poorer grain yield and likely lower protein. It also leads to lower soil organic matter in the long-term (Figure 2). Lower grain yields mean less crop residues. Crop residues provide the raw materials for building soil organic matter. The impact of the change to no-tillage was evident when we compared soil organic carbon (SOC) before and after the change to no-till. The systems fertilized with N plus phosphorus (P) were able to maintain SOC, but the unfertilized wheat rotations actually lost SOC. For example, all three unfertilized rotations lost about 1 ton SOC per acre between 1987 and 1996, 6 years after the change to no-till, while SOC in the fertilized systems remained relatively constant.

We had expected the introduction of no-tillage (because it increases available soil moisture) to enhance SOC, especially in the fertilized systems. It has not done this. It may be that any positive

contributions due to increased crop residues are being counterbalanced by greater rates of organic matter decomposition in the more moist soil conditions.

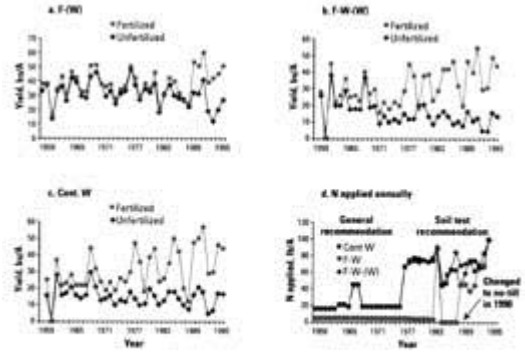

Figure 1. Effect of N and P fertilization and change to no-till management after decades of conventional tillage on spring wheat yields in: a. fallow-wheat (F-W), b. fallow-wheat-wheat (F-W-W), c. continuous wheat (Cont. W), and on d. annual rates of N applied (rotation phase sampled in parenthesis).

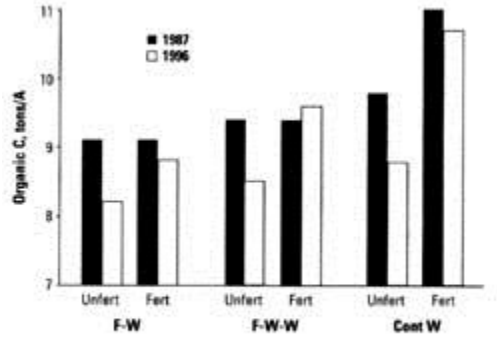

Figure 2. Effect of cropping frequency and fertilizer N+P on SOC in the 0 to 3-inch depth after 30 and 39 years.

Dr. Campbell, Dr. Lafond, and Dr. Zentner are Research Scientists with Agriculture and Agri-Food Canada, located at Ottawa, ON, Indian Head, SK, and Swift Current, SK, respectively. Dr. Roberts is PPI Western Canada Director, located at Saskatoon, SK.

To Keep or Not to Keep Mature Shelterbelts

By Juanita Polegi,

Regional Soil Conservationist

On the north side of the road along Highway #16 in the Wynyard area, field after field has a row or two of shelterbelts. With the Big Quill Lake serving as a back drop, the trees add some interest to a seemingly level landscape.

On one field belonging to Sherry and Jerry Pytlyk, a mature caragana belt runs east and west on the south side of the field. The trees in that belt were planted about 1952. Their age and location were of interest to researchers from the PFRA Shelterbelt Centre studying biomass production and the amount of carbon sequestered by trees and shrubs. While the Pytlyks are interested in the amount of carbon their trees are storing, they see the trees providing many more tangible benefits.

In a time when there is still some bush clearing occurring, I asked the Pytlyks why they bothered to maintain the old field shelterbelts. Sherry explained, "This land is butted up to the Big Quill Lake. When Dad bought this land in the 40's, he saw how the wind from the lake blew and blew and took the soil with it. He wanted to stop that erosion." The trees did their job. The problem of the soil blowing in to the ditch was reduced. And the other benefits the trees provided back then are still useful to Jerry and Sherry today. Sherry said, "While the trees keep the wind down they also protect our cattle, especially in the summer. And they reserve moisture. It seems the moisture leeches out from the trees throughout most of the summer".

When I asked the Pytlyks if the field shelterbelts created any problems for them, Sherry said, "When the break off, they're a nuisance to clean up, but generally they're trouble-free. People who don't get wind from a lake can't appreciate the value of field shelterbelts. We like farming our own soil so the trees will stay!"

For Sherry's brother, John Burns, the trees do present more of a problem. "The mature belts, especially those with maples in them become very wide (about 35 feet) so they trap a lot of snow and make weed control along their edges rather difficult". While the snow trapping was desirable in the days of conventional tillage and summerfallow, it is less desirable since the Burns' have moved to continuous cropping and direct seeding. John explained how the changes in tillage systems and crop rotations affect the need for trees. "Once you have the stubble covering your field, drifting soil becomes less of a concern. The extra run-off created by the snow trapped in the trees can actually have a negative effect on seeding. One spring when there was ample soil moisture, I couldn't get any closer than 100 feet from the edge of the trees to seed. I then had to go back later in the spring to seed the area around the trees."

While the Burns have not yet opted to remove any of their field shelterbelts, John has several recommendations for anyone planning to plant some trees and for shelterbelt researchers. "It

seems that trees that are 10 feet high do a good job of controlling ground drifting yet they don't spread out too wide. For that reason, I feel villosa lilac is a good choice for a field shelterbelt. And because green ash doesn't spread out very much, it works well, too. Mature belts can have a nuisance value especially if they're allowed to grow too tall or too wide".

In the days of the Save Our Soils program in the early 1990's, the District # 20 ADD Board brought in a piece of equipment designed to trim mature trees. The unit was demonstrated on some of the belts in the area and it worked well. John said, "While the equipment was very effective in trimming branches and chopping them, it was a very expensive operation. Finding a way to maintain mature belts that is easy and inexpensive should be a goal of the researchers". John fears that if such research is not conducted, we're in danger of the losing the trees.

Shelterbelts are good for the soil, good for the environment and good for humanity. Establishing and maintaining field shelterbelts is time-consuming and often difficult. Farmers who bother with field shelterbelts deserve to be commended.

Shelterbelts and Carbon

By Juanita Polegi,

Regional Soil Conservationist

Motorists fortunate enough to be able to cruise Highway # 16 between Wynyard and Kandahar can't help but notice the miles of field shelterbelts that have been planted. Some of the trees were planted in the late 40's so have been a regular feature of the landscape for a long time. One of the tree rows of caragana on the north side of the road is especially interesting because every so often, 10 m of the row has been cut back to ground level. Those trees were part of a study conducted by the PFRA Shelterbelt Centre to determine the biomass production and carbon fixation of prairie field shelterbelts.

Using funds from the Green Plan, John Kort and Bob Turnock conducted the study from 1994 to 1996. The objective of the project was to determine the amount of biomass and carbon in prairie shelterbelts and to explore the potential of future plantings to offset atmospheric carbon emissions. John Kort explained how this is accomplished, "Carbon emissions end up in the atmosphere as carbon dioxide, the main greenhouse gas. Plants take the carbon dioxide out of the air through photosynthesis using the carbon to build tissue and grow".

Kort and Turnock then set about taking samples of mature deciduous trees, coniferous trees and deciduous shrubs in 3 soil zones: the Black, Dark Brown and Brown. They took a number of shelterbelt measurements including the height and width of the rows and the moisture content of the trees. Based on these measurements, they were then able to do some calculations that showed that each species contains about 50% carbon. They were also able to calculate total carbon per tree and the amount of carbon per km of row of each species (Table 1).

Table 1. Carbon Content of Shelterbelt Trees and Shrubs.

Species	Total C/tree (kg/tree)	Total C (tonnes/km)
Green ash	125.2	62.6
Manitoba maple	117.0	58.5
Hybrid poplar	294.8	117.9
Siberian elm	145.2	72.7
White spruce	180.1	80.0
Scots pine	113.1	62. 9

Colorado spruce	147.8	82.2
Caragana	29.1	38.9
Chokecherry	35. 1	30.2
Villosa lilac	29.2	25.1
Buffalo berry	23.4	23.4
Sea-buckthorn	14.6	16.1

Since hybrid poplar are fast growing trees and may have the greatest potential as a carbon sink, the Shelterbelt Centre, with support from Sask Power and local cooperators, is establishing several poplar plantations throughout Saskatchewan. The plantations will enable the researchers to study the growth of hybrid poplar, its value as a carbon sink and the feasibility of growing poplar as a source of wood.

The Shelterbelt Centre has been distributing trees since 1903. Since that time, over 500 million trees have been planted in prairie fields and farm yards. While it has been recognized for many years that field shelterbelts protect the soil from wind erosion, provide wildlife habitat and control blowing snow, Kort and Turnock have proven that trees offer one more very important benefit - growing trees are carbon sinks. The ability of trees to store significant amounts of atmospheric carbon enhance their value to both the farm and society.

Plots seeded at Preeceville

By Juanita Polegi,

SSCA Soil Conservationist

At the coffee shops and at the producer meetings in the winter of 1998, it seemed the conversation often turned to growing forages. With such interest in forages, Florian Balawyder, Grant Peterson, Ernie Patrick, Extension Agrologist and I decided to set up a forage demonstration.

The demonstration has a number of objectives. The first is to show that forages can be successfully direct seeded. The effect a cover crop has on the forage stand is the second objective. The third objective is to determine what, if any, the effect of fertilizer has on the establishment of a forage stand. Timing of harvest and the effect it has on the stand in the second year is the fourth objective. And the final objective is to showcase a number of grass varieties.

The demonstration site is located on a field of Grant Peterson's, just south of Preeceville. Barley was grown in 1997 and the stubble left standing. On May 22, the site was sprayed with 1.0 l/acre Roundup to control the volunteer barley and winter annuals. Seeding occurred May 28.

A plot-sized Conserva Pak with 12 inch row spacings seeded the plot. The grasses were seeded east-west. The grass varieties, seeded directly into the standing barley stubble, included perennial rye, meadow brome, smooth brome, crested wheat, timothy, creeping red fescue and tall fescue.

The grasses were then cross-seeded to various rates of oats. Various fertilizer treatments were also applied to the plot. Some of the oats with each grass variety were cut as for green feed on July 31. While this is not a scientific study, our findings showed that an increase in green feed yield was achieved as the seeding rate of the oats was increased from 17 lbs/acre to 35 lbs/acre. A higher seeding rate did not result in higher green feed yields.

The remainder of the oats was left to be harvested to determine if the time of cutting will make a difference to the yield of the grasses in subsequent years.

The site was evaluated Sept. 4, about the time the oats could have been harvested. Generally the grasses were fairly well established across the treatment that had received 40 lbs N but no oats. The grasses were beginning to shoot up where the oats had been cut in July. Most of the grasses were barely visible where the mature oats were standing, regardless of the seeding rate of the oats.

Due to a lack of equipment, the mature oats were not harvested in the fall, therefore, no grain yield data is available.

This spring and summer we will continue with the demonstration, monitoring the stands.

The establishment of these plots is a cooperative effort between the Sask. Soil Conservation Assoc. and Sask. Agriculture and Food. Sponsorship for the plot has been provided by Preeceville Implements, Bal Com Seeds, and Monsanto.

Alfalfa and Pursuit Smart Canola Demo

By Juanita Polegi,

SSCA Soil Conservationist

While discussing forages one day with Florian Balawyder and Grant Peterson of Preeceville and Ernie Patrick, Extension Agrologist, the conversation turned to establishing alfalfa. With the registration of Pursuit on seedling alfalfa, many producers are now intercropping alfalfa and Pursuit Smart canola. This practice allows them to establish a stand of alfalfa and take off a cash crop in the year of establishment. But does the competition from the canola affect the vigour of the alfalfa stand? We decided a demonstration might answer some of the questions.

A number of objectives for the demonstration were set out. The first was to direct seed the plot. The second was to show the effectiveness of Pursuit on alfalfa seedlings. The effect of different canola seeding rates was the third. Determining the vigour of the stand in the various treatments in years 1 & 2 were the fourth.

Grant Peterson's field just south of Preeceville is where the site is located. The site was sprayed on May 22 with 1.0 l/ac Roundup to control volunteers and winter annuals. Seeding into standing barley stubble occurred May 28 using a Conserva Pak with 12 inch row spacings.

In all treatments, 50 lbs of N and 36 lbs P_20_5 were side banded. Alfalfa was seeded at 6 lbs/ac across the treatments.

No canola was seeded in Treatment #1. In Treatment #2, the canola-seeding rate was 4 lbs/ac. It was 5.5 lbs/ac in Treatment #3 and 8 lbs/ac in Treatment #4.

A mix of Pursuit and Poast (with a little Merge) was applied to the plot June 30 to control wild oats, green foxtail and stinkweed.

On September 4 the plot was evaluated. In Treatment #1, the alfalfa plants were thriving. They had a lush green colour and were 8-10 inches high.

In Treatment #2, the density of the alfalfa wasn't as great but the plants appeared to be doing well. They were about 6-8 inches high. In Treatments # 3 & 4, the alfalfa plants were rather straggly in comparison to the first 2 treatments. Some alfalfa was just beginning to germinate while the taller plants were about 3-4 inches tall.

At this point, no conclusions can be drawn about the effect of the canola on the stand. While the alfalfa that had no cover crop certainly appears to be hardier than the other treatments, the alfalfa in the other treatments may very well catch up to it in year 2. Monitoring will continue through year 2. As well, while no crop would have been harvested in the establishment year in Treatment

#1, a crop would have been taken off in the other treatments, which in theory would have provided some income.

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Points to Ponder When Picking Packers

By Ken Sapsford & Juanita Polegi,

SSCA Soil Conservationists

When farmers look into purchasing a direct seeding system, one of their first questions is "Which opener should I use?" While the proper opener is an integral component of the system, packers also play a role in the seeding success or failure of any unit.

Ken Sapsford, Regional Soil Conservationist with the SSCA, says careful consideration must be given to the opener-packer combination. "Very often when we see problems with emergence in a direct seeding system, we can trace the cause back to improper opener and packer configurations".

There are a number of packer styles on the market. Each has its own features. Sapsford explains that packer style should be matched to soil texture. "Rubber packers flex so mud drops off. These packers work well in heavier soils such as clays. Steel V packers perform well in loam and sandy loam soils".

Packers should also be matched to the trench created by the opener. For instance, in a situation where the opener is single shooting, such as a spoon, the trench will be flat. Choose a flat packer for that opener (Fig. 1). Similarly, if the opener creates a V shaped trench, use a V packer. "A flat packer on a V trench will crumble the seed shelf and push the seed into the fertilizer" (Fig. 2), explains Sapsford. "And a V packer behind a spoon won't pack the entire trench as evenly as a flat packer".

Sapsford says the proper positioning of the packer will actually *enhance* the performance of a double shoot opener. "In a situation where a single side band opener is followed by a V packer centered over the seed row, the packer will actually push the seed closer to the fertilizer (Fig. 3). Centering the V packer over the fertilizer row will push the seed to the side, away from the fertilizer (Fig. 4)." As Ken points out, this is more critical to small seeded crops such as canola that cannot tolerate too much fertilizer in close proximity. Pushing the smaller seeded crops deeper, can also create emergence problems.

Another factor to be considered when selecting a packer is its width versus that of the seed row. The rule of thumb is that the packer width should match that of the seed row. Sapsford explains why matching widths is so important, "In direct seeded fields, many times we see weeds growing only where a packer wheel has been running. And if a V packer centered over the fertilizer is too narrow it won't pack the seed row and won't achieve that sideways movement of the seed away from the fertilizer".

And finally, packing force must be taken into account. Research has suggested that a little packing force, about 50 - 60 lbs per press wheel is good but that extra force will not make a

significant difference to emergence. In years of reasonable spring moisture, that finding is accurate. However, under dry conditions, packing force is critical. "Under dry conditions such as the spring of 1998 in west central Saskatchewan, I found we needed heavy packing to seal the soil," says Sapsford. "Generally, much better emergence occurred in fields where air drills running 150 - 200 lbs per press wheel were used than in fields where air seeders were used and the gang mounted packers exerted only 45 - 50 lbs per press wheel. This was especially evident in fields where the soil had been ripped open by double shoot openers".

Purchasing new equipment for a direct seeding system can be expensive. Openers and packers contribute to the cost. The wrong opener-packer configuration for your farm can create some costly mistakes. Understanding your farm's soil texture, the capabilities and limitations of your opener and selecting a packer that compliments your opener will go a long way in promoting successful crop emergence.

Figure 1.

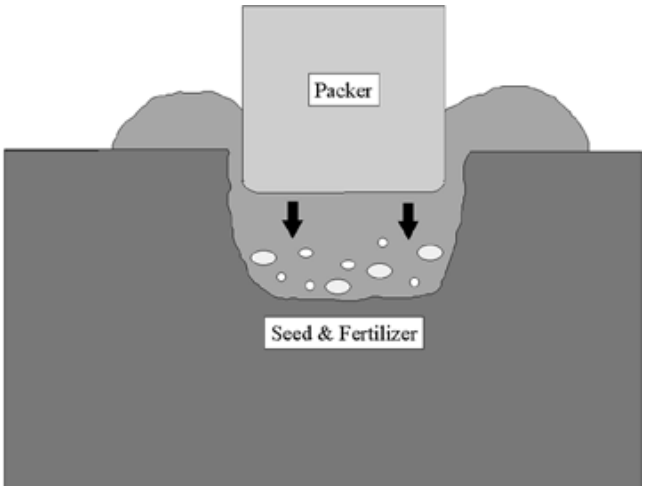


Figure 2.

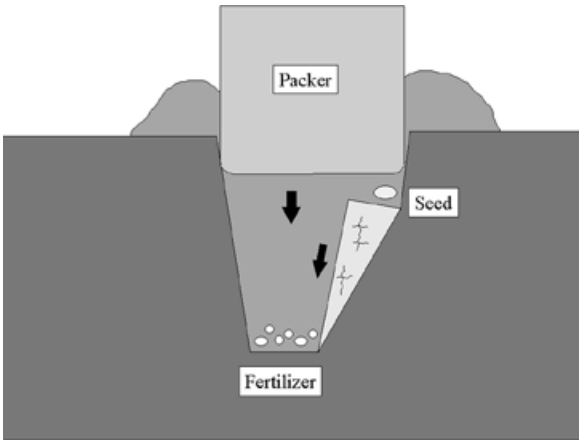


Figure 3.

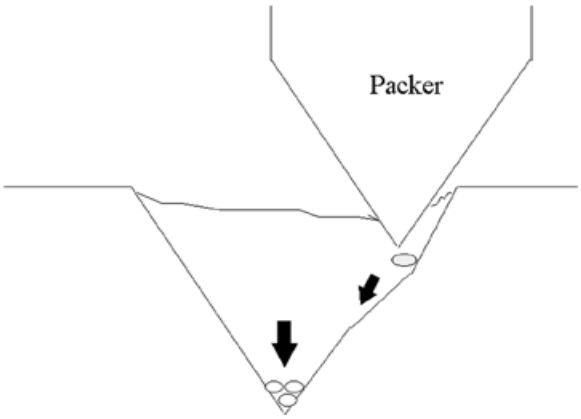
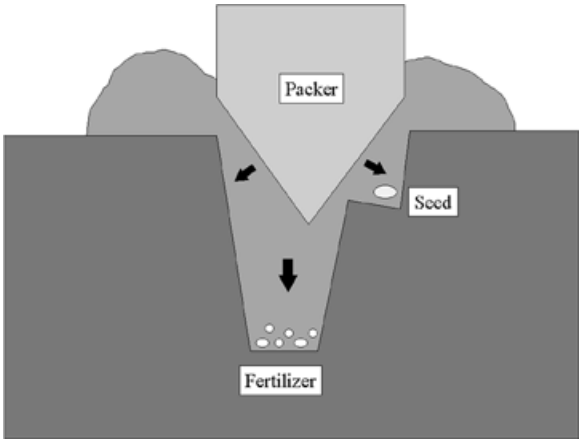


Figure 4.



Tillage Erosion: The Major Soil Loss Problem in Saskatchewan

By Blair McClinton,

SSCA Assistant Manager

Wind erosion shows itself through duststorms and soil drifts along fencelines. The evidence for water erosion are the channels and deposits from small rills and larger gullies. Farmers and agrologists have traditionally been taught that these are the two main types of erosion. However, within the past three or four years, new research has shown that another type of erosion, tillage erosion, is the largest cause of erosion in many areas using mechanized agriculture. The evidence on the prairies for the severity of tillage erosion are all those eroded knolls. The soil on these knolls was not eroded by water as was traditionally believed but was pushed downhill with every tillage pass.

This likely isn't earth-shattering news to most farmers since anyone who has seen a discer work knows that tillage moves soil. However, in the soil science community, tillage redistribution was considered to be minor compared to water erosion. The only problem with the scientist's view was that largest soil loss from water erosion should occur near the base of the hill and the smallest soil loss should occur on the knoll. This was the opposite of what was observed in the field where the largest soil loss occurs on the knolls. Research on tillage erosion found that not only does tillage move large amounts of soil, it predicts soil redistribution from the tops of hills into the depressions better than any other process.

While tillage erosion does not result in the loss of soil from a field but only redistributes it. The redistribution of soil from the knolls into depressions can result in many agricultural and environmental problems. By moving topsoil with high organic matter levels into the moist depressions, increased mineralization occurs. This results in higher amounts of nitrogen being released in the depressions causing problems with lodging and delayed maturity. In addition, this nitrogen can be lost through leaching or denitrified as nitrous oxide, a powerful greenhouse gas.

Unlike wind and water erosion, tillage erosion does not result in visual clues to the problem. There is no equivalent to a duststorm or field gully. Tillage erosion occurs gradually overtime with no single severe event. Unfortunately, since the problem of tillage erosion is not common knowledge in the agricultural community, it has been easy to ignore.

There are only two ways to control tillage erosion. One is to seed the land down to a perennial forage for hay or pasture. The other is low disturbance direct seeding or zero till. Minimum till practices will reduce but not eliminate the problem. It is fortunate that the conservation tillage practices developed to control wind and water erosion also happened to eliminate the real culprit, tillage.