

The Newsletter of the Saskatchewan Soil Conservation Association

Issue 31 -- Winter, 2001

[Clean Grain Screens On Combines](#)

[Conservation Groups meet with Greenhouse Emissions Management Consortium \(GEMCo\)](#)

[Darryl Reynolds Takes Directors Position In 2000](#)

[Emissions Trading and the Transfer of Risk - Concerns for Farmers](#)

[Harvesting Cereal Straw](#)

[Is Canola Still a Good Crop Rotation Option](#)

[Meet SE Director, Arthur Murray](#)

[Meet the Northwest Director](#)

[Mother Nature - the ultimate opportunist](#)

[New Director-At-Large Joins Board](#)

[New SSCA Discussion Forum](#)

[Perry Leach, SW Director](#)

[President's Message](#)

[Seed Growers Direct Seeding for Nearly 20 Years](#)

[Shop Built Ditch Sprayer For Common Tansy Control](#)

[Some Reasons for Optimism](#)

[SSCA Web Site](#)

[Think About a Retro-Fit](#)

[Weather Challenges at the Conservation Learning Centre](#)

[Winter Wheat After Forages](#)

[Yorkton Teacher Receives Award](#)

Clean Grain Screens On Combines

By Bob Linnell

SSCA Soil Conservationist

So you were introduced by the combine sales staff to a "new and revolutionary" concept that simply involved taking the bottom off your clean grain cross auger under the separation sieves and replacing it with a mesh cover. This will economically remove any early possibility of earth strike on your pulse crops. It will also spread those pesky weed seeds back onto the field so you are not troubled with them in the grain storage bin.

This concept is great from the point of view of the grain buyer, who doesn't ever see those weeds again, and he gives you a potentially better grade because there is no earthstrike present on the grain you deliver. From the standpoint of freight relief from the normal dockage removal charges at the primary delivery elevator, you have saved a great deal of money, well in excess of the cost of the screen.

Quandry #1

Now comes the often forgotten hidden cost. Management of the field is now deferred to you as the operator, and you must deal with the pesky weeds left in your field, albeit, in a nice orderly row system across the field. You must decide if this will stress you in any way when it comes to testing your weed control methods. Will the preseeding burnoff do an adequate job of controlling those weeds prior to seeding, so they don't give any trouble in the crop, or will there be multiple flushes throughout the crop growing year?

Some people like to show off their new heavy harrow systems and go out after harvest and stir up some dust at the same time as they try to do a better job of spreading the straw around. At this point, I believe the weed row acts much like the under-spread chaff row. The crop following may not establish well if the weed seed row is thick, and we all know the yield loss potential by now on areas that are not well established.

Quandry #2

What is the cost of sufficient weed control chemicals and headaches when trying to get good control on these weed rows? If your rotation indicates cereals are the next crop, you are probably not in that bad shape. But, if your next crop happens to be canola, you may very well have a big problem. You usually only have one shot at getting to the solution if you are growing non modified canola, but multiple flushes of germinating weeds and volunteer pulses could produce less than desirable harvest results.

Do you "fight" the year and try to deal with the problem in the harvested seed, or do you take the economic loss by potential downgrade and dockage? Maybe you have just delayed the problem by a year.

Perhaps what someone should develop is a gathering mechanism to collect those weed seeds and allow you to remove them from the field altogether. I am old enough to recall a weed seed removal rotary screen on the old Massey 17 combine we once owned and operated. This simply had to be dumped every so often (in the field) or I suppose, you had the option of ferrying the unit back to the yard regularly to try and make some economic use of the screenings. I also recall this similar system being employed on a farm dedicated entirely to the production of pedigreed lawn grass seed.

Quandry #3

If you have one of the new combine toys called a yield monitor, just how do you "spot" these weed rows into the memory to try and economically and agronomically manage them in future years? They are not like a spot "ID" that appears on the field map to show a place where you wish to remind yourself that you intend to do something about that spot in the future. I suppose that the old tried and true "tractor notebook" comes into play here, although the problem should be obvious from the edge of the field, even at 100km/hr.

More Quandries:

How do you spot the problems in a chick pea field with "thick" disease incidence?

How do you mark (spot) air drill manifold plugs when they occur over a mile long field?

How do you "fix" them so the neighbors don't have to enjoy them over the entire growing season, since they are conveniently located next to the municipal roads?

Why didn't you scout for midge?

Why didn't you apply weed control products in adequate amounts to do the job right?

These are just a few of the problems that crossed my desk at one time or another throughout the 2000 growing year.

Care to share any of your experiences? We always welcome feedback. Take the time and phone or write. We appreciate it.

Conservation Groups meet with Greenhouse Emissions Management Consortium (GEMCo)

By Don Horsman,

SSCA 2nd Vice President

For some time Canadian conservation organizations such as the Saskatchewan Soil Conservation Association have had an interest in greenhouse gases. It has been shown that carbon dioxide can be taken from the air by the plants through photosynthesis and deposited in the soil. Farmers using certain management practices may return more carbon to the soil than they emit and, therefore, have a net carbon credit which is of interest to other emitters. SSCA has had an ongoing contact with groups who are net emitters regarding a trade in carbon credits. One such group of energy companies belong to GEMCo and are attempting to purchase these carbon credits either as a transitional or long term strategy to address their emissions re the Kyoto Agreement. Soil carbon credits were not accepted at Kyoto but maybe added in future negotiations.

SSCA felt that conservation groups needed to approach this very important issue with a common front. Thus the SSCA began working with the Peace River Soil Conservation Association, Alberta Conservation Tillage Society (ACTS), Manitoba North Dakota Zero Tillage Farmers Association (MANDAK), and the Innovative Farmers of Ontario to deal with the issues of emission reductions and carbon removals through sequestration.

GEMCo established a trading structure in the United States and wanted to see if something could be done in Canada. As a result a meeting between members of the conservation groups and GEMCo was arranged in Regina on April 17, 2000.

During this meeting, members of the conservation groups presented their points of view and their concerns about entering into such an agreement. These concerns might best be described under the heading of RISK.

(1) Price risk - GEMCo has been suggesting a price of a tonne of CO₂ at \$3 to \$5 while other sources suggest a price now and in the future of \$20/tonne and up. Currently any trades are speculative and may not accurately reflect future pricing.

(2) Input price risk - Prices for inputs like fuel, fertilizers and herbicides may increase due to regulations designed to restrict greenhouse gas emissions. If producers have sold their sequestered carbon, they would not be able to use this asset to offset their own emissions.

(3) The soils ability to store carbon - Soils have a natural limit to the amount of carbon it can store. So while a farm may be a net sequesterer now, it will be a net emitter at some later date. A farmer may need to use their stored soil carbon to offset their emissions in the future.

(4) Baseline protection and credit for early action. Currently there is no established base year for counting greenhouse gas reductions through sequestration. In addition there is no Canadian policy to give credit for early action. In other words, farmers who sequestered carbon before 2008 will not get any credit for previously stored carbon. This creates an absurd situation where current policy may encourage no-till farmers to release their stored carbon through tillage only to re-sequester it at a future time for which they can get credit. Credit for early action needs to address both emission reductions and sequestration.

(5) There is uncertainty about the amount of soil carbon that can be credited and traded.

GEMCo suggested that they would like to arrange a trade soon to influence future policy development. They suggested that they are not interested in dealing with producers themselves but see some organization being an aggregator. The aggregator would accumulate carbon credits through contracts with individual farms and then sell these to an emitter. In the United States, an insurance company, which already had contacts in the farm community, fulfilled that role. GEMCo does not see the price changing much from the \$3 per tonne of CO₂, but on the positive side would be willing to write a contract conditional on credit on early action and baseline protection.

John Bennett, a director with SSCA, suggested that we might address the many potential risks in an outright sale of carbon credits by arranging a lease. The farmer would lend the credits to energy companies to help them over a transitional period, be paid for this loan, but at some predetermined time, these credits again be returned to the farmer. Energy companies would presumably have made appropriate adjustments by this time. GEMCo said they had no interest in such an arrangement. Several days after the meeting with GEMCo a conference call of members of the conservation groups was held to discuss a trade. Members felt that there is a considerable risk for farmers for very little monetary return and that we should not proceed with a trade at this time. There continues to be an interest in carbon credits and the idea of a lease arrangement is being pursued.

Darryl Reynolds Takes Directors Position In 2000

By Garry Mayerle, P.Ag.

SSCA Conservation Agrologist

Introductions are in order for Darryl Reynolds of Nokomis who fills one of the vacant Board positions of Director at Large for the Saskatchewan Soil Conservation Association this year.

Darryl joins the board with a strong farming background and a number of years of experience as an agrologist with the Royal Bank. He worked at their Melfort and Saskatoon locations. He has handled both individual and industry accounts. He has filled a number of roles including reviewing and making recommendations on problem accounts and assessing specialty farm proposals. Darryl felt he was a bridge between the farmer and the bank because he understood both sides.

Darryl has been involved with his father Ross at the family farm near Nokomis for many years. In 1995 his father reached retirement age and decided he needed more help on the farm if they were going to continue. Darryl cut his commitment to the bank down to 60% of full time and spent the other 40% of his time back at the farm. In 98 he came back to the farm full time.

Darryl says he and his wife Janice always intended on coming back to the farm to raise their family. They have 2 girls: Sydney who is 3 years old and Amber who is just a year old. Janice is very busy as a breast feeding advocate publishing her own newsletter entitled Moms For Milk. She also works part time as a school book publishing rep. Darryl is a very family oriented man and the whole board and staff look forward to seeing Janice and the girls every 4 months or so at board meetings and other events.

Darryl and his father seed 4500 acres producing a variety of crops including: spring wheat, durum, canola, peas, lentils, coriander, caraway, and sunflowers. They moved their farm slowly into direct seeding starting back in the late 70's. The first step was continuous cropping. By the mid 80's they were seeding with sweeps on a Concord. Fertilizer was banded prior to seeding, also with sweeps. By the early 90's they had replaced the sweeps with Nichols 4² Quick-Change openers and Froc boots. With this arrangement the seed is directed to the sides of the opening and liquid fertilizer is dribbled right behind the shank and between the 2 rows of seed. To date they use this same configuration to seed peas and wheat.

In 1995 they wanted something different for oilseeds so they included a Seed Hawk in their seeding program. They wanted shallow, accurate depth control and good fertilizer placement. They continue to use liquid fertilizer. The Seed Hawk seeds some fall seeded canola and as well as the spring seeded canola and flax. Lentils are also seeded with this machine. Extra effort is put into the spice crops. Coriander is usually seeded after the canola. About a week after the

coriander is seeded they will come back with Seed Hawk and seed the caraway. The burn off can be done about a week later and the coriander will be coming up a week after this.

In the early 80's Darryl says they saw that residue management was important so they went to a Redekop chopper which also spread the chaff. Reynolds' cut with a 30¢ and a 36¢ header and they are very happy with this residue handling system. They now also have a New Holland chopper with a chaff spreader and they are satisfied with this set up too.

Darryl says weed control is one of the weak points their system faces, as he hasn't been around at spraying time as long. He is always looking for information, talking to company reps, dealers, and SSCA personnel. He continues to work at developing this part of the program especially with the specialty crops. They have started using some 2,4-D in the fall and then a pre-burn on everything else with 2,4-D or a ½ liter of glyphosate. They pre-harvest about ½ of their acres, mostly peas and wheat.

One of the things Darryl emphasizes is watch your return on investment. Try to keep your investment on equipment down. You can run a good line of reliable equipment but it doesn't all have to be new!

Darryl says Greg Kane played an important role in getting him on the SSCA Board. The board and staff are happy to have you and hope you are with us for a long time Darryl!

Emissions Trading and the Transfer of Risk: Concerns for Farmers

By John Bennett, SSCA 1st VP, and Dave Mitchell

This is an abbreviated version. For the full document, contact the SSCA Head Office.

Introduction

Agriculture can make two contributions to lowering greenhouse gas (GHG) concentrations in the atmosphere: it can **reduce emissions** from fossil fuels, fertilizers, and livestock, and it can **remove greenhouse gases** from the atmosphere with biological sinks. It is important to design markets address these differences.

GHG removals through soil sinks can be very useful as a "bridge" to allow emitters time to implement emission reductions. Markets for sinks must not transfer the liability for emission reduction to farmers and land managers.

A Word on the Terminology

When speaking of emission reduction credits (ERCs), there are important differences between credits that represent GHG *emission reductions* and credits that represent GHG *removals*.

- *Emission Reductions* mean only that a lower level of GHGs are being emitted than was previously the case. Significant amounts of GHGs are still being emitted.

Removals refer to the actual removal of GHGs from the atmosphere. Biological sinks are the only method at our disposal to actually remove GHGs from our atmosphere.

In the case of *emission reductions* the price need reflect the cost of reducing emission levels (though cleaner-burning fuels, increased energy efficiency, and so on). For *removals*, the price must reflect both the cost of removing the GHGs from the atmosphere and the cost of maintaining the sink.

Virtually all farms could lower emissions levels. For example, a farmer implements a fuel consumption reduction and reduces emissions by 10%. Later, the farmer implements a fertilizer management practise that reduces N₂O emissions 10%. The farm has now reached a 20% reduction. If the emission targets were -6%, the farmer would have a surplus of 14% to sell in an emission reduction market. The -6% target can change varying the surplus with it. The scientific community is adamant that a Kyoto target of -6% will not address the problem. If public opinion follows the scientists' lead, so will the politicians. A prudent farm manager should recognize the "moving target" for emission reductions.

Let us assume this farmer adopts Best Management Practises (BMP) with reduced or zero tillage and that would remove CO₂ from the atmosphere and sequester it in soil as organic matter, creating a carbon sink. GHG removals would be the greatest in the early years and would level off as the sink becomes saturated. Farmers must also realize that this sink can quickly be eliminated with the adoption of tillage.

The GEMCo deal

In October 1999, GEMCo purchased 2.8 million tonnes of carbon offsets from a crop insurance company in Iowa. The exact details of the deal are confidential but the deal may set precedents. This contract deals with **emission reductions** and **GHG removals** and also identifies biofuels.

Two elements of this deal are of interest. The first is the price of carbon, which is highly uncertain. Farmers who sell their carbon now may lose out if the real price of carbon rises substantially. The second element is the question of permanence. It is not clear if the burden of risk of permanence *has* been placed on the buyer, or if the question simply has not been addressed. If a buyer meets his emission quotas in any given year with the help of removal ERCs purchased from farmers, then that year balances out - the farmers sequester X tonnes of carbon, and the emitters emit X tonnes of carbon. However, if a few years later a farmer is forced to till his ground, it is unclear exactly who would be responsible for the emitted carbon. The emitters are likely to argue that the obligation is no longer theirs since the farmer's sequestration in the past replaced their emission, and that the emitter's obligation was cancelled. That responsibility may fall to farmers, simply by default.

Two Sources of Risk

Price Risk

If farmers sell their carbon now, they are in effect gambling that the price of carbon will not drastically increase in the future. If they find that, for one reason or another, they need to buy back some of the carbon which they sold earlier, they may be forced to buy it back at the new higher price. Farmers could become locked in to land management practices that may cease to make sense at some point in the future.

Emission reduction will likely become more strict, requiring further and further emission reductions. Farmers could be advised to put off selling their carbon until the price stabilizes, or at least ensure that, if they sell their carbon now, measures are in place that will guarantee that they will not have to buy the credits back at greatly inflated prices.

Permanent vs. Temporary Agreements

Credits representing *permanent* sequestration of carbon, will likely require a legal mechanisms such as *conservation easements* to guarantee this permanence. These easements could be a liability, depressing land values for any land that is held under easement.

Permanent agreements to sequester carbon, have important implications:

1. *Sinks become saturated.* Under any BMP, soil can only hold a certain amount of carbon which means that eventually no new carbon credits are being generated. The sink is effectively "full" and becomes simply a maintenance liability. There is a cost associated with maintaining the sink, as well as with establishing it.

- 2. *Carbon sequestration is reversible.* Carbon can be released in only a few years if a farmer deemed it necessary to revert to conventional tillage. The farmer would likely have to buy the credits back from the original purchaser (or buy an equivalent amount from another source) if he needs to till his soil.
 1. *Permanent agreements likely bring short-term revenue and long-term obligation.* Once a sink is full and the carbon sold, the farmer is left with the obligation to maintain the sink, perhaps indefinitely.
 2. *Permanent agreements reduce future land management flexibility.* If the agreement includes a conservation easement, the current and subsequent land owners are obligated to maintain the sink in perpetuity.
 3. *Permanent agreements reduce farmers' future options for total accounting.* If government regulations require future emission reductions, farmers will be expected to reduce their overall emissions. Farmers who have already sold their carbon, will have to meet these quotas in other ways, perhaps pay taxes or fines on their emissions.

Permanent agreements could place an unfair burden of risk upon farmers.

Carbon Banking: An Alternative System

Temporary agreements can distribute the burden of risk between farmers and emitters. The key is to see them not as a permanent transfer of carbon from farmers to emitters, but as a lease or loan, designed to ease the burden of emission reductions, to be paid back once the industries have their more permanent (and more expensive) measures in place.

Land managers such as farmers (or foresters) could contribute sequestered carbon to this bank - the bank's "capital." This capital (sequestered carbon) could then be leased or loaned on a temporary basis to an emitter to allow them to achieve a short term emission reduction target. Once the emitter has implemented the necessary emission reductions to his operation, the capital would be returned to the sequestered carbon bank. Such a system would provide an incentive for the farmer (or forester) to create and maintain the largest sink possible, without transferring the risk of permanence from the emitter to the land manager. This loan or lease would not substitute GHG removals permanently for emission reductions.

GHG removal and storage in a sink would have some value for as long as the sink is maintained.

If the sink is lost, for example by tillage in the agricultural sector or by fire or disease in the forestry sector, the land manager would forfeit only the right to loan or lease the value of the sink.

A broad based market system for emission reductions would establish the value of the sequestered carbon "capital," and any loan or lease rate could be negotiated using this value and the agreed upon term.

Conclusion

In summation GHG removals with sinks need different policies and markets than GHG emission reductions. A market system for GHG removals that transfers risk from emitters to land managers would likely fail. Farmers and foresters already assume tremendous risks due to the uncertainty of managing biological systems as well as volatile markets. A market system for GHG removals with sinks would not provide any incentive for land managers to adopt best management practices if it adds yet another risk to an already risky operation.

GHG removals with sinks are the only current mitigation tool that actually removes GHGs from the atmosphere. This is a limited opportunity for society and should not be squandered in the early stages of addressing dangerous GHG concentrations in the atmosphere. GHG removals can be very useful as a "bridge" to meet short term GHG targets, allowing emitting industries the time they need to implement permanent emission reductions. GHG emission reductions and GHG removals are very different and therefore require different markets.

Harvesting Cereal Straw

By Garry Mayerle, P.Ag.

SSCA Conservation Agrologist

Technology has turned some of agriculture's trash, cereal straw, into an economic commodity in today's market place. Cereal straw is now being used as fiber. Cereal straw as a feed stock for bio-ethanol is almost a reality and who knows what is next? A dilemma is that direct seeders had already decided that straw was not "*trash*" but that it had some value and were developing their production systems around those values. Is technology going to pay enough for cereal straw to cover those values and a margin?

Many producers traditionally thought of their cereal straw as trash and not calculated the value of the benefits in the selling price for straw. One of the benefits of cereal straw is the nutrients it contains for future crops. A Farm Facts sheet entitled "Best Management Practices When Harvesting Surplus Cereal Straw" was put out this fall by Sask Ag & Food (SAF). They have confirmed that an average tonne(t) of wheat straw contains: N 12-15 lbs, P₂O 4.5-5 lbs, K₂O 27-34 lbs, S 2-3 lbs. The value of these nutrients are about \$9.30 to \$11.75. Another benefit of residue is its ability to prevent the processes of erosion. Over time there could be a substantial value put on this benefit. The next benefit is that straw contributes to the organic matter content of our soil. It is an important component of direct seeders ability to "build up" our soil. It is hard to put a dollar value on this benefit. A price for carbon sequestration would be part of this dollar value. Another benefit of straw in direct seeding is its insulating value conserving moisture. Again, very difficult to put a dollar value on this benefit.

Most straw in the past has been priced in baled form. This is the only way it can be transported. SAF's Custom and Rental Rate Guide gives a custom baling rate of \$9.30/bale if you put 90 hours annually on your baler (this gives you \$1.15 margin or profit). Considering the heaviest straw bales made, 2 of them could weigh a tonne. This makes \$18.60/t for baling. Farmers know this rate guide is usually the high end of the scale. The local alfalfa dehydrating industry says they can get baling done for \$12 - \$13/t. That is about \$7.30 a bale and it includes stacking the bales in rows in the field. That puts you at \$15/t for baling straw.

In SAF's October issue of the Feed Grain and Forage Listing Service the lowest price for this year's wheat and durum straw is listed at \$22/t. Although this producer might not think he needs to make a margin on baling he is still just getting paid for the nutrients in his straw. Isobord Enterprises, a large strawboard manufacturing company operating at Ellie, just east of Winnipeg, buys their straw in windrows in the field. They buy their straw for \$8 - \$9/t and they have had no problem procuring straw.

For the most part, the farmers that have survived to date are business men. There must be a reason why they are ready to let straw go for such a seemingly low return. About half of the nutrient value of wheat straw is in potassium. In most Saskatchewan soils (except some sandy

and sandy gray soils) we have an excess of potassium and maybe we can afford to mine some. This will only go so far but maybe we justify selling potassium to buy other nutrients that will give us a yield increase next year.

Agriculture and Agri-Food Canada researchers have some long term comparisons showing productivity and soil quality differences after years of harvesting surplus straw or leaving it spread in the field. The best comparison for the purposes of this article is being carried out at Indian Head. This is in the black soil zone on heavy clay soils. After 40 years of returning cereal straw in one set of trials and baling it off in another, there was no significant difference between the amount of organic matter and nitrogen in the soil in the two trials. These plots were in a fallow-wheat-wheat rotation and were properly fertilized. The baled plots had the straw removed every year a crop was grown. In a discussion with Dr. Con Campbell, a former Agriculture and Agri-Food Canada researcher, he says that there was no effect on yield in this comparison. He does point out that they only removed an average of 22% of the above ground residue with their baling operation. The Best Management Fact Sheet gives these ratios: above ground material other than grain in a typical western Canadian wheat crop is 1.66 times the amount of grain produced. (However this ratio can vary from 1 to 4 t of residue to 1 t of grain.) They suggest that baling removes 0.6 - 0.8 t of residue per t of grain removed. This is a removal of 36 to 50% of the above ground residue. Another factor to keep in mind is the organic matter root production returns to the soil. When all these are added together, it is obvious that baling straw takes away a fairly small portion of the biomass produced by the wheat crop.

A low disturbance direct seeding system provides us with excellent erosion control. Leaving the stubble standing is what provides this control. Chopping and spreading straw doesn't add a lot to the erosion protection of standing (6" or higher) cereal stubble. This broad generalization should probably not apply to erodible soils such as sandy soils. If you have sandy soils you probably do not have too much surplus residue to harvest. You want to protect that light soil from wind and use as much residue as possible to build up organic matter levels. Also, soils with any amount of topography need all the protection they can receive against water erosion. If somehow it would be feasible to leave residue on eroded knolls even where straw from the rest of the field is being harvested a lot can be gained from trying to build these areas up. A certain quantity of residue is needed to protect any soil from erosion. The Best Management Practices fact sheet suggests that you need 750 lb/ac of standing stubble and 250 lb/ac of loose residue after seeding to protect your soil. A 40 bu/ac wheat crop cut at 6' high will leave 750 lb/ac of standing residue. As long as sufficient quantities of residue are produced baling will still leave enough behind to protect the soil.

A number of researchers seem to agree that surplus cereal straw is produced on many of the non-erodible soils of the black soil zone. In the gray soil zone organic matter contents are lower, the soils are more fragile and probably not a lot of straw should be harvested. In the brown soil zone a much lower quantity of residue is produced and most if not all of it is probably needed to protect and build up the soil and to conserve moisture. Wetter areas of the dark brown soil zone may produce sufficient residue for some straw harvesting.

The Best Management Practices suggest that in black soils, straw can be harvested every year that a cereal crop is produced. In the gray and brown soil zone, they recommend that a frequency

of 1 in 5 - 7 years may be acceptable. One of the important understandings in these guidelines is that crops need to be fertilized to soil test recommendations. The fact sheet cites research work done in Alberta where soil organic matter improved even when all crop residue was removed as long as fertilizer was added to soil test recommendations.

Best Management Practices points out that harvesting residue from canola, mustard or pulse crops needs to be avoided. These residues decompose faster so maintain as much of these residues as possible for soil protection.

One of the benefits of residue that has only been touched on is that crop residue conserves moisture for the following crop. There certainly are instances in some growing seasons when this is a hindrance to the following crop. If a producer finds that there is often a time in his rotation when there seems to be excess moisture the previous fall, this would be the time to harvest residue. Here in the northeast, the most likely time this scenario happens is when canola is to be planted early into cereal residue. Probably the most beneficial time to harvest straw is at this point in the rotation.

There are a lot of community benefits and spin-offs to the ventures that are or would like to utilize straw. I believe that it is right for producers to do a lot to support these ventures. However, straw is not trash and I think that the market today is not quite or just paying for the value of the straw. Optimistically, I think the market will begin to recognize this and it will respond to give producers a margin. Until this response comes, I would rather error on the conservative side of protecting our soil resource by, even in the black soil zone on non-erodible soils with decent top soil levels, harvesting cereal residue 1 out of 4 years. SSCA recommends a basic cereal broadleaf rotation so that means straw from every other cereal crop would be harvested.

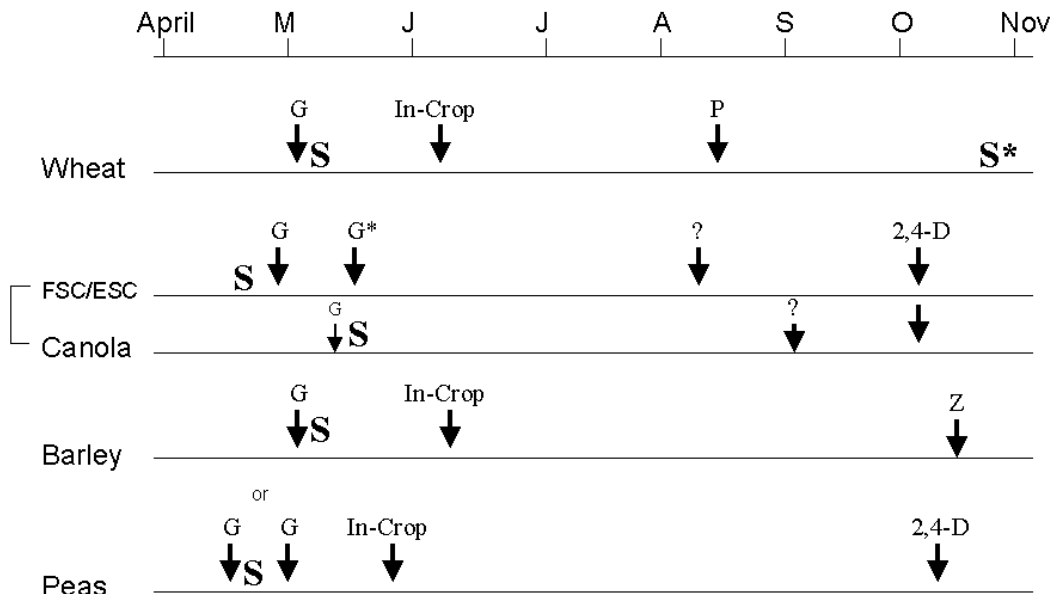
Is Canola Still a Good Crop Rotation Option?

Eric Oliver, P.Ag.

SSCA Conservation Agrologist

With the price of canola near rock bottom, as are most of the commodity prices, many farmers have been opting out of this crop because of the high input costs associated with it and are often replacing it with a cereal. In addition, the rise in wheat prices is another factor causing producers to think about replacing canola with wheat. Granted, the input costs of canola are relatively high, but producers should not be too quick to replace canola in their rotation.

The chart illustrates a 4-year cereal/broadleaf rotation. As Ken Sapsford described in a previous edition of this newsletter, there are advantages to a cereal-oilseed-cereal-pulse rotation. Annual and volunteer weeds are easier to control (i.e.) controlling broadleaf weeds in cereal crops and grassy weeds in broadleaf crops. Crop diseases are reduced due to the 4-year rotation. Crop residues are easy to manage since there is a low residue crop between a high residue crop. Finally, soil fertility is enhanced with this rotation.



FSC/ESC - Fall-seeded canola/Early seeded canola

? - Post-harvest glyphosate

S - Seeding date

G - Glyphosate

P - Pre-Harvest Glyphosate

S* - Fall seeding date

G* - Second treatment if needed

Z - Zero incorp. granules

There are some factors that should be considered before dropping canola from the rotation. First of all, research indicates that the yield and quality of a cereal on canola stubble will generally be higher than a cereal on cereal stubble. In addition, by replacing canola with wheat, it means you will have a back to back wheat-wheat in the rotation. By doing so, the likelihood of getting high protein is much less than if wheat was on even canola stubble.

Canola is also a strong competitor with weeds once it bolts. If using a herbicide tolerant canola variety, a very wide spectrum of weeds can be controlled. If perennial weeds are present, a pre-harvest application of Roundup in the wheat crop the year prior to the canola can be effective in controlling these weeds. The way this rotation sequence is set up, it allows for a post-harvest application of Roundup in the canola the year following wheat if perennials are still present. A herbicide tolerant variety also allows the option of fall seeding. Fall and early spring seeding of canola have certain advantages for reducing risk in most areas of the province, although the reasons may be different for each region. In the Brown and Dark Brown Soil Zones, these reasons may be that it allows the crop to establish when there is soil moisture available and to increase the odds of maximizing flowering before the major heat period. For the parkland areas, the advantages may be that it increases the chance that the canola will be harvested before a frost. Fall seeded canola also spreads out the workload at seeding. Many producers spread out their risk of growing canola by dividing up their canola acres into a percentage seeded in the fall and/or early spring and the remainder at the traditional spring seeding time. The rotation chart illustrates this strategy.

But what about the poor price of canola? Well, before switching canola in the rotation for wheat, let's look at some of the economics of canola versus wheat. To compare costs and returns of wheat and canola, there are some basics that we can compare: seed cost, herbicide costs and fertilizer. For this exercise, I am using inputs that would be used in a continuously cropped direct seeding system in the Brown Soil Zone.

The Roundup Ready and CLEARFIELD system canola (SMART) varieties are using a 6 lb/ac seeding rate while the Liberty Link variety is at 5 lbs/ac. The seeding rate for the wheat is 1.25 bu/ac. The fertilizer used for the canola is a blend that contains 50 lbs/ac N, 20 lbs/ac P, and 10 lbs/ac S. The fertilizer for wheat was 50 lb/ac N and 25 lb/ac P using 34-17-0.

Canola	Fall seeded:	\$23.70/ac
	RU Ready variety @ \$3.95/lb* TUA Fertilizer In-crop - Roundup - 1 application	\$15.00
	Total cost	\$23.90
		\$4.10
		\$66.70/ac
	Early spring seeded & Normal spring seeded:	\$15.00/ac

	RU Ready Variety @ \$2.50/lb TUA Fertilizer	\$15.00
	In-crop - Roundup - 2 applications Total cost	\$23.90
		\$8.20
		\$62.10/ac
	CLEARFIELD canola variety @ \$2.50/lb**	\$15.00/ac
	Roundup burnoff	\$4.10
	Fertilizer In-crop - Odyssey Total costs	\$23.90
		\$25.50
		\$68.50/ac
	Liberty Link canola variety - 5lbs/ac @ \$3.75/lb**	\$18.75/ac
	Roundup burnoff Fertilizer In-crop - Liberty Total costs	\$4.10
		\$23.90
		\$23.00
		\$69.75/ac
Wheat:	Certified seed 1.25 bu/ac @\$8.00/ac Burnoff	\$10.00/ac
	Fertilizer In-crop Total costs	\$4.10
		\$23.80
		\$22.00
		\$59.90

* Seed price includes Extender Coat

** Seed price does not include Extender Coat

Returns:

Using the canola price for November, the net return is \$5.45/bu. For spring wheat, the Pool PRO net return is \$4.14/bu for No.1 with 12.5% protein and \$3.92/bu for No. 1 with 11.5% protein. To compare the two crops I used the yield necessary to break even with the input costs.

Yield needed to break even:

Canola:

Roundup Ready variety:

Fall seeded: 12.2 bu/ac

Early spring & normal spring seeded 11.4 bu/ac

CLEARFIELD canola variety * 12.6 bu/ac

Liberty Link variety* 12.8 bu/ac

Wheat: 12.5% protein 14.5 bu/ac

11.5% protein 15.3 bu/ac

* Early or normal spring seeded.

As it turns out, canola looks pretty good compared to wheat. Another factor to consider is that if the grade of wheat is lower, which can be the case when growing wheat on wheat, the break even yield is even higher. Granted, these input costs don't include expenses such as crop insurance or hail insurance which are higher for canola than wheat. With all the variability with these costs, one has to apply their own numbers to the cost of production. However it does illustrate that not only does it make agronomic sense to keep canola in the rotation, it makes economic sense as well.

Meet Arthur Murray

SSCA Director for the Southeast

Arthur, along with his wife Gwen, and family of 4 girls, farm in the Glenavon district, about 100 km ESE of Regina in the area containing moist dark brown and thin black soils. They grow a multiplicity of crops including peas, canola, barley, wheat, including winter wheat and fall rye over about 1400 acres seeded annually. Arthur and Gwen both are very active members of their community, and have served on school boards, church boards, agriculture board, Sask. Wheat Pool committee, and Arthur currently belongs to a producer group that meets regularly. This producer group discusses a variety of topics and take a high interest in what the SSCA is doing.

When asked what he thought was important about soil conservation, Arthur replied that we have learned a lot about prevention of erosion and keeping our soil in place. They have experienced both heavy rains and dry conditions in the 80's on their farm, and soon realized the care needed to preserve what they had, and prevent further losses. In order to take action on water management, the area formed a Conservation and Development district, collects levies and has a local board to help manage the annual plan. Arthur serves on that board.

Reflecting on what we have learned in the past, Arthur and Gwen both stated the fact that we have learned a lot about time saved in farming operations. Methods of farming have changed tremendously, and they sensed they had to adopt new techniques such as direct seeding to keep pace with the forefront of the industry.

They retrofitted a seeding machine that works in their soil type and and crop rotation regime and, in doing so, avoided a heavy capital investment that might have placed undue stress on their farming operation. They have utilized efficient practices such as more chem-fallow, less tillage, growing winter cereals and are continuing to evolve into better agronomic practices that fit their area.

The next step may be uncertain as they feel they are near the limit of practical rotation cropping, but see the advantages of some legumes in their plan. They will continue to manage with changes to rotations, weed control and a more active time spent in marketing.

They see the future as very bright and applaud the SSCA in their efforts to educate people on the benefits of carbon sequestration, and hope the appropriate government officials soon take notice and take action. The Murray's would also like to see more farmers get involved in education others about this practice, and feel an important opportunity exists in the job of educating the farming community about carbon, global environment issues and changing techniques in the agricultural industry. Arthur says that more and more farmers should learn the advantages of direct seeding and soil carbon sequestration.

Arthur is currently serving on the board as an active regional director for the southeast, and represents the board on the management committee to IHARF, (Indian Head Agricultural Research Foundation), taking a keen interest in the precision farm research project.

Arthur welcomes your comments and questions anytime.

Meet the North West Director

John is the senior partner in a dryland grain farm at Radisson. He and his wife Marg farm with three of their children and have two younger daughters still in school. They operate a zero-till farm that produces wheat, canola and yellow peas. When the markets are right, they have also grown durum, barley, flax, CPS wheat and lentils. The farm has been continuous cropped for the past 20 years so it was a natural progression to move to a zero-till operation. They wanted to leave the land in better condition than when they started farming it in 1975. One of their most progressive steps toward improving the land has been the incorporation of legumes into their 4-year rotation. As well, their purchase of an airdrill made single-pass seeding using anhydrous ammonia both possible and preferable.

John has been involved on a number of community boards such as school, church, recreation and co-op. He was a Pool delegate for 9 years and a Canadian Wheat Board Advisor for 8 years.

In 1998, he was elected for a 4-year term on the Board of Directors of the Canadian Wheat Board. He serves on the Audit & Finance committee and chairs the Benchmarking committee. He also represents the CWB on the Western Grain Research Foundation.

John and Marg enjoy snowmobiling in favorable winter conditions and camping at the lake in the summer. John has a soft spot for IH antique tractors. But lately his favorite pastime has been playing with an energetic grandson.

Mother Nature - The Ultimate Opportunist

By Tim Nerbas, P.Ag.

SSCA Conservation Agrologist

The old adage 'give a man an inch and he'll take a mile' is never truer than when dealing with Mother Nature. Since humans first began cultivation, weeds and diseases have been the Achilles heel in grain production. But what we have failed to realize is that weeds and diseases are just one of many ways Mother Nature adds diversity to the system.

Weeds and diseases are signs that the farming system does not contain sufficient diversity. Historically, we have treated these antagonists using tillage and pesticides instead of addressing the real problem: why do we have specific weed problems or disease incidents? The advancement of new pesticides have lulled many producers into thinking that previously valued agronomic skills are less important than picking a good pesticide.

Inputs such as fertilizers and pesticides should not be used as tools designed to stop natural processes, but rather as a way to initiate natural cycles. This is what is referred to as a systems approach. A crop or two is added to the rotation to provide the diversity that is lacking from the system. Nutrients are used to replace the nutrients that are exported from the system, but they must be applied to provide a competitive advantage to the crop intended for harvest.

For the farming system to be profitable, as well as sustainable, the system must be designed such that natural cycles and principles become an ally rather than an enemy. If we grow crops placing a heavy emphasis on creating a healthy and biologically active soil ecology, we can attain a high level of pest control. At the Lethbridge Research Centre, Dr. Jill Clapperton found as many as 300 earthworms per square meter under no tillage compared with zero under conventional tillage. In the same experiment, significantly lower incidences of common root rot in the no-till situation illustrates the long-term benefit of maintaining the soil habitat.

The presence of earthworms in the soil is often considered a positive indicator of soil quality and productivity. Numerous researchers have suggested that earthworms play an important role in the breakdown of organic matter and nitrogen cycling in reduced tillage systems. Earthworms prefer plant material that has been colonized by fungi and bacteria which can lead to reduced incidents of fungal diseases like take all and pythium root rot.

Many of the soil organisms that are rapid colonizers of organic matter are antagonistic to disease-causing organisms. As well, the residue from some crops inhibit the growth of other plants either directly or indirectly from the byproducts produced from the microbial decay of the residues (allelopathy). Fall rye, mustard, oats, black medic, hairy vetch, sunflower, oil seed hemp, and sweet clover are all reported to inhibit the growth of weeds. There is also research showing that residues from oats can inhibit the germination of some disease causing fungal spores like Sclerotinia.

The work done by earthworms and other soil fauna provide a biological tillage of the soil profile. These soil animals feed on the organic matter, fungi, bacteria, and each other to recycle all the carbon, nitrogen, phosphorus, sulphur and other nutrients in the soil organic matter into mineral forms that can be used by plants. At the same time, the root exudates, hyphae of the fungi and the secretions and waste products of the bacteria act as binding agents to hold small soil particles and organic matter together to improve soil structure. This makes for a better soil habitat which, in turn, attracts more soil animals, which further increases the amount of nutrient cycling.

Farming practices that include diversified crop rotations, increased use of legumes, cover crops, green manures, and composts not only build up soil organic matter but also increase the biodiversity of soil organisms. One of the basic principles in developing a proper rotation is that the diversity must be appropriate for each land parcel. Some land is owned, some is rented, and each parcel has its own cropping and management history that must be taken into account. However lack of diversity allows an opportunity for weed and disease organisms to build to harmful levels.

Dwayne Beck from the Dakota Lakes Research Farm emphasizes there must be proper water utilization intensity. This means that crop water use must match the water available. Problems with salinity, erosion, and nutrient loss can occur if the intensity is not sufficient. However, if the system is too intense, poor yields due to water stress or stand establishment problems are likely. In either case, improper intensity will result in management problems and less than optimum profitability.

The best systems attempt to mimic native vegetation in water use intensity, and employ as much diversity as required to optimize the system. Every resource on the farm (land, labour, machinery) is managed to optimize its contribution to the operation without overtaxing its capability. Sustainable profitability must be the primary goal in order to assure that conservation continues long-term.

Remember, Mother Nature is an Opportunist. If you have a problem (weed and/or disease), you have provided the opportunity for that problem somewhere in your system.

Henry Ford once said:

"The land supports life. Industry helps man to make the land support him. When Industry ceases to do that and supplants the land, the land is forgotten and man turns to the machine for sustenance, we find that we do not live off the work of our hands but off the fruits of the land".

Leopold (1933):

"A harmonious relation to the land is more intricate and of more consequence to civilization than the historians seem to realize. Civilization is not, as they often assume, the enslavement of a stable and constant earth. It is a state of mutual and interdependent cooperation between human beings, animals, plants and soils, which may be disrupted at any moment by the failure of any of them. Land spoliation has evicted nations and can do it again. As long as six virgin continents awaited the plow, this was perhaps no tragic matter....".

William Bryant Logan (1995):

"A soil is not a pile of dirt. It is a transformer, a body that organizes raw materials into tissues. These are the tissues that become the mother to all organic life."

New Director-At-Large Joins Board

Corey Loessin, along with three of his family members, operate a 6000-acre grain, oilseed, special crop, and beef cattle operation at Radisson. The Loessin farm has used a direct seeding system for five years and soil conservation is considered a top priority in their operation.

After completing a BSA degree in 1986, Corey worked for five years as a District Agriculturist with Alberta Agriculture. Upon his return to Saskatchewan and the family farm in 1991, Corey began instructing crop science courses at the University of Saskatchewan during the winter months. He has been extensively involved in the development and administration of distance education programs in Agriculture. He is past president of the Saskatchewan Ag Grads Association and has served for five years as agriculture advisor on the National Advisory Panel for the Canadian Chemical Producers Association. Corey recently joined the Saskatchewan Soil Conservation Association as a director at large.

Corey's leisure interests include hockey, snowmobiling, waterskiing and motorcycling.

Corey and his wife, Joan, have two children.

SSCA Discussion Forums

By Blair McClinton, P. Ag.

SSCA Executive Manager

Do you have questions on direct seeding, views on the direction of the SSCA or equipment for sale? The SSCA has set up the SSCA Discussion Forums at our web site (<http://ssca.usask.ca/cgi-bin/ubb/Ultimate.cgi>) as an interactive place where SSCA members and others interested in soil conservation can discuss issues like soil carbon or have technical questions answered.

The discussion forum is an Internet bulletin board where users can post messages or reply to other posted messages. Forums are typically used as places to ask questions or discuss related issues. Other users can reply to the questions or discussion to voice their opinions. It is quite common to have many replies to a post allowing an active discussion amongst several users. Posted discussions are public and can be viewed by anyone.

In an effort to stimulate discussions, the SSCA discussion area has been subdivided into several different topic forums. Two forums are setup as bulletin boards where users can post event notices or equipment for sale notices. The other forums are intended to as locations where users can start discussions by posting questions or opinions. Currently, the general discussion headings are:

Bulletin Board

- Events: Agriculture meetings, trade shows and field days (Registered Users Only)
- Soil Conservation Equipment for Sale: seeding equipment, straw/chaff spreaders, harrows, wide blade cultivators etc. (Registered Users Only)

Discussions

- Soil Carbon Sequestration and Climate Change: Discussions on climate change and soil carbon sequestration, and how they may affect agriculture.
- General Soil Conservation: Discussions on general soil and water conservation issues.
- Residue Management: Discussions on residue management problems and solutions.
- Weed Management: Discussions on weed management in conservation tillage systems.
- Crop Rotations: Discussions on rotation planning, crop selection and crop management.
- Direct Seeding Equipment: Discussions on seeding equipment, openers and equipment modifications.
- Fertility Management: Discussions on fertility management issues like fertilizer placement, variable rates, micronutrients, etc.

Feedback

- About SSCA: Discussions about the SSCA, its activities and mandate.
- SSCA Web Site: Beefs, bouquets and suggestions for the SSCA web site.

While anyone can post a message or reply in the discussion forums without registering, the software that we are using has several useful features available only to "Registered Users." Registered users can edit messages they have previously posted and setup e-mail notification to let them know when someone replies to their message. Anyone can become a registered user for no charge by completing the on-line form. Any personal information will be kept confidential. A more complete description of the site's features is in the Forum's "faq" page (frequently asked questions).

While SSCA is in the process of adding technical information to our web site, these forums give, you, the user the opportunity to give us feedback and to discuss issues specific to your operation. Please take the time to participate in these forums

Perry Leach, SW Director

Perry was born and raised in Empress in southeastern Alberta, and started farming with his brother in 1976. He married his wife, Sheridale, in 1995 and together, they have a one year old son. They now reside in Leader, Saskatchewan, where his wife is the vice-principal of the school.

Perry's father, like his father, relied heavily on tillage in his farming practices. They used discers to seed their crops, which included wheat and durum in a 50/50 crop-fallow rotation. Like most everyone, they used a cultivator to manage their fallow land. However, in 1988, the tillage practices caused severe wind erosion on their farm. That was all it took for them to decide to make changes.

Since 1990, Perry has been using disc openers to seed their crops, which now include durum, canary seed, wheat, lentils, chickpeas, mustard, some coriander and just this year, introduced alfalfa into the rotation. Their soil ranges from a sandy loam to a clay loam with no shortage of stones.

The openers Perry has been using are the Barton disc openers, which he mounted on a 30-foot JD cultivator with a converted JD 665 tow-between tank. He has been using these openers for six years now and they seem to be well suited for his soil zone and soil type. They seed approximately 1900 acres per year and keep about 800 acres of chem fallow. Perry is amazed at how much the soil has improved, due to the change in tillage practices. Perry describes the soil as "It seems to be as mellow as a sponge." Soil tests this spring show the organic matter to be as high as 3.2%.

Perry explains that his success with zero-till practices is in many respects, due to his involvement with SSCA. He has been a member of the association for a number of years as well as been on the Board of Directors for the past three years.

President's Message

By Don Kelsey

SSCA President

As I sit at the old computer board and try to figure out which finger goes where, it reminds me a lot of our theme for the Direct Seeding conference " Managing Risk in Difficult Times ". My risk being the wrath of J.P. if I don't get this article in after taking two extra weeks. (Ed.Note: J.P. is not nearly as scary as the Board and Staff think when they miss their deadlines, however, she will do nothing to change their minds. Fear is good when it comes to encouraging these people to get their material in on time!!)

My greatest problem, aside from my typing speed, is a theme or unique idea. I attended and helped to co-chair the national convention of the National Farmers Union Nov.29-Dec.2 in Saskatoon. On my way home, aside from trying to stay awake, I was thinking of how the NFU theme "The Family Farm: Paths to Prosperity" seems to fit in with the theme for our SSCA conference. It has seemed that for the majority of families who continue to call farming their occupation or habit, " Managing Risk in Difficult Times" has become a continuous and long struggle. That path to prosperity has become more difficult over the years despite the dramatic changes that farmers have made in their operations. Direct seeding, specialty crops, changing livestock operations, transportation issues, climate change and Kyoto are but a few that require risk management to reach that prosperity we all hope for.

I, and the rest of your directors, hope that over Christmas and New Year you had time to spend with your families and we also hope to see you in February at the SSCA Direct Seeding Conference and Trade Show.

Seed Growers Direct Seeding for Nearly 20 Years

By Juanita Polegi, P.Ag.

SSCA Conservation Agrologist

A rented Haybuster drill for seeding winter wheat enabled Churchbridge area farmers, Warren and Roger Kaeding, to direct seed for the first time in 1980. At the time, the Kaeding's had already decided they wanted fewer tillage operations on their farm. As they moved from press drills to a hoe drill and then to an air seeder, they were getting closer to their goal. But it was the drought of 1987 & 88 that convinced them to move the entire farm to a direct seeding system. "We were doing high disturbance direct seeding until 1992," said Warren. "Then we equipped our Flexi-Coil 820 with knives and we haven't looked back."

The Kaedings' move to less tillage and direct seeding coincided with their move into the seed business. Wagon Wheel Seeds began growing seed in 1982 and the seed cleaning plant was built in 1984.

As the seed business grew, the need to pay attention to crop rotation also grew. When I visited Warren this fall, I asked him about his crop rotation and how he can manage in the seed business without any tillage. Warren indicated that volunteers are a seed grower's worse enemy and that he has to be careful with the varieties he grows. Wheat is the anchor of the Kaeding rotation. "We grow Hard Red spring (HRSW), Canada Prairie Spring (CPS), and winter wheat," said Warren. "We also grow canola, pulse crops and sometimes, slip oats into the rotation." Sunflowers, the early season, short stature variety are seeded on a small acreage. Warren's comment about growing sunflowers was, "I love them." He explained that they can be seeded late and left to stand in the field until there's bin space in the fall. Another advantage to growing sunflowers is their tolerance to mild salinity. They also do a good job of drying out the ground so an oat crop the following year in saline soil does pretty well.

The Kaedings grow a variety of other crops on small acreages including corn, dry beans, perennial rye grass and nutraceuticals such as evening primrose and willow herb (most commonly known as fireweed).

Of the 5600 acres the Kaedings farm, only 80 of those are in fallow each year. Warren said, "I can keep a check on the volunteers through rotation and herbicides but for some of the high status seeds, I like to put them on the summerfallow. In Year 2, I seed pedigree canola and in Year 3, a Foundation cereal goes in."

In terms of weed control, Warren said that the direct seeding system has enabled them to clean up a lot of perennial weeds. He used quack grass as an example. The farm has moved from having a problem with quack grass to being able to grow registered grass seed. On the other

hand, he feels direct seeding has changed the microclimate enough to encourage the growth of different weeds. "We're seeing increases in the populations of narrow leafed hawk's beard, chickweed, wild buckwheat and ball mustard, weeds we didn't have to contend with before." They started using zero incorporated Edge in 1999 so they expect to see better control of some of these now that they have re-introduced the pre-emergent.

A good fertility program has always been part of the Kaeding plan. For years, anhydrous ammonia was applied in the fall with knives and the phosphate went down with the seed. Then in 1997, the Kaedings began using a more complete fertilizer blend. They continue to apply anhydrous in the fall but are now using a blend of 20 lbs N - 25 lbs P - 20 lbs K - 20 lbs S, at seeding. In order to apply the blend, they replaced the knives with Flexi-Coil single side band openers. Generally, the blend has shown good results although they are questioning the value of sulfur for all their crops. "I'd never again seed an oilseed without sulfur and it appears the CPS wheat also benefits from it," said Warren. "We're not sure that we're getting any value from applying sulfur to the other wheat or pulses". Increasing the potash rate on the cereals is something the Kaedings are considering for the spring. "Since we've been using the potash, we've seen a lower incidence of disease, improved straw strength and a great reduction in the amount of lodging we have to contend with", said Warren.

Warren cites a number of reasons for staying with direct seeding. The first is the cost. Warren said that after he did a rough analysis, he concluded that his fuel and labour costs, using current values, are roughly 60% of what they were 10 years ago. The difference would be even greater using real dollars.

Another reason became obvious in the wet spring of 1999. Warren indicated that if the farm had been in a conventional tillage system that year, they would have lost one third of their acres due to the excess moisture. Direct seeding enabled them to seed all their acres in decent time.

Change is the norm for the Kaedings at Wagon Wheel Seed Farm. The spring of 2001 will see its own changes. Gone is the air seeder. It will be replaced with a Flexi-Coil 5000 air drill, single side band openers and 3-inch rubber packers.

Direct seeding and the seed business can co-exist with good management and crop rotation. Wagon Wheel Seeds is yet another example of a farm that's doing just that.

Shop Built Ditch Sprayer For Common Tansy Control

By Garry Mayerle, P.Ag.

SSCA Conservation Agrologist

Common tansy prompted direct seeder Wayne Nontell to build a ditch sprayer in his search for solutions to this potentially problematic weed.

Wayne has just 2 years of direct seeding experience but is already seeing common tansy in his fields. He farms south of Tisdale in an area, which certainly has a lot of this weed present in the roadside right-of-ways and uncultivated pieces of land. He says he is already seeing common tansy moving out 50 yards from the road ditches. He was advised by his local Westco Ace that the time to control the weed was now and he is in total agreement. The bulk of the stands of common tansy are still in the ditches. It is certainly obvious that these stands are spreading in untilled areas such as roadside ditches. They are especially obvious at this time of year as the stocks are quite tough and tall and can be seen sticking out of the snow.

The sprayer Wayne built is really a conversion of an older model field sprayer. He cut the right hand boom down to about 20¢ and suspended it about 5¢ off the ground. It is hinged so it can swing out to the side in spraying position or back to trail behind the sprayer in transport position. Wayne has made the sprayer more versatile by allowing the spray solution to be directed to a length of hose with a handgun attached. For spraying fence lines the solution can also be directed to a section of vertical boom on the other side of the sprayer.

When spraying roadside ditches, it is imperative to realize that someone owns this land. In most instances this will be the rural municipality. Permission must be obtained before spraying on their property. Contact with the 2 RM's that Wayne farms in indicates that they recognize the problems that are developing and will be quite receptive to producers making an effort to find solutions. One of the issues to keep in mind is that these are not agricultural lands and the regulations are therefore different. One of the regulations is that you have to have an industrial pesticide applicator's license to spray roadside ditches. Note that this is different than the agricultural pesticide applicator's license needed to do custom spraying on agricultural cropland. It would also be wise to know your liability requirements for this type of herbicide application.

As a licensed applicator, for liability reasons, you are going to want to adhere to regulations and registrations. There are 2 herbicides that have common tansy on their label. These products are industrial herbicides. Industrial herbicides tend to be the kind of products that are used for roadside, highway and industrial right-of-way spraying.

One of these products is Telar. Its' active ingredient is chlorosulfuron which used to be formulated under the trade name Glean for agricultural production. At 28 g/ac, the rate that gives

common tansy control, the cost will be \$36/ac. The most effective application time is when growth is about 4² high. According to a company rep this is the time when the plants are the most actively growing and you will get the most product distributed in the plant. He also says that you will get the best coverage at this stage. One of the detrimental effects of this rate of Telar will be on grass species. Smooth brome grass, which is very common in our ditches, will be set back and yellowing will be evident although well-established plants will survive. A company rep also suggests that this product will cause needle die back and leaf drop if trees get sprayed. Healthy large trees will probably be injured but will survive. Smaller, stressed trees may not survive exposure to Telar. At the rate that you need to kill common tansy there is going to be a lot of residual and you are going to have to be careful to stay away from the rooting areas of trees. The label also says to be cautious applying Telar to areas where the herbicide may be washed to non-target areas.

The other product registered to control common tansy is Escort. Its active ingredient is metsulfuron methyl, which is the active ingredient in Ally. Again a company rep says the best time to apply it is when growth is at the 4² stage. The registration states that biennials and perennials can be treated up to early bud stage. The Escort rate for common tansy is 8g/ac and will cost \$12/ac. Ron Standish, out of Calgary with True North Specialty Products, a company that sells industrial herbicides, indicates that Escort will be very active on Common Tansy. He suggests that the 12g/ac rate is better but it is very important to use the recommended surfactant. It also is a product with some residual and will likely have the same effect on trees as Telar. It will also set back grass species but probably not as severely as Telar. If a heavy rainfall occurs shortly after applying Escort the product will be moved into the rooting zone and the grass will be more severely affected.

Except for areas like Wayne has, where the common tansy is heavy enough to be "everywhere" in the ditches, it is probably a wise use of resources to spot spray stands. A comment from Midland Vegetation, a company hired by the Dept of Highways to spray their right-of-ways, was that common tansy was most often observed in difficult-to-spray locations as far as a ditch-spraying rig was concerned. Garry Bowes, a researcher with the Integrated Noxious Weed Management Program, who works mainly with scentless chamomile, also says that he sees common tansy in fence lines and hard-to-control places where it's best to use a hand sprayer. Garry points out that producers need to be very conscious of picking up tansy seed on the edge of their fields and putting it through harvesting equipment and thus carrying on the spreading process. For scentless chamomile, and possibly common tansy, he promotes spraying 6¢ into the ditch edge so that there is less chance of picking up seed and spreading it during harvesting. One of the cautions for blanket application of herbicides in ditches is the potential destruction of a diversity of species that may flourish in ditches. Although we don't know all of the benefits of bio-diversity it seems that even for large-scale agriculture like we have in Saskatchewan, the advantages of maintaining as much bio-diversity as possible may pay off.

There are a lot of things we don't know about common tansy. It would certainly be to our advantage to have some research time put into this weed given the odds that it may spread and become a threat like scentless chamomile.

Fortunately there are some herbicides available to combat common tansy. It looks like a serious enough threat that direct seeders who see it on the edge of their land, need to schedule time into their weed control program to combat it before a seed bank builds up in their fields.

Some Reasons for Optimism

By Blair McClinton, P.Ag.

SSCA Executive Manager

The past year has been a year of change for the SSCA. Over this time, we were forced to scale back our field programs to reflect our new funding reality. I believe that we have turned a new corner and I am optimistic that SSCA's field programs will continue to evolve and grow.

Over the past few months, SSCA has been working with potential industry partners to develop new programs to continue to increase direct seeding cropping systems within Saskatchewan. At the time of writing, the SSCA is finalizing a new partnership agreement with Monsanto and is in negotiations with a second. The new agreement with Monsanto is to develop both a targeted extension program to focus on areas of low adoption and to promote low cost direct seeding strategies.

While there was no agreement at COP6 in The Hague in November, we are still optimistic that soil sinks will finally be accepted when talks resume. Just prior to the federal election, the federal government released its National Action Plan on Climate Change. Within this plan, the Agriculture Sector is expected to provide 20% of Canada's emission reduction target under the Kyoto Protocol. This means that carbon sinks will play an important role in Canada's greenhouse gas management strategy. The Action plan states that they plan to take advantage of the strengths of soil conservation farm groups like the SSCA to help convert more farms to direct seeding systems and other best management practices that sequester more carbon and/or reduce emissions.

Best wishes for the New Year.

ssca.usask.ca

By Juanita Polegi, P.Ag.

SSCA Conservation Agrologist

The next time you visit the library or sit down to your own computer, why not go on-line and check out the updated SSCA web page?

The first item on the menu is the Direct Seeding Conference. For the first time, you can print out the exact brochure and registration form. You'll see that we have an excellent group of speakers and a couple of panel discussions to complement the ever-popular Bear Pits.

New to the web page are the Technical Pages prepared by SSCA staff. The pages provide information on the 5 pillars of direct seeding (residue management, rotations, soil fertility, weed management and seeding equipment), the economics of direct seeding and carbon sequestration issues. These Technical pages will be updated constantly as more information becomes available. Case studies of farmers from around the province who have successfully moved to direct seeding will be added in the spring of 2001. Another feature of these pages is the Links to other sources of information.

SSCA Membership Information is the next menu item. If you're wondering who the SSCA is and what the Association does, it's all there. Membership rates and a downloadable membership application form can be found there, too.

The next two menu items feature the phone numbers and addresses of the SSCA Staff and the SSCA Board. Got a burning issue? Call your nearest board member or member of the Executive. Need some technical information? The staff is there to help.

The SSCA newsletter, the "Prairie Steward" is published three times a year. The last 16 issues appear on the web site and are easily downloaded. (If you want to see the photos, though, you'll still want to refer to the paper copy. Not that any of the staff want to give up their day jobs to open a photography studio, but amateur photos, even the ones we submit, are better than no photos at all!)

The Farmers Helping Farmers Service is the next menu item. Several years ago, the SSCA began to develop a database of farmers willing to share with other farmers, their experiences with various pieces of equipment. This item describes more fully what the database offers and how to access it.

The SSCA Members Benefit Plan and Project Soils, a conservation education program, are other items on the web page.

The SSCA web page is a good source of conservation-related information and it doesn't take very long to open from a farm computer. We think that once you've had a chance to view the SSCA web page, you'll soon want to add it to your "Favourites" file.

Think About a Retro-Fit

By Bob Linnell, P.Ag.

SSCA Soil Conservationist

Spring seeding time is coming, and with it, the never-ending decision of what to plant, on which field, when and why.

Rotations are a guessing game at the best of times, especially if you are unable to sell what you harvested this past fall, and your plan is somewhat set in regards to what you want to plant on which field for next year. Most producers are focused on tactical or operational considerations but get a failing grade when it comes to taking time for a lot of strategic thinking.

In times of stress for farmers, they usually think in terms of "What are we going to do?" and not often of "What can we do?" In those situations, it is more common to concentrate on what crops to plant, how to boost yields or reduce input costs, whether to crop more land or add to the herd, because we think we know a bit about those things.

Consider a producer who has steadily expanded his operation in a bid to stay profitable. It is a logical response to the long term and ongoing trend of declining margins. But smaller margins also mean it takes longer to recover from a bad event, such as a crop loss or a price drop. When a second bad event comes along, the result can be disastrous. When a farm faces bankruptcy in those kinds of circumstances, is it bad luck or the result of basing capital expenditures on profit margins which no longer exist? The overall farm plan approach comes into play at this point; do you want to be a low cost-high volume producer, or a small or medium operation with some off-farm income, or perhaps a producer or marketer of specialty commodities? I think most would agree that the practical approach is the priority of the day. Capital management is a significant factor in the management of any farm today.

So what the hell has this all got to do with seeding anyway? The answer, my friends, may lie in the manner in which we have been seeding and how we make the switch to more efficient seeding methods like direct seeding. With the high cost of fuel, labor and new machinery, we all have to "hunker down" and try to make use of what we may have on the farm or at least in the local community. **This is where Retro-Fits come in.** You can think in terms of buying a new machine, or, if you already have a basic frame that will convert into an air drill, you have the start of what is usually a viable beginning to direct seeding. The frame is the key to the whole picture. If the old cultivator has pretty good clearance for trash (residue), it will likely work for you. If the residue clearance leaves a lot to be desired, then my best advice is to look around for a better frame in your area that doesn't cost the world, and then go out and buy it as cheaply as you can, shanks and all. Three rank machines are better than four rank. Under frame clearance doesn't usually constitute too much of a problem once we (you) have learned to cut your crop stubble at a height that is close to the shank spacing, provided you have made a good job of spreading the straw and chaff to the width of cut at harvest time. If the machine can be converted to a floating

hitch configuration, with the addition of front castor wheels and rear packer sections, so much the better.

Next comes packing. All crops in this part of the world establish better if seed is placed on firm ground in good moisture conditions. If the ground is dried out by pre-working, it is important to place the seed into moisture, not just to it, now that you have dried the soil out above the seed. This has been the lesson we first learned when the principles of direct seeding were being developed. Direct seeding tends not to dry out the surface, but places the seed in the ground with very minimum disturbance, thus preserving more of the moisture present in the field. Packing of the seed from above was found by a P.A.M.I. study to be of benefit when compared to no packing. According to their research update (749), "Minimal packing was necessary for optimum crop establishment in the soil moisture conditions found while testing openers in direct seeding conditions." The type and shape of the packer seemed to be of minimum significance, as long as there was some packing. It is important, however, to pack directly over the seed for optimum emergence and yield results. Packing can be achieved by the use of shank mounted packers as manufactured by several companies, and this is one easy and relatively simple solution, for a lot of machines. Very wet conditions will cause problems for some packers and owners should be aware of over packing potential in very wet conditions along with the combination of small seeds like flax, canola, etc.

Seed carry and delivery systems can vary over several types of machine from the manufactured boxes on an old seed drill to air delivery tank systems with a wide variety of power sources. Seed boxes will work fine but are often frustrating to use because of the necessity for lots and lots of stop and fill up time. Some people will put extensions on the top of the boxes for extra capacity, while others will design new larger boxes and attach the metering devices of their choice to the bottoms. Metering drive systems can be hydraulically run, or motor driven, or ground drive setups. Home built tanks come in singles, doubles and triples, to deliver the chosen number of products you wish to apply in one pass. You don't have to have a large number of compartments in the tanks, but two is adequate for most purposes. The fertilizer necessary for a good crop can all be applied at the one pass seeding time, or some people apply fertilizer to the land in the fall when prices are usually cheaper and they have more time, especially if they only have developed a single shoot system. The trend is for double shoot systems, and this can lead to one other problem; the need for a second truck to deliver either seed or fertilizer to the machine in the field. Even an old unlicensed truck can deliver seed from the cleaned source bin to the field and the best truck can be reserved for hauling fertilizer.

Shown in the pictures is a modified Seed-Rite 8018 with a Morris 6130 tank setup that works as a single shoot system for a smaller farmer. The owner has used the Morris "flat distributor system" that comes with the Morris tank, and has used on-row packers from a Morris M-11 hoe-press drill. Not a lot of modification was needed to put together this system, just a bit of looking around the farm and a bit of welding and adjustments.

A J.D. Model 655 is also shown that has modifications in the form to enable a liquid fertilizer caddy tank to be attached to the rear of the frame. The shanks have been removed and coulter discs have been attached in their place. This is a relatively light horsepower requirement unit and shows forty feet of machine being drawn by 110 horsepower. The machine is seeding canola

fairy shallow into wheat stubble on medium hilly loamy land. Some phosphate fertilizer is being placed with the seed in the fall, with mid-row banding nitrogen-phosphorous mix being placed mid-row to the seed.

A list of after-market suppliers of openers, and other direct seeding equipment is available from the SSCA for farmers who wish to start accumulating equipment for retro-fitting this late fall and winter season. Phone 1-800-213-4287 (SK & MB) for a copy of the list from Bob Linnell.

This article is published as an aid to producers who wish to start the process of retro-fitting machinery to enter into the practice of direct seeding. More pictures of other machines are available with some detail, and anyone wishing to learn more about direct seeding is advised to contact any staff member or Board member of the Association. Assistance on technical matters is usually free, unless a request for travel is involved outside the province.

Weather Challenges at the Conservation Learning Centre

By Laurie Hayes, M Sc, P Ag

Manager, CLC

The 2000 crop year presented a few challenges. A cool wet spring coupled with excessive rainfall (16+ inches of rainfall between mid-June and late July) and an early frost (August 31) had an impact on the crops. Most projects were completed but results have yet to be tallied. There were a number of successful tours this summer and as in the past, our school program was extremely busy.

Crops

Harvest is done for 2000. The AC Elsa and AC Barrie wheat were very good crops and yielded 55 and 52 bushels per acre respectively. Unfortunately, both crops were touched by the frost on August 31, downgrading the grain to feed. Some trials examined granular versus foliar copper and foliar nitrogen on the Barrie wheat but are waiting for results. The "strip-farmed" AC Metcalfe malting barley was light (47 pounds per bushel) and yielded about 60 bushels per acre.

The fall-seeded canola froze, did not emerge and/or was choked out by weeds. Yield was very poor and dockage very high. Time to swath was a best-guess scenario - part of the field was still blooming, part was ready to be swathed and part was already ripe. We chose the middle road. The section that we sprayed with extra nitrogen and sulphur had large patches that were still blooming when the rest of the field was ready to be swathed. Therefore, when considering applying extra fertilizer it is necessary to take into consideration the effect on the length of the growing season. Some results that were very clear are that fall spraying is extremely important to control winter annuals. Many of the weeds were winter annuals and had a significant impact on the reduced yield.

The Delta peas yielded about 25 bushels per acre. Weed control was (through an oversight on my part) very poor and this no doubt had an impact on yield. The claim of a stronger seed coat certainly appeared to be true with this variety. There seemed to be much less splitting although we will only know for sure once they are sold. Overall the Deltas were a very nice looking pea - smooth and round.

The CLC's precision farming project with Liberty Link canola yielded about 27 bushels per acre. The field was seeded using precision farming technology for varying fertilizer rates. Unfortunately, we could not generate a yield map, as we were unable to source a combine with yield mapping capabilities.

Caraway was seeded without a cover crop on 1.4 acres. Emergence and establishment was very good. Next year the caraway will be fertilized with 60 lbs N, 20 lbs P, 20 lbs S and possibly 20 lbs K (broadcast).

School

The education program was extremely successful again this year, **reaching 1853 students in 2000**. The following school districts were invited to participate in the program at the CLC: Saskatoon (3), Melfort, Nipawin, Wakaw, Parkland, Saskatchewan Valley, Prince Albert (2), Division Scolaire Francophone and the Saskatchewan Home School Association. We are trying to remember to call the program the "education" program because we are now getting groups that are not school-related such as 4-H clubs, environment clubs and Katimavik. Again, we have had wonderful reviews from the visitors to the CLC. We appreciate the feedback because it helps us expand our program.

The CLC has again been nominated for the Outstanding Agriculture Ambassador Award. The nomination was submitted by Chris Clinton, a teacher involved in the Outdoor School at Carlton Comprehensive High School in Prince Albert. Mr. Clinton and his group camped at the farm again this fall and sessions included the importance of shelterbelts (after which the students had to design a shelterbelt for a farm site), the area of agroforestry, soil development, erosion and conservation and GMO's.

In October, we participated in the National Agriculture Awareness Conference in Saskatoon. All participants were involved in ensuring agriculture is in the classroom. Representatives from all provinces (except New Brunswick) as well as federal officials and educators nationwide were present. Through the course of the conference, over 40 attendees stopped by the booth or approached me to discuss our program. All exclaimed at the good fortune of Saskatchewan teachers to have such a facility at their disposal. Many were excited about the opportunities such a facility could present to school students in their provinces and were interested in more detailed information about the CLC and its operations, including the education program. It was extremely gratifying to see such enthusiasm about our education program from outside the province.

In an effort to attract more schools to the CLC, we will be participating in Showcase 2001 in Saskatoon. It is the annual teachers' convention - attendance for teachers is compulsory and all teachers in the north half of the province (about 7,000) will be attending. We hope to generate more interest in our programs and increase participation further.

Again, thank you to the Saskatchewan Canola Development Commission for supporting our school program.

Partners and Sponsors

The CLC would like to thank its partners and sponsors for the 2000-2001 year:

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Canadian Adaptation and Rural Development Saskatchewan

Without the support of these organizations, groups and individuals, programs at the CLC would be severely affected. Thank you again for your contributions.

Winter Wheat After Forages

By Juanita Polegi, P Ag

SSCA Conservation Agrologist

"Do you know anyone who has sprayed out a forage stand and then direct seeded winter wheat into it?" That was the question posed to me by Dwayne Kitzan who farms north of Theodore. I replied that no one came to mind but that I'd do some checking. After a few phone calls to other agrologists, it became apparent that removing forages with a herbicide and then direct seeding winter wheat into the field wasn't a common practice. While it sounded good in theory, we couldn't come up with a name of anyone who had tried it. Dwayne decided he would.

In mid July, I visited Dwayne and we looked at the 2 fields of forages he wanted to remove. Both fields were 10 years old. The first was a mixture of alfalfa and smooth brome grass although there wasn't much alfalfa left in the stand. The second field was also a mixture of alfalfa and brome, but there were mole hills everywhere! The mole (pocket gopher) activity had left the field so rough that it was becoming increasingly difficult to cut and bale the hay. Yet the stand itself appeared to be quite healthy. This health was due to the fertilizer it had received. In April of both 1999 and 2000, Dwayne broadcast a blend of N-P-K-S on the field. He indicated that he has come to believe in the value of fertilizing forages as he estimates that the production on that field tripled after the fertilizer was applied.

Following Monsanto's recommendation, Dwayne applied 2.0 L/acre Roundup Dry to the fields on July 14. He cut the hay July 17 and was able to begin baling it on July 20.

On August 21, Dwayne seeded the variety Claire at 120 lbs/acre and applied 7 lbs N, 35 lbs and 10 lbs K₂O fertilizer with his Morris air drill and paired row openers. He felt the fields were really rough after seeding so he gave them a light harrowing.

When I called Dwayne in mid-October to ask him about how everything went, he replied, "Just excellent! The germination was great and there aren't any weeds to contend with." Dwayne said he'll keep an eye on the fields next spring and if there appears to be a problem with winter annuals, he'll apply some 2,4-D.

Seeding winter wheat into a field that had forages may not be a common practice but Dwayne Kitzan has shown it can be done successfully.

Yorkton Teacher Receives Award

By Juanita Polegi, P Ag

SSCA Conservation Agrologist

Doug Ingham, a teacher at the Yorkton Regional High School, recently received the "Outstanding Ag Ambassador Award" from Agriculture in the Classroom. For several years, Doug has been teaching the Agriculture class to Grades 11 & 12 students. An innovative teacher, Doug has utilized the knowledge and expertise of several local area agrologists, to enhance his classroom presentations. The SSCA has been included in this list of guest presenters. In fact, for the past few years, David Struthers of Winter Cereals Canada and myself have taken Doug and his students on a bus tour around rural Yorkton to show them examples of soil degradation and conservation. I've then followed up the tour with a slide presentation and discussion in the classroom.

The SSCA congratulates Doug on his award and trusts he will continue to teach such an important subject to the students at YRHS.

For more information about the Agriculture class, contact Doug Ingham at the YRHS (786-5560).