The Newsletter of the Saskatchewan Soil Conservation Association

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Farmers Helping Farmers - At the Kitchen Table

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SSCA Executive Manager

I have learned at least one thing over my career in agriculture (almost 20 years now which means my kids are probably right when they say I'm not as young as I think I am). When looking for crop production information, farmers trust other farmers as much or more than those of us in the agrologist profession. Researchers and extension workers rank up there pretty high as do most farm input retailers. Chemical reps can rank anywhere from just below the former group to right near the bottom when the only time a farmer calls you is after he has read the label and loaded the 12 gauge. Being a former chemical rep I can truthfully hold this opinion. But knowing that farmers get a lot of information from other farmers has made us at the SSCA very aware of the need for our programs to accommodate this farmer to farmer dialogue.

Currently the SSCA has a program in place called *Farmers Helping Farmers.* It is a data base of information from our members that includes their experiences with various seeding machines, openers, crops, rotations and other soil conservation practices. This information is available to any member or interested farmer who is seeking information on soil conservation or direct seeding. Often we are called by farmers who are looking for someone who can give them first hand experience on one of these topics. As our membership grows and the word spreads of the existence of this service we feel the information transfer between farmers will only get better.

This fall the SSCA will initiate another program designed to put farmers together in a very informal setting to foster the free flow of information. The program is called the *Kitchen Table Program* which aims to link those farmers with direct seeding expertise with those who seek this information. The setting will be around the kitchen table at the home of a farmer with the expertise. An SSCA soil conservationist will be present (as will be other specialists where requested) to facilitate the meeting and provide technical information on whatever topics are discussed relating to direct seeding. In this way we hope to see more farmers adopt the practice of direct seeding on at least some if not all of their cultivated acres.

Although next spring is a long way away we hope the kitchen table program will carry on into the growing season. Our plan is to have some of these groups get together again to visit fields that have been seeded using suggestions from the winter group discussions. Thus the crop production and soil conservation results from the information passed on in the winter sessions can be seen first hand and adopted to other operations during the next season.

Farmers on the prairies have a long tradition of helping other farmers to be successful in their operations. We at the SSCA will build on this tradition to help all farmers in their production

operations while at the same time encouraging the protection of our soil resource and our environment for the benefit of future generations.

Making Winter Cereals Happen

By Lee Moats, Sask. Winter Cereal Growers, and Farmer, Riceton

'Making Winter Cereals Happen' may sound like an off-beat title for an article on winter cereals in rotation but there's a good reason for the title. Regardless of how much information is provided on technical matters, the biggest, most important factor in using winter cereals in rotation is simply to make up your mind and make it happen.. Winter cereals are not going to work if left up to chance. You have to plan well in advance, you have to be organized, and then you have to make it happen.

Planning is the key element to any crop rotation, but with winter cereals you have to place more emphasis on the time management portion of your plan. The single most important step in making winter cereals happen is the planting of the spring crop on the field where your winter crop will go. Although planting fall rye on summerfallow and winter wheat and winter triticale on chem-fallow is a recommended practice, this article is entirely focused on stubble planting as I am not a fallow enthusiast.

While the exact date varies by location, September 1 is a good planting date to shoot for over most of Saskatchewan. Having a field ready in time might happen by accident but it happens a lot. It's better if it isn't left up to chance. That means seeding the spring crop early and planting crops that will mature in time. Good choices are barley and Polish canola sown first thing in the spring. Flax can also work if planted in late April or early May. Research by Guy Lafond at Indian Head has proven that flax is very resistant to spring frost and flax will mature in time if you plan it that way.

The time management doesn't stop with crop selection. It also helps to arrange your spring planting so harvest is staggered somewhat. If your early maturing crop is sown early in preparation for winter cereal seeding and then you move to a later maturing crop, you can end up with a window of time during harvest to plant your winter cereal.

The next step in managing time for winter cereals is to get your seeding equipment ready for seeding immediately after seeding. Now that's not a type-o. If you make sure your seeding equipment is serviced and repaired after you finish normal spring seeding, it will only need a quick check-over in the fall before it goes to the field. The harvest period is busy enough without having to include drill maintenance and repair.

The hardest part of time management for winter cereals comes when the great spring plans don't work out and you find yourself in harvest mode and its seeding time. Sometimes compromises can't be made and harvest operations have to come first. After all, getting this years crop in the bin tends to be a bit more important than planting next years. One method of overcoming this is to seed when it's too tough to combine. This works well if you're not using your tractor to pull

the pull-type combine and if you can muster the mental energy to be doing two main jobs at one time.

Some other time related items you will want to consider are:

- Get your clean seed in position as early as possible by lining up next falls seed right now.
- Get your fertilizer in the bin at home before your seeding day arrives.
- Figure out how you are going to get the fertilizer and seed to the field during harvest. You will want to account for the unexpected such as having a truck tied up with a load of something when you want to seed. If you use an air-seeder and are planting a field close to the yard you can fill with seed and fertilizer at the bin.

Making winter cereals happen on your farm will take some effort. In my experience, the first couple of times can seem overwhelming. But once you get it figured out, the whole process becomes automatic and surprisingly easy. Not only that, but the biggest part of time management comes the next year when you start the winter wheat harvest before anything else is ready to go.

While time management seems like an obstacle to making winter cereals happen it really isn't one at all. It's one of the very large benefits of fitting these crops into your rotation. I haven't even mentioned that you don't have to worry about wheat midge, that spring annual grassy weeds (wild oats, etc.) aren't much of a problem or that you can get some very large yields of both bushels and dollars with winter cereals.

Economics of Zero Till Canola Production

By Marvin Fenrich, SSCA President

Another crop has been harvested and in a few short months we will be focusing our efforts on the 1996 growing season. In northwestern Saskatchewan, there are many farmers who will want to forget 1995. The 1995 growing season was one of the driest on record and personally saw some of the worst crops in 20 years. In the agriculture business there is always something to learn and this year was no exception. The most important management tool in 1995 was "MOISTURE MANAGEMENT". Those who wasted moisture early in the season paid dearly. Those who practiced zero tillage were surprised with the yields of some crops.

In this issue, I promised to continue my discussion comparing the economics of canola production on stubble vs. summerfallow. I also promised to share the results from our farm for the comparison. I will look at the costs between the two systems as accurately as possible. I am not an economist, so please don't throw the baby out with the bathwater if you don't agree with my numbers.

We presently farm as a family unit that has five family members with about as many ideas of what the best rotation is. We run a minimum till and a zero till system and are in the process of trying to pick the best one. All of my land base is zero tilled and in my view it is the way to go in the dark brown soil zone. Moisture is always the limiting factor and this year it certainly limited yield across the region. Summerfallow canola this year looked much better on our farm throughout the growing season but at the end of the day the yield was not substantially better. I feel that during years of reasonable commodity prices summerfallow is not as profitable as most have come to believe.

95 Precipitation	
April	0 mm
May	20 mm
June	25 mm
July	47 mm
August	50 mm (helped late crops)

Economic Analyses of Zero Till vs. Minimum Till Summerfallow Canola

Zero Till Costs						
Direct Cash Operating Costs	**Wheat**	**Canola**	**Wheat**	**Peas**	**Wheat**	**Canola**
Machinery operating and Depreciation						
Pre Seeding Burnoff	2.00	2.00	2.00	2.00	2.00	2.00
Air Drill Seeding	6.80	6.80	6.80	6.80	6.80	6.80

In Crop Spray	2.00		2.00	2.00	2.00	
Pre Harvest Roundup Spray	2.50		2.50	2.50	2.50	
Swathing	5.00	5.00	5.00		5.00	5.00
Combining	9.25	9.25	9.25	11.00	9.25	9.25
Fall Spray or Spread Gran. Herb.	2.60		2.60	2.60	2.60	
Sub Total	**30.15**	**23.05**	**30.15**	**26.90**	**30.15**	**23.05**
Inputs						
Chemicals - Roundup @ ..5-.75 L ac.	4.50	6.75	4.50	6.75	4.50	6.75
broadleaf in-crop	4.50	13.20	4.50	10.00	4.50	13.20
grassy weeds in-crop and (spot spray canola)	12.00	(1.50)	12.00	15.00	12.00	(1.50)
Roundup pre- harvest @ 1L every 2 yrs	4.50	4.50	4.50	4.50	4.50	4.50
Fertilizer - Nitrogen @ .30 lb.	12.00	21.00	12.00		12.00	21.00
- Phosphate @ .34 lb.	5.10	5.10	5.10	5.10	5.10	5.10
- inoculant				2.60		
Crop Insurance	1.26	3.43	1.26	2.21	1.26	3.43
Hail Insurance	2.21	4.96	2.21	6.62	2.21	4.96
Sub Total	**46.06**	**60.44**	**46.06**	**52.78**	**46.06**	**60.44**
Total Costs	**76.21**	**83.49**	**76.21**	**79.68**	**76.21**	**83.49**

Minimum Till Costs - No Field Pea Production						
Direct Cash Operating Costs	**SMF**	**Canola**	**Wheat**	**Wheat**	**SMF**	**Canola**
Machinery Operating and Depreciation						
Pre Seeding Band Fertilizer			5.21	5.21		
Pre Seeding Harrow Pack			2.60	2.60		
Pre Seed Cultivate and Pack 2 x 4.30		8.60				8.60
Post Seed Harrow and Pack			2.60	2.60		
Seed - Airseeder with Sweeps			5.21	5.21		
Seed - Hoe Drill (Canola)		7.00				7.00
Fall Spread Herbicides			1.75			
In Crop Spray			2.00	2.00		

Summerfallow and Fall Spray	4.00		2.00	2.00	4.00	
Cultivate Summerfallow - 4 x $3.90 ac.	15.60				15.60	
Swathing		5.00	5.00	5.00		5.00
Combining		9.25	9.25	9.25		9.25
Sub Total	**19.60**	**29.85**	**35.62**	**33.87**	**19.60**	**29.85**
Inputs						
Chemicals - roundup @ 1 L/ac.	8.70				8.70	
- in crop broadleaf			4.50	2.50		
- in crop grassy		15.50		12.00		15.50
- SMF (spots) thistle control	1.50				1.50	
- SMF fall winter annuals	1.50	1.50	3.30	3.30	1.50	1.50
Fertilizer - Nitrogen @ .30 lb.		6.00	15.00	15.00		6.00
- Phosphate @ .34 lb.		5.10	5.10	5.10		5.10
Crop Insurance		4.50	1.26	1.26		4.50
Hail Insurance		4.96	2.21	2.21		4.96
Sub Total	**11.70**	**37.56**	**31.37**	**41.37**	**11.70**	**37.56**
Total Costs	**31.30**	**67.41**	**66.99**	**75.24**	**31.30**	**67.41**

Yield and Gross Returns - Five Year Average

	Ave Yield	Our 95 Yield	Ave. Prices	95 Prices	Ave. Return	95 Return
Wheat - ZT	36	27	$ 3.50	$ 5.50	$126.00	$148.50
Wheat - MT	36	25	"	"	126.00	137.50
Wheat - Conv.		20 (area)	"	"		110.00
Peas - ZT	32	28	5.00	5.50	160.00	154.00
Peas - MT	32	15	"	"	160.00	82.50
Peas - Conv.		10 (area)	"	"		50.00
Canola - ZT	22	26	6.50	8.00	143.00	208.00
Canola - MT	20	17 (area)	"	"	130.00	136.00
Canola - Conv. SMF	29	31	"	"	188.50	248.00

Summary of Net Returns

Zero Tillage

Crop Rotation	Ave. Return	95 Return	Costs	Ave. Net	95 Net
Wheat - ZT	126.00	148.50	76.21	49.79	72.29
Canola - ZT	143.00	208.00	83.49	59.51	124.51
Wheat - ZT	126.00	148.50	76.21	49.79	72.29
Peas - ZT	160.00	154.00	79.68	80.32	74.32
Wheat - ZT	126.00	148.50	76.21	49.79	72.29
Canola - ZT	143.00	208.00	83.49	59.51	124.51
Six Year Average Net Returns				58.11	90.03
Minimum Tillage					
SMF - MT	0.00	0.00	31.30	(31.30)	(31.30)
Canola - SMF	188.50	248.00	67.41	121.09	180.59
Wheat - MT	126.00	137.50	66.99	59.01	70.51
Wheat - MT	126.00	137.50	75.24	50.76	62.26
SMF - MT	0.00	0.00	31.30	(31.30)	(31.30)
Canola - SMF	188.50	248.00	67.41	121.09	180.59
Six Year Average Net Returns				48.22	71.89

Conclusions:

The numbers that I have put together can be a starting point to consider looking at your own farms present costs and returns. I have not included any fixed costs or costs to convert to a new equipment base so you will have to consider these costs into your scenario. The cost of soil degradation on summerfallow has not been taken into consideration . The road to improving soil quality is sometimes longer than we would like but I can assure you that it will not take many years to see improvements in soil tilth. The challenges in zero till are many but after only a few years I find that most weed control problems can be overcome. The technology now available for zero till farming has greatly improved the chances of returning profits to your operation. Find a successful zero tiller in your area and talk with him as I am sure he will share his experience with you.

I now feel more confident that summerfallow in the rotation is not as profitable as a diverse rotation that includes legumes. Stubble canola is a challenge but with proper seed placement and fertility along with good weed control and trash management you can grow respectable crops even in the dry years that we have experienced. Moisture is a valuable resource and every effort must be made to collect and conserve every drop in order to have a chance of succeeding in stubble canola.

Take the time this winter to attend a conference in your area discussing alternative farming systems since this is the best way to start the learning process. Also try to attend a direct seeding

field day or a neighbor's farm as this will also help you sort through the many alternatives. Thank-you for your time and I hope these articles have helped you.

Direct Seeding Requires Adjustments

by Bob Linnell

SSCA Soil Conservationist

Ed Douglas has always enjoyed a challenge. Farming a fairly large tract of land in heavy clay soil conditions is one of those challenges. Ed and his wife Elaine farm in the McTaggart area of Saskatchewan, and have witnessed the changes in operating techniques of their neighbors and friends. Ed learned early from his father Don, not to be just a follower, but a leader. Ed was educated in engineering at the University of Saskatchewan and worked for a time in Manitoba, before coming back to the family farm.

They tried continuous cropping before many others in the area. Neighbours watched their practices with some skepticism. Eventually, many neighbours adjusted their thinking. They attempted many new specialty crops with varying degrees of success. They always thought a good rotation helped the soil function better. This began rebuilding the organic matter in their soils.

Soil health and management became the main focus of the farming operation. Economic health and realism were always in the forefront of decisions made concerning the farm and so the gradual accumulation of a larger land base proceeded. The family was also growing and eventually found employment opportunities off the farm. This left Ed and Elaine with time management problems involving the logistics of covering the land in a timely fashion.

One son is now a veterinarian, another son is an Ag. Engineer, and the daughter is a lawyer. All this combined with Elaine working actively as a Registered Nurse and doing farm work put even more pressure on the farm. Meanwhile Ed continued to increase his computer business and sit as a director of the Weyburn Inland Terminal.

Something had to change and seeding seemed to be the logical conclusion. For many years, they fall banded liquid fertilizer and seeded the following spring with discers. This combined with the traditional harrow-resulted in an overworked seed bed, in Ed's opinion. His dad still preferred a "good black looking field" and didn't particularly like the appearance of a crop emerging in a stubble row. He thought it looked as if nobody farmed there. The Douglas' always tried to achieve the maximum yield possible. Ed decided after choosing a Flexi-Coil Air Drill that he wanted to modify the unit to allow for additional liquid fertilizer to be applied mid-row. This was supported by the fact they already had large tanks on the farm to serve the fertilizer availability and form they wanted. So Ed's engineering thinking came into play again. He had a separate cruiser tank and pump system manufactured to properly place the amount of fertilizer where he wanted and still do the seeding operation in one pass. This can be managed by basically one person with a trucking assistant.

The neighbors are still watching them closely and wondering how they achieve the yields. Change has not been without some difficulties, but Ed and Elaine are comfortable with their operation as it stands. This past year they put it to the test by taking on some more land in the area. It was a challenging year with somewhat delayed seeding because of excessively wet, cool conditions and an even larger land base. The family was able to give some fall harvesting help and everything turned out pretty good at the end of the day. Ed will always be prepared to adjust and progress to achieve good sound goals that suit their farm plans.

You can contact the Douglas' at McTaggart 306-842-7133.

The Only Way To Go!

by Bob Linnell

SSCA Soil Conservationist

You just have a natural liking for Jim and Lois Watts the first time you meet them. They are a quiet couple, who have lived in the Weyburn area most of their lives and have been increasing the size of their land holdings over the years. About 5 years ago, there was a transition in Jim's life when the kids grew up and left home for other job opportunities. There was a lot of land to cover and the farm needed a few things to be able to meet the challenges of the nineties. Lois had always taken an active part in the farming operations, so the discussion turned to matters of how to take advantage of opportunities for expansion and improve the farm for the future.

Seeding took a big part of the discussion and since Jim had been following the trend of direct seeding, they decided to take a good close look at whether this was the way they wanted to upgrade from their present method of seeding. They were seeding with discers and then harrow-packing at least twice to firm up the ground to allow healthy plant growth. Jim spent his dutiful hours on the 4 wheel drive with forty-eight feet of discer behind and Lois spent an equal amount of time following up with the big harrow- packer unit. Lois' penchant for straight tractor marks in the field was really tested in some of the wetter years in the heavy clay soils when sloughs formed in the middle of perfectly manicured fields. Jim took in two events one year that probably changed the way their farming proceeded forever. The first was the SSCA direct seeding conference and annual meeting in Moose Jaw, and the second was the SSCA direct seeding field day, also in the Moose Jaw area.

He went home and worked through the farm economics picture on his computer, talked about it with his friends in the local marketing club. He thought about the benefits offered by direct seeding with a reduction of field operations and the feature of seeding completely in one pass. They then decided to move to a direct seeding machine. They chose a Morris Maxim air drill and traded in the discers and sold the harrow packer setup. They also upgraded their sprayer to deal with proper weed control by allowing for timely pre-seed spraying. They chose a 120 foot machine with wind screens to remove uncertainty over marginal spraying conditions and improve their window of application. They also knew the importance of adequate straw and chaff spreading and made sure the combine had a Straw Storm in good working condition, and they added a spin chaff spreader.

The thought of purchasing all this new equipment and going away from their old system gave them a few gut wrenching sleepless nights. After the first harvest yields were safely stored in the bins, they were convinced this was the way to go.

An opportunity came up in the next year to rent a large tract of land right next door to their home farm and they seized the chance. They dropped their lease on some previously rented land so they would not be overburdened and set out to make the most of this new and bigger challenge.

They were clever enough to enlist some custom help where needed, but dealt with nearly all of the operations themselves.

Now they have a different problem; there is so much more grain to haul per acre of farm operated, but Jim thinks he has a solution to that one. He smiles a lot.

You can contact the Watts' at Weyburn: 306-842-5056

Feeding Chaff Fits With Direct Seeding

By Garry Mayerle

SSCA Soil Conservationist

"Collecting chaff makes direct seeding easier," says Ed Beauchesne, North East Director for SSCA. Ed has been collecting and feeding chaff for 5 years, and sees some great benefits for his farm operation.

Ed, Marguerite and their family farm at Albertville. They started toying around with direct seeding in 1989 and went into it full force 4 years ago. Knowing that chaff management was necessary to make direct seeding work they decided to go the route of chaff collection rather than spreading. They put a chaff blower and wagon on their combine the year before they started using their air drill. Ed is sure that getting the chaff off the field reduces his weed problems. "Over time it's a clean up operation," he says.

They see some real savings feeding chaff in their backgrounding operation. This year 85% of the roughage they feed will be ammoniated chaff. On top of this they feed rolled grain and supplements. This year with the price of feed up they hope to buy a cleaner and feed screenings as well. Buying 500 lb. calves in November, they have averaged 1.75-2 lb/day rate of gain over the winter. Ed says one of his neighbours who runs a cow-calf operation is actually selling good hay this year because he can replace most of the hay he would normally feed his cows with ammoniated chaff. As far as feed quality goes Ed has found that ammoniated flax chaff is the best chaff for feed, high in protein and very palatable. Oats chaff is the next best followed by wheat and barley. After ammoniation, feed testing has shown his chaff has 14-24% crude protein. A Sask. Ag and Food bulletin, Potential of Chaff, states that ammoniated chaff, "could contain from 8-12% CP and from 43-54% TDN...similar to a medium quality hay."

Ed picked up a used blower and wagon for a $1000 when he first started. Another $2000 and labor converted a Mckee Stack'n'Mover blower into a vacuum to pick up piles. The last $1000 and labor was spent on a top for his grain truck.

The process to ammoniate the chaff is not very complicated or expensive. It cost Ed about $10 per tonne of chaff for the ammonia last year. He gets the moisture content of the chaff up to 25% by spraying it with water as a payloader piles the chaff into 50ft. wide piles about 9ft. high. This moisture content and a high temperature are needed to get a good reaction during ammoniation. Representative loads of chaff are weighed so that an accurate approximation of the amount of chaff can be made. In 4-5 days the chaff has started to heat and 3.5% ammonia by weight is shanked in. This is accomplished with a 24 ft. 2in. steel pipe with 3/16 in. holes drilled every 2ft. along the length of the pipe. One end of the pipe is tapered to a point and the other end is fitted to a tractor so it can be pushed into the bottom of the stack parallel to the ground. Fittings for an anhydrous nurse truck are also tied into this end. This probe is pushed into the chaff to the center of the 50ft. wide stack every 4ft. along each side of the stack. The calculated amount of ammonia

is applied at each probing. Ed says, "even if you can't get a nurse truck to meter the ammonia you can use a nurse wagon and time valve openings to apply the correct amount of ammonia. With this technique the ammonia probe is applied to within every 2 square feet of stack. The ammonia stops the spoilage and kills any viable weed seeds. Remember the dangers of working with ammonia and be sure you have taken adequate protection against any mishaps.

Ed feeds these piles free choice moving an electric wire into the stack as the chaff is eaten. He combines back and forth, and dumps the chaff wagon at either end of the field to make pick up easy. Canola is the only crop in which he might not make a 1/2 mile per wagon. He dumps the wagon on the go and is very pleased with the low maintenance of the blower and wagon.

If you are operating a mixed farm and some of your potential grain producing acres are being used to produce hay, there should be a good opportunity for feeding ammoniated chaff. As Ed says, using chaff will not guarantee you a profit feeding cattle, as he found out in the backgrounding industry last winter, but it could at least reduce some feeding costs. For more information on feeding ammoniated chaff see: *Potential of Chaff* by Saskatchewan Agriculture; *Ammoniation of Straw and Chaff* put out by the University of Saskatchewan or talk to Ed and Marguerite Beauchesne. Ed also says that he got a lot of good help from Leo Redekop of Redekop Chaff Systems.

Dandelions and Direct Seeding

By Ken Sapsford

SSCA Soil Conservationist

A weed that is showing up more and is being blamed on direct seeding is dandelion. This weed is well adapted to field conditions when there is no tillage. In order to set a management practice to control dandelion in a direct seeding system we must first understand it's growing habits.

Dandelion is a perennial that grows from a taproot many feet long. It reproduces from seeds to produce new plants while the original plant sends up new shoots from the root crown. The seeds are produced throughout the growing season and germination of these seeds can occur anytime throughout the summer. At any particular time of the year you may have newly germinated dandelion plants less than 1 inch in diameter as well as large perennial plants greater than 1 foot in diameter. Once dandelions have developed into a large perennial plant, shallow tillage will not control them. All that happens is the top of the plant is cut off and it regrows from the crown.

In a direct seeding system your control options are: Preseeding, Incrop, Preharvest and Post harvest.

Preseeding: Rob Neyedley, Product Development Representative from Monsanto, has been looking at rates of Roundup required for dandelion control. He has found that 1 litre per acre of Roundup as a spring preseeding treatment gave good control of dandelions up to 6 inches in diameter. When he added 2,4-D amine at 6oz. active/acre he did not see any increase in control. Neyedley also used 1 litre of Rustler, this is the same as 0.4 litres Roundup + 2 oz active Banvel per acre. This treatment gave unsatisfactory control, less than 50%. Spring rates of 1.5 - 2.0 litres of Roundup per acre were required to get any control of the dandelions larger than 6 in. in diameter.

Incrop: Topgrowth control or suppression can be achieved in cereal crops with 2,4-D or MCPA. However there is no registered control for dandelions in pulse crops, oilseed crops or other specialty crops.

Preharvest: Roundup at 1 litre per acre provides excellent control of dandelions, 87%, 10 to 12 months after treatment, according to Monsanto's research. At the Indian Head Experimental farm Dr. Doug Derksen found similar results. Using preharvest Roundup at 1 litre/ac. on lentils and wheat in the 1992, 1993 and 1994, he achieved a 90% + control. When he added a postharvest 2,4-D application he showed an improvement in control of close to 100% the following spring as this would control late germinating seedlings. Both Derksen and Neyedley found reduced control in crops with a heavy canopy. Neyedley recommends the use of water volumes of 7 to 10 gal/acre when spraying cereals or canola with heavy canopy cover. This will improve coverage of the Roundup and improve control of the dandelions.

Post Harvest: Dandelions are a low growing plant and are usually not disturbed with swathing or combining. Most of the leaves are still intact after harvest and Neyedley has found excellent control with 1 to 1.5 litres per acre of Roundup in a postharvest application, providing the plants are not covered with dust or straw.

If dandelions were not controlled this fall the following steps should be taken next spring on your direct seeded fields.

1. Preseeding Roundup at 1 litre/ac.
2. Plant a competitive cereal crop and use an incrop treatment to control topgrowth.
3. Pre or Post harvest Roundup at 1 litre/ac. followed by 2,4-D late in the fall to control late seedlings and other winter annuals.

This may be a bit costly in the first year, but once we get the large plants under control the smaller ones that are usually seedlings are not as tough to manage. Spring applications of 0.5 to 0.75 litre of Roundup per acre should control seedlings less than two inches in diameter.

Beware of Foxtail Barley in Zero Tillage

By Dr. Brian McConkey and Marty Peru,

Semiarid Agricultural Prairie Research Centre

Complete zero-till cropping in the Brown soil zone is difficult because of the potential weed problems with foxtail barley (also called wild barley). Foxtail barley is the greatest production challenge faced when we eliminate tillage and seed directly with low-disturbance drills. Once foxtail barley is well established in a field, zero tillage wheat production becomes much less profitable than conventional-tillage management systems because of the high cost of chemical weed control. The Swift Current Semiarid Agricultural Prairie Research Centre has grown spring wheat since 1982 with conventional, reduced, and zero-tillage in a two-year rotation with fallow and a continuous rotation. Each rotation and tillage management system exists on a sandy loam, silt loam, and heavy clay. When tillage was eliminated, foxtail barley became a serious problem within two to four years after initiation of the studies. This occurred in both rotations on all soil types. Being shallow rooted, foxtail barley is readily controlled by tillage. Thus, it is usually not a problem weed in either the reduced or conventional tillage systems. Foxtail barley is a short-lived perennial which is very competitive. It is a prolific seed producer and the seeds can survive both in and on the soil for several years. The seeds are wind dispersed. There are no selective herbicides for controlling foxtail barley in a cereal crop. Spraying glyphosate (Laredo, Roundup, Victor, or Wrangler) in chemical fallow, or before seeding wheat, at 0.3 to 0.4 L of product per acre controls foxtail barley seedlings and often suppresses established plants. But, once foxtail barley is well established, chemical control is difficult. Glyphosate at 1.0 L per acre has provided good control of established plants in some years. In other years, especially when the foxtail barley is stressed, we have found control of foxtail barley to be difficult, even at higher rates of glyphosate. Problems with foxtail barley control are greatest in the Brown soil zone because this weed is often more drought stressed and thereby less susceptible to herbicide compared to other soil zones. In zero-tillage wheat production systems, we recommend that a routine preseeding application of glyphosate be used, even when there appears to be very few weeds, so as to control the difficult-to-see foxtail barley seedlings. Where foxtail barley is starting to move in from the field edges, tilling the outside of the field should be considered. Tillage every two to three years can be an economical way to control foxtail barley in a reduced-tillage wheat rotation. In a companion experiment, we have seeded stubble spring wheat, with and without preseeding tillage, in a wheat-wheat-fallow rotation. For the fallow phase of this experiment, we sprayed all the plots with a glyphosate-dicamba mix in late May and then tilled twice during the summer. These fallow operations kept the foxtail barley from becoming a problem while still providing excellent residue coverage for erosion control. Over the last four years, direct-seeded stubble wheat has averaged 10% higher yield than the stubble wheat which received preseeding tillage. This annual yield increase is explained by the better water conservation and lower evaporative stress provided by direct seeding. In contrast, our long-term zero-tillage continuous wheat system described earlier has yielded exactly the same as our conventional-tillage continuous wheat system. In these continuous wheat systems, we believe the competition from the foxtail barley which escaped control from the preseeding application of glyphosate erased the

potential yield advantage of direct seeding. The benefits of direct seeding, i.e. improved water conservation, minimal soil erosion, less labour and machinery operation costs, increased soil organic matter, and increased nutrient supplying power, are real and worth pursuing. However, diligent control of foxtail barley, possibly with the occasional use of tillage, is necessary to make direct seeded wheat rotations successful in the brown soil zone.

Don't Forget Herbicide Residue

by Garry Mayerle

SSCA Soil Conservationist

With the introduction of Pursuit, Muster, and Assert herbicides in the last few years the necessity for rotational restrictions because of herbicide residue became commonplace on many farms. There are a number of farmers who want a rotation that can remain somewhat market sensitive. However, changing some seeding intentions while running the drill could prove disastrous if you forget your herbicide residue restrictions. Direct seeders must be especially aware of these restrictions because they are always looking for more products to add to their arsenal against weeds.

Saskatchewan Agriculture and Food publishes a very good publication on herbicides every year. It used to be the *Weed Control Guide*. This last year they entitled it *The Crop Protection Guide*. It contains just about everything on the herbicide labels and more to help you make wise pesticide decisions. But, by the time farmers recuperate from seeding the rush to get spraying is upon them. At 4:00 a.m., the only thing they want to read is how many jugs to dump in the tank before the wind comes up. I know, I've been there. As direct seeders you are the farmers on the cutting edge. Get this guide before seeding and be up to date on any products you might use! Be especially aware of the recropping guidelines under the precautions section of each herbicide.

Herbicide disappearance is a complicated process, probably not entirely understood by anyone and more or less different for each herbicide group. Generally though the disappearance of a large portion of the herbicides we apply can be grouped into two modes. One of these is microbial degradation. Conditions such as soil moisture and temperature that influence microbial activity also affect herbicide persistence in the soil. Fig. 2 shows how temperature affects 2,4-D breakdown. A warm fall could really increase the time for herbicide breakdown A dry year will mean more herbicide carryover into the following year. (See Fig. 1) Light textured soils have less moisture holding capacity and therefore a greater potential to carry over herbicides than heavier soils. Fig. 3 shows carryover of Avadex and trifluralins over 8 years. Notice the differences, especially after a drought in 1980.

Most of the other methods of herbicide degradation can be grouped together under the heading: chemical modes of disappearance. Many herbicides become more or less tightly bound to soil particles. Some will never be released while others are slowly released to microbial decomposition. In these processes, soil pH and organic matter play an important role in the rate of disappearance of some herbicides. Degradation by sunlight and volatilization (escaping to the atmosphere as a gas) also play a part in the disappearance of some groups of herbicides.

For specific recommendations, make sure you consult your label or the crop protection guide. Probably the most important time to keep residue restrictions in mind are when making crop planting decisions. Herbicide records with specific locations are very important. When taking

over new land be sure to ask about herbicide residue. Here are some products with residue precautions on their labels. Restrictions apply to **2,4-D** and **Rustler** when used as a burn-off. **Ally**, **Muster**, and **Amber** breakdown is affected by soil pH. Cyanamid's **Assert** and **Pursuit** have soil zone restrictions. DowElanco's **Tordon 202-C** has long term restrictions for legume crops. **Lontrel** and **Prevail** also have legume recropping restrictions in the year following application. **Trifluralin** and **Avadex** have restrictions for canary seed and oats respectively. There are a number of number of weed sprays used on alfalfa that have recropping limitations. Also using some products within too close a time frame can create additive effects.

When spraying new products and products that might have residues, it would be well worth your time to leave a well-marked check strip to use next year. You may not even be aware that residue conditions are causing crop damage, without a check strip for a comparison. If you think you have a residue problem, be sure to get the company representative, and your Sask. Ag and Food soils and crops agrologist to look at the problem. You might even consider analyzing some plant tissue, if the cost can be justified.

Fig. 1 Breakdown of 2,4-D in moist heavy clay at 20^0C at different moisture levels.

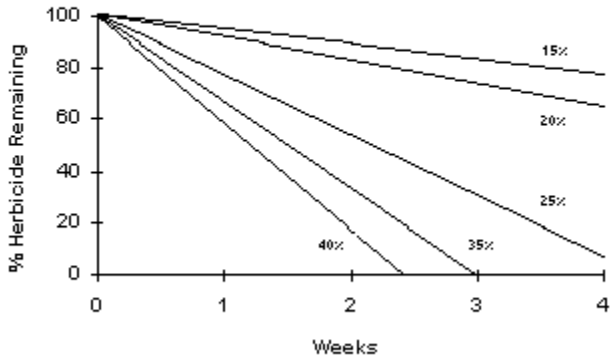


Fig. 2 Breakdown of 2,4-D in moist heavy clay at various temperatures

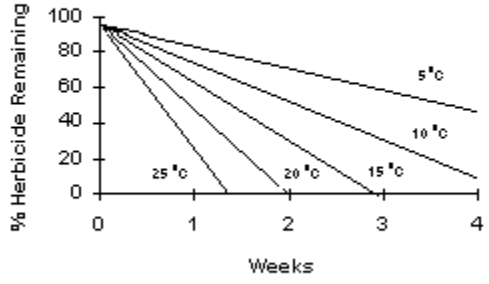
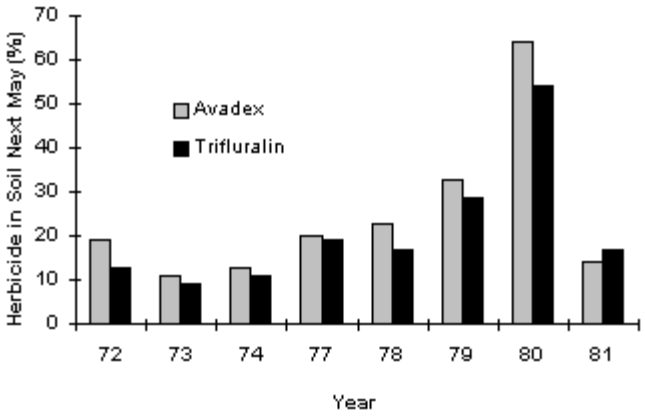


Fig. 3 Carryover of liquid Avadex BW and Trifluralin to the following year in heavy clay soil.



Heavy Harrow, Necessary or Not

By Ken Sapsford

SSCA Soil Conservationist

There has been a lot of interest in the heavy harrow the last few years and many farmers feel they are a necessity before they get into direct seeding. The main purpose of the harrow is to spread crop residue. If you have your combine set up with a good straw and chaff spreading system you may not need to harrow your fields**. The heavy harrow, like all harrows, will not spread chaff. This must be done with the combine.** If you need to spread the straw with a harrow, do it as soon as possible after combining on a hot fall day. The heavy harrow will spread the straw better than a conventional harrow, but you must ensure that it is set properly for your field conditions.

Dr. Bill Hamman, Research Manager at the Monsanto Farm at Lethbridge, says "The heavy harrow works well for managing residue and works well for shallow incorporation of Avadex, but both can not be done at once." When spreading straw the angle of the harrow should be set to allow the harrows to fill but clean evenly to avoid bunching. When incorporating Avadex or fortress they should be set fairly straight. When harrowing pulse stubble it can roll into large bunches under certain conditions. "If not used properly they (heavy harrows) can problems." Said Hamman.

If you were in an area with hail this year that flattened much of the crop, or there were other reasons the crop was unharvestable, then harrowing would be required. With the use of a heavy harrow "you can direct seed a field that you may not be able to otherwise," says Hamman.

Harrowing will also stimulate weed growth, that will be killed with a frost in the fall or can be controlled with a pre-seeding burnoff in the spring. The heavy harrow is not necessary for this as any harrow will do, including diamond, rotary, tine or oscillating harrow. If you are unable to seed low residue fields, canola, peas, lentils, etc., early, a spring harrowing may help to create a dust mulch on the surface to avoid excess moisture loss. Once again any harrow will do this and a heavy harrow is not required.

Terry Pearse has been direct seeding in the Tisdale area for many years. He uses the oscillating harrow in his direct seeding system. "There are four reasons I use the harrow: 1) I can start with a smooth field the next year, not only remove drill runs but also any mole hills that have sprung up over the summer. 2) It helps germinate any weeds and volunteer grain in the fall. 3) I get enough soil disturbance to allow a little black soil showing through to help warm the soil next spring. 4) An early spring harrowing on low residue fields will give me a dust mulch to help prevent moisture loss," Pearse explains.

The heavy harrow has some advantages over the other harrows. It has variable tooth angle and variable down pressure, so it can harrow very aggressively. Do not aggressively harrow on low

residue fields or light soil in the fall since the soil on these fields may blow all winter long if there is not adequate snow cover. "Management is the key. Every field has a different condition to deal with" says Pearse.

Tips on using the heavy harrow by Monsanto

Trash Management

- Allow harrows to "float"
- Set tooth angle to allow harrow to fill but clean evenly
- Front and rear tooth angle may differ to allow this
- High speed and dry straw allows good straw shattering
- Heavy canola stubble can cause bunching problems
- Gives soil-to-granule contact but no incorporation

Avadex BW & Fortress incorporation

- "easy on black(no residue) soil but more complicated with high trash"
- Set aggressive tooth angle
- All teeth should have same angle and pressure for uniform incorporation
- Apply maximum downward pressure to break soil crust for incorporation and speed soil warming
- Early harrowing and waiting 10-14 days allows Avadex BW transfer and stimulates weed germination for preplant Roundup

The heavy harrows on the market today do a good job of what they are intended to do. There are many direct seeders who do not own a heavy harrow and have been doing a successful job of it for many years. If you have a good straw and chaff spreading system and a seeding system that gives you very little plugging problems the heavy harrow is not necessary, except for those special problems like lodged crop. Harrowing a field in the fall or early spring is one of individual requirements depending on field conditions. There is no use burning fuel, harrowing a field that does not require it.

Look at the heavy harrow as another tool to use in your operation, it is not required by all, but it may fit into your plans.

Farmers and the Internet

By Eric Oliver

SSCA Soil Conservationist

An ongoing problem to farmers has been trying to keep up to date in a rapidly changing agriculture. At the same time, obtaining relevant information has become increasingly more important as farmers face new challenges in their farming operation. These challenges may include new crops, marketing off-board crops, weed control in direct seeding, etc.. Traditionally, farmers have relied on farm magazines, extension agrologists, etc., for the bulk of their information and these sources will obviously continue to be important. More recently, however, the electronic age has allowed farmers with a computer and a modem, to access a variety of information. A good example of this is FBMInet. There are also very specialized, subscription-based services such as DTN and Global Link. These two market oriented services require a satellite hook up and specialized equipment to download information.

The latest trend in electronic information transfer is the Internet. Although there has recently been an explosion of people accessing and "surfing the net", the Internet has actually been around for over 25 years. For those who are new to the net or are thinking about joining the "Information Highway", it can be a little intimidating. There are virtually millions of documents on the Internet. Finding something of interest and relevance to you can be a challenge. Although there are so called "search engines" that are simply electronic indexes (just like in a library), the amount information one can access is simply mind boggling. Also confusing, are the search engines have rather bizarre names like Web Crawler, Lycos, Gopher, Archie, Veronica, etc.. In addition, their ability to search for a specific item may not overlap with each other. Another problem is that information is constantly being added and deleted from the Internet on a daily basis.

There has not been much ag-related information on the net that had much relevance to farmers in Saskatchewan. However, this has changed in the past few months and continues to improve. Although the amount of information relating to agriculture is steadily increasing, certain problems remain for rural areas. One problem is the line charges and packages still tend to be higher in rural areas as compared to the primary urban areas. Another problem, which relates to line charges is the amount of time involved when making extensive searches for information. The more time spent making searches, the more the line charges will be.

With the increased interest in Internet, there has recently been some activity in reducing the necessity for each individual to make extensive searches. The Extension Research Unit of Saskatchewan Agriculture and Food have developed a booklet called The Internet "Agriculture Magic Bus" Directory. This booklet contains a wide variety of Internet addresses the individual can use to contact directly. There is also a brief description of what information the user can expect to find at that address. This provides an important shortcut for users. The 31 page booklet is available at your local Rural Service Centre. The booklet covers a variety of Agriculture-

related topics such as; general agriculture, biotechnology, weather information, market information, extension articles, livestock, horticulture, libraries, educational information for schools, agricultural magazines, statistics, and even shopping. For example, an address that would link you to the Winnipeg Commodity Exchange would be http://www.ifas.ufl.edu/WWW/AGATOR/HTM/AGMARKET.HTM. Note that addresses are case sensitive, therefore, must be typed in the correct case.

Agriculture and Agri-Food Canada are undertaking a pilot project to develop a national directory that can be accessed through the Internet. This directory of Canadian sites can be accessed at the following address: http://actest.agr.ca/agriweb/agriweb.htm.

Various software programs can be downloaded as well from various locations. For example, the September issue of the Country Guide had a listing of several programs in its home page. Some of these programs include CROPCOST, COWCHIPS, CROPPLAN, and FETBLND. Some of these programs are only demos of the original program, but it will give you an idea if you feel the program is worth purchasing. The address to this site is: http:www.mbnet.mb.ca/~wilkins.

PARI (Parkland Agricultural Research Initiative) have research information from Agriculture Canada Research Stations in Alberta and Saskatchewan. Their site is located in the text-based Gopher system and the address is: gopher://paridss.usask.ca

SSCA has also entered the information highway. The text-based page includes past issues of the Prairie Steward and proceedings of the last two SSCA Annual Conferences. The address for the SSCA Page is: gopher://logic.uc.wlu.edu:30002/7?paridss. Our page is found in the PARI directory.

Ultimately, the Internet should be looked on as another source of information the farmer can now access. In most cases, the information you can access will be free (except for line charges). However, in some cases, certain information like detailed commodity market quotes may have a subscription fee before you can access the information. Undoubtedly, the amount of agricultural information coming onto the net that is relevant to the prairies will greatly increase in the near future.

How much use farmers will get out of the Internet will depend on their needs and in some cases their demands for certain information. Navigating the maze of information that is on the Internet is now being made easier by various groups who are compiling directories of agriculturally related addresses. Hopefully, these groups will continue to update the directories on a monthly basis in order that we can be kept up to date in this rapidly changing medium.

Happy motoring on the Information Highway!

PRETTY DEADLY --Purple Loosestrife Watch

By Juanita Polegi

SSCA Soil Conservationist

The European settlers brought to North America determination, a desire for a better life and a whole bunch of purple loosestrife seeds. While we admire our ancestors for their tenacity and understand their desires, we are justified in wishing they had left the loosestrife in the homeland.

Purple loosestrife (Lythrum salicaria) is beautiful to look at but is deadly to riparian areas and waterways. Purple loosestrife is capable of producing over 2 million seeds per year that are easily transported through water bodies. Upon reaching land, the seeds germinate quickly and compete with the native plants. Once established, the purple loosestrife chokes out the native vegetation. Unlike native vegetation, purple loosestrifedoes not provide shelter and food for wildlife.

Purple loosestrife is a noxious weed in Alberta and Manitoba. Len Juras, weed control specialist with Saskatchewan Agriculture and Food says, "While the weed hasn't yet received that designation in Saskatchewan, it's important for landowners to watch for purple loosestrife around their water bodies." Lyle Saigeon, a biologist with Ducks Unlimited in Regina says, "Although the plant is in the Wascana area, the City of Regina is working to control it." He adds that a number of agencies are working to inform home owners of the nature of the plant and encourage them to rid their gardens of it. The cultivars sold by nurseries to gardeners are supposed to produce only sterile seed. However, there is some evidence that the cultivars can cross pollinate with the wild plants and produce viable seeds. Again, the City of Regina is doing its part by eliminating the plant from its flower beds.

Both Saigeon and Juras urge anyone who spots the plant near a water body to contact their nearest Rural Service Centre or Ducks Unlimited office. The plant is easily recognized by its long, pink flowers and tongue shaped leaves that are attached to a tall, erect, square stem. At this time, as there are no herbicides registered for purple loosestrife control, the most effective method of control is to pull the weed by hand.

An invasion of purple loosestrife does not have a direct impact on cultivated land. However, as members of the SSCA, we should all be aware of those plant species that inhibit the diversity of species in a given ecosystem. Purple loosestrife can ruin our wetlands. If you discover a plant that looks suspicious along your pasture's creek bed or in the coulee, report it as soon as possible. For more information on purple loosestrife, contact your local DU office.

Producers and Endangered Species: Same Side of the Fence

by Cynthia McDougall

Endangered Species Coalition

Have you ever seen a swift fox on your land? How about a ferruginous hawk? You probably haven't -- most Canadian farmers haven't, and likely won't. These are two of Canada's 243 species now at risk of extinction. Although rarely seen, they are key players in the web of life. They make up ecosystems which maintain ecological functions, and provide medicines such as cancer-fighting drugs, and genes which protect agricultural crops from pests and disease.

More so than most other Canadians, farmers understand the land and the value of protecting ecosystems. While they have acted on this for a long time, the government has only begun to do so recently. Until now Canada has not had national legislation to protect endangered species. And as a result, our country has lost 20 species, and has allowed hundreds of others to move towards extinction. Now, urged on by a groundswell of public support for endangered species legislation at the national level --over 80, 000 names on a petition, and thousands of letters to Ottawa -- the government has released a *draft* version of endangered species legislation. Unfortunately, because of several overwhelming weaknesses, the draft bill puts Canada at risk of completely missing its goal of protecting endangered species. The bill neither protects species at risk on public lands, nor does it support farmers' important stewardship efforts.

UP TO THIS POINT:

Many people believe that Canada already has endangered species legislation because it has an official list of species at risk. The problem is that even once listed, species receive no legal protection. As Stewart Elgie of the federal Task Force on Endangered Species puts it: "That's like a hospital that registers their patients, assesses their needs, but doesn't treat them". Beyond that, only four of our twelve provinces and territories have any kind of endangered species legislation at all, and theirs are all ineffective in a number of significant ways.

The result is that efforts to protect species at risk have been on a piecemeal basis. Farmers have been the key players in many of these efforts. They have protected riparian areas, grown cover crops, and set aside critical habitat. In doing this farmers have helped to protect ecosystems and species at risk from coast to coast - from wetlands in the east, to the burrowing owl in the west.

There are two serious problems, however, with Canada's piecemeal approach to protecting species. The first is that many of farmers' stewardship efforts have been uphill struggles. Farmers' efforts have been discouraged, or even thwarted, by disincentives and the lack of positive incentives and assistance. The farmer who sets land aside for conservation purposes is still forced to pay tax on that land. Why shouldn't he or she be given a serious tax break? Policies

encourage farmers to drain wetlands and to cultivate marginal lands. The farmer may benefit here (in the short term), but the environment loses, permanently. Policies that benefit both the farmer and the environment are very hard for interested farmers to find. The popular Permanent Cover Program was a good example of this kind of program.....but it has recently gone the way of the passenger pigeon.

The second problem with Canada's approach is simple: it's not working. We're losing species far faster than we are saving them. Since 1988, only one species -- the prairie long-tailed weasel -- has been taken off Canada's list of species at risk, and only two have improved in status. In that time, a total of 10 species have deteriorated, and hundreds more have been added to the list.

THE MOVE TO NATIONAL PROTECTION FOR SPECIES AT RISK:

What will endangered species legislation mean for farmers? It has great *potential* to benefit them by supporting their stewardship efforts. It can build on farmers' voluntary conservation efforts, offering them long-overdue assistance and incentives for conservation. The Canadian Endangered Species Coalition has recommended to the government that legislation could and should include:

- providing farmers with information about species at risk
- providing private landowners with technical assistance in preparing conservation plans
- assisting landowners interested in generating revenue from protecting species at risk
- tax relief for landowners who manage land for the conservation of species at risk
- maintaining programs compensating landowners for conserving critical habitat

The problem is that the draft bill *completely* misses this opportunity. The bill applies only to lands under federal jurisdiction (essentially national parks, military bases, and oceans, not provincial or private lands). This amounts only to a tiny percentage of Canadian land - roughly 4%. In fact, the bill leaves both farmers and species worse off than before. It does farmers a considerable disservice by disregarding their work as stewards, and diverting support away from them in this role. Farmers are again left facing formidable obstacles and disincentives to conservation. As for species, the bill abandons all the species which live on the other 96% of Canadian lands to the status quo. Furthermore, even on federal lands, critical habitat is not required to be protected. As habitat loss is the main threat to 80% of species at risk, this omission leaves the legislation empty of meaning. If this is not changed, then Canadian species most likely face a dangerous decline.

EFFECTIVE, NOT HEAVY-HANDED:

Canada needs legislation that works both for farmers and for the species it is meant to protect. We have witnessed some conflict between US endangered species legislation and private landowners. This experience teaches us a very important lesson. The US has had to take a heavy-handed approach to species on private lands because it is in a "critical care" stage in terms of endangered species. It is fighting to bring back over 747 species from the brink of extinction. Canada is in a much better situation -- only 56 of our species are in that category. The danger is that if Canada enacts *ineffective* legislation now -- i.e. the draft bill -- that fails to protect species

at risk and their habitat, then in the future we will have to take drastic "crisis management" steps like the US. The positive side is that Canada is still in a position now to create legislation that does not need to be heavy-handed to be effective. On the contrary, effective legislation for us now means assistance and incentives -- farmers meeting their needs while meeting the needs of species at risk.

What will endangered species legislation cost? Using calculations based on American and Australian experiences, it is predicted that federal legislation in Canada will cost only about 35 cents per person per year. Also, it is very interesting to note that, aside from the rare but well-publicized few cases, even in US endangered species legislation has not blocked development . Over**99.9%** of projects have been able to proceed with no or very minor modifications.

The record of species decline clearly indicates that Canada needs effective endangered species legislation. Furthermore, this legislation is a very important opportunity for Canadian farmers and ranchers, who have been heavily involved in the struggle to preserve species up to this point, to receive the support they deserve and need in their vital role of stewards of the land. Farmers and ranchers agree - a full 90% of Canadians living on farms and in small communities support federal legislation to protect species at risk (Angus Reid Group poll, 1995).

Unfortunately this draft legislation only pays lip service to the idea of actually protecting species at risk or helping farmers do so. There is still time to change this. If enough Canadians express support for positive legislation that supports farmers in protecting species and habitat on private lands, then the government will respond with effective legislation. If not, then everyone -- farmers, ranchers, and species included -- could be in for a pretty rough ride not too far down the road.

'95 Field Season at the CLC

By Patricia Flaten

CLC Manager

How was your summer? Did you get those bumper crops you planned for this spring?

We, at the CLC, achieved surprizingly good crops for the moisture received. Spring sub-soil moisture conditions were excellent, but the surface moisture quickly disappeared with hot late May weather. Then, we didn't get significant rainfall until mid-June, when 1.25 inches fell over a four day period. It was the end of July before any more fell and it continued to rain throughout August. In what was essentially drought conditions, the roots really had to work - this, relatively cool conditions, and August rains saved the crops in this area. Although the flax has not yet been harvested at the time of writing this article, other field-scale crops at the CLC yielded 33 bpa (Teal HRSW), 25 bpa (Highlight yellow peas), 47 bpa (B1215 Barley), and 50 bpa (Biggar CPS wheat).

Due to drought conditions, many of the forage projects seeded this year have had a real struggle getting started - not at all like the easy establishment of '93 and '94! However, they are looking much better after the late summer rainfall. In one experiment, it certainly is obvious where a companion crop was used or not. There was significantly poorer emergence where seeded with a companion crop.

This was also not an ideal year for tree-planting, but the trees planted last year are starting to become more obvious - a little taller and a little greener. We really look forward to the look of the tree projects in just another 3-4 years.

We've also seen some accomplishments in our equipment lineup here over the summer. Thanks to some federal help, we now have more grain storage space and a small tractor with a 3 pt. hitch mower. We also invested in a 25' sprayer, a grain truck, and fuel tanks. We are very thankful for a couple of generous equipment donations. Westfield donated a 41' auger and one of our past SSCA presidents, Gerry Willerth, donated a slightly used Massey combine! You can be sure that in future issues of the Prairie Steward, we will let you know of other items which we may ask for your leads on. At present, we are discussing options for seeding implements for the future. These are some of the things which we are finding make the operation of the farm just a little more efficient.

Field tour season was busy. We decided to spread the weather risk by having several smaller tours, many with a specific focus topic, such as wildlife, forages, or special crops and pests. This approach was very successful, as we were able to have good interaction between the resource people and the producers on the hay racks as we travelled from project to project. The school program is continuing to bring in some of the younger learners - we expect to have 25 school

groups visit the CLC in 1995. The program provides a great opportunity to use *Project SOILS*, an activity-based teachers' resource developed by SSCA staff three years ago.

This has given you a brief overview of the general impressions of the CLC summer. Many of the results of our projects will be described in upcoming issues of the Prairie Steward. Don't forget to continue passing on your ideas for demonstrations and for research projects that you would like to see at the CLC - that's what the CLC is for!

Cooperation in Action

By Patricia Flaten

CLC Manager

At one time, demonstration farms were much more common across Saskatchewan. Then, with improved communication and fewer resources, they seemed to almost become extinct. Recently, once again, there is some resurgence of the concept, not because communication is lapsing or resources are plentiful. Instead, perhaps it has more to do with admitting that we still like to actually see crops and results of different management strategies as they are experienced in the field. However, now due to limited budgets, demonstration farms are seldom possible without several agencies pooling their resources.

The Conservation Learning Centre (CLC) is a conservation demonstration farm which exists only due to just this kind of cooperation. Did you know that your association, the SSCA, is in partnership with Canada's Green Plan and Ducks Unlimited Canada to study and demonstrate conservation issues through the CLC? This demonstration farm near Prince Albert has been a natural extension of the activities and interests of all three groups.

The objectives of the CLC are very broad: to demonstrate and research ways of conserving soil, water, and wildlife. The target audience is even broader, as it is attempting to answer the questions of students of all ages and backgrounds. This includes the producer, the scientist, the schoolchild, and the agrologist. The nature of the CLC then is to function as a dynamic and cooperative entity.

Producers are not only represented through the SSCA partnership, but are also represented on the CLC Steering Committee itself. Half of the committee are producers, and several other members, although representing agencies, are also part-time farmers.

Producers have also shown their interest in the CLC by signing up on a special mailing list through which one can receive results and notification of workshops or field days. These are the individuals who have the most to contribute to the project in terms of practical questions to be answered. They are also the individuals who will adopt the practices which are being tested or demonstrated at the CLC.

Ducks Unlimited Canada has enthusiastically endorsed the project by supplying the site for the farm, 480 acres of land. Due to the representation of Ducks Unlimited on the Steering Committee, the CLC also benefits from their expertise in the area of forage selection, establishment, and management, all of which are included as projects at the site.

Canada's Green Plan, through Agriculture and Agri-Food Canada, provides the basic funding for the project. The Melfort Research Station (Agriculture and Agri-Food Canada, Research Branch) has become involved through the establishment of several research projects. Some of the topics

being pursued are: testing of dense nesting cover forages, direct seeding of forages and annual crops, effects of short-term alfalfas in rotation, fertilizer management within a crop rotation and variable rate fertilization across a landscape.

Agribusiness is involved as students with us, as well as contributors to the ongoing expenses and projects. Several of their researchers have been invited to conduct trials that relate to CLC interests. Equipment manufacturers, fertilizer companies, seed companies, inoculant suppliers, seed treatment companies, and herbicide companies also supply many of the cropping inputs that the farm requires. This helps extend the financial resources of the CLC so that many more projects can be carried out.

The University of Saskatchewan has also contributed, not only through the advice of its representative on the Steering Committee, but also through a number of projects which are in progress at the CLC site. In particular, the scientists provide leadership to the rest of the participants in how to conduct research in variable topography. Also, some specific projects deal with fertilizer placement and monitoring the environmental effects of our cropping practices.

PFRA staff have been very supportive of the project and have committed their resources to the CLC in several ways. The most significant and visable form of support has been through an extensive package of shelterbelt demonstrations.

Saskatchewan Agriculture and Food have been supportive of the project by supplying office space. Although the CLC has developed a field office at the farm site, the provincial office space is used over the winter season. The extension staff are often involved in CLC extension activities.

This kind of cooperation has been critical to the success of the demonstration farm during the first two years of operation. We appreciate the efforts that all of our partners have contributed so far and hope that this will continue for many years to come.

Potential Soil Erosion A Problem in the Northwest

By David Shortt, SSCA Soil Conservationist

Drought conditions in the northwest region has resulted in low amounts of crop residue being produced. To further complicate this matter, straw has been baled to be used for cattle feed this winter. The low levels and removal of straw will expose our soils to higher chance of erosion in the coming year. This is especially true for fields that are worked this fall and are to be summerfallowed next year. In order to lessen the chance of soil erosion farmers should be planning now how to conserve as much cover as possible.

If a field is to be summerfallowed the most cost effective option is to replace a tillage operation through the use of herbicide application. The most cost effective option is the use of fall or spring 2,4-D application to control the broadleaf winter annuals. Winter annuals include flixweed, stinkweed, and shepherd's purse to name a few. These weeds germinate in late fall, overwinter as rosettes and begin growth early the following year using valuable moisture and soil nutrients. Recommended rates of 2,4-D and MCPA are .34 to .45 liters per acre. Both amine and ester formulations work well for most winter annuals. For a complete list of weeds controlled at the different rates consult the 1995 Crop Protection Guide available at your local Rural Service Center. The use of fall applied 2,4-D can replace up to two tillage operations, i.e. late fall and/or early spring. The removal of this one tillage can save from two to four hundred pounds of straw residue per acre. This amount goes a long way to reducing the potential; amount of soil that could be lost from wind and water erosion over the next two years.

The use a non-selective herbicide like Roundup could be used to replace another tillage operation and conserve even more straw residue. Each tillage pass with a heavy duty cultivator and harrows buries 40% of the residue. The use of herbicides to replace the first two tillage operations will conserve more residue than using herbicides to replace tillage operations later in the season.

Forage Lands At Risk

By David Shortt, SSCA Soil Conservationist

Increasing grain prices may once again make cropping of marginal lands economic. Unfortunately many hayfields that were sown back to grass are susceptible to erosion. Marginal lands are due to such factors as salinity, topography, fertility, and stoniness to name a few. Each of these factors pose unique problems in cropping. However, from a conservationist point of view it is important to keep cover on these lands at all times. The purpose of this article is to outline ways in which to keep erosion to a minimum on these soils.

In the past forage lands were worked several times in the year to kill the existing vegetative stand. This practice took the field out of production for one year. The field also required 7 to 8 tillage passes to kill the forage and prepare a decent seedbed. However, there are more options available today. The use of Roundup to kill the stand followed by direct seeding is a cheaper and more cost effective way to bring a forage stand back into annual cropping. Similar to direct seeding, there are a number of management steps that will allow the success of this transition.

Firstly consider the type of forage present, smooth bromegrass and alfalfa are difficult to kill completely with one pass of glyphosate especially if reduced rates are used. Timing is also critical to achieving good control. One cannot expect to spray in the spring, seed the following week and grow a profitable annual crop. The best time to spray with glyphosate is before the first cut of hay with the recommended rate and if there is a lot of second growth is to do a follow-up spray in mid-August. This will allow some of the sod to break down and the soil should store moisture for the next growing season.

Understand that when the sod is breaking down, it ties up nitrogen that will not be available to crop. To remedy this increase fertilizer rates by 10 to 20 lbs of N per acre in the first cereal crop following the year of herbicide application.

One should also choose a competitive cereal crop like wheat or barley for the first crop to further weaken any remaining forage plants. Choosing a cereal will also permit the use of a broadleaf herbicide to control any alfalfa regrowth. With smooth bromegrass, a preharvest application of Roundup will be required to further control this grass.

Any direct seeding machine will do an adequate job of seed placement into forage stands killed by herbicides. However, hoe or shank openers may pop more rocks onto the soil surface, requiring a rolling or stone picking operation. If herbicides are to be used to control forage stand always consult the 1995 Crop Protection Guide for products and registered uses. This Guide is Available at Rural Service Centers throughout the province.

Marginal lands can be brought back into annual crop production safely and without fear of soil erosion by employing the use of herbicides and direct seeding management. For more information on how to apply this to your farming situation contact your Regional Soil Conservationist.

Landscape and Agriculture Research

Patricia Flaten

CLC Manager

The Conservation Learning Centre (CLC) is unique for several reasons, perhaps most notably because it is located on 'real' land. The intention of the project partners was to choose a location which most consider typical Parkland topography. This land includes all the potholes and variations in soil that you would experience if you were farming in most of the Black Soil Zone.

How does this affect the operation of a research and demonstration farm?

The advantages are that we are challenged in two ways. First, the practical challenges of farming in such a landscape, then secondly, how does one conduct research on such a landscape?

To operate practically in this landscape, field operations require some practical consideration to such simple things as: allowing the lower slopes to dry out enough to get through at seeding time; choosing which areas to leave alone or to seed to grass because it isn't practical to grow annual crops on them; managing weeds which find particular landscape elements more favorable to grow on. Simply put, we are forced to get field operations done within the variables that most Parkland farmers have to deal with everyday. Many farmers would say, 'It's about time!'.

At the Conservation Learning Centre, a number of projects are dealing with questions about direct seeding and forage production in the Parkland landscape. The traditional approach to field research is to set up a small plot on land with a predictable and uniform crop production potential. Since the CLC essentially has no uniform land to establish research plots on, every researcher associated with the Centre is dealing with landscape issues. New approaches are being developed to gather meaningful information from the variable landscape.

Besides the practical challenges of crop and forage production on this landscape, we see opportunities in focussing research to issues unique to that landscape. For instance, what can be done to improve crop and forage production on this landscape? What can be done to improve the conservation of soils, water and wildlife habitat on this landscape?

In the future, perhaps there will be more extensive use of site specific management for variable landscapes, including varying fertilizer, seed, and herbicide rates. Will there be a time when this approach becomes integrated into a management routine, including or going beyond the tractor cab decisions to speed up and slow down across the variations in the field? If so, it will require a technology which is dependable and affordable. It will also require a better knowledge of how the variables change within the landscape. The Conservation Learning Centre is providing an opportunity for producers and researchers to pose and answer some of these questions.

NOTICE OF PROPOSED EXTRAORDINARY RESOLUTIONS

NOTICE is hereby given that it is proposed to move, and if thought fit, to pass, with or without amendment, the following resolutions as extraordinary resolutions at the Annual Meeting of the Saskatchewan Soil Conservation Association Inc. on Wednesday, February 14, 1996. Although these resolutions have been passed by the Board at previous Board meetings, they must still be moved and seconded at the upcoming annual meeting in February.

The "*Comment*" in italics following each resolution is intended to briefly describe the subject, nature and effect of the proposed resolution. It is NOT part of the resolution.

PROPOSED EXTRAORDINARY RESOLUTION #1

Proposed by Marv Fenrich

WHEREAS Section 29 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. currently states the fiscal year end of the Association shall end on the 31st day of December of each year.

Resolved as an extraordinary resolution that Section 29 of the Bylaws be amended to read:

"29. The fiscal year of the Association shall end on the 31st day of October of each year."

Comment: Currently the SSCA has a December 31st fiscal year end. The feeling of the board and staff at previous board/staff meetings was to move our year end to October 31st. In moving our year end to October 31st we allow for timely reporting to our project partners. SSCA management by contract must provide a report to our project partners consisting of program plans and budgets. By having an audited financial statement prepared at this time it will cut down on time and money creating an interim statement.

PROPOSED EXTRAORDINARY RESOLUTION #2

Proposed by Marv Fenrich

WHEREAS Section 32 (1) (a) of the Bylaws of Saskatchewan Soil Conservation Association Inc. currently states that "financial statements for the year ended not more than 4 months before the annual meeting;"

Resolved as an extraordinary resolution that Section 32 (1) (a) of the Bylaws be amended to read:

"32 (1) (a). financial statements for the year ended not more than 6 months before the annual meeting;"

Comment: This resolution will simply give us more time to present our financial statements to our membership. It is more common for organizations and businesses to have a 6 month period before this report is given to the members. It was felt by the Board we should give ourselves more time to cover any changes in annual meeting dates that may occur in the future.

PROPOSED EXTRAORDINARY RESOLUTION #3

Proposed by Marv Fenrich

WHEREAS Section 3 (a) of the Bylaws of Saskatchewan Soil Conservation Association Inc. currently states "to encourage soil conservation by promoting agriculture production systems which reduce soil degradation and maintain economic viability."

Resolved as an extraordinary resolution that Section 3 (a) of the Bylaws be amended to read:

"3 (a). Producers promoting conservation production systems that improve the land for future generations."

Comment: The change in the mission statement resulted from a strategic thinking session for Board members last winter. The proposed mission statement is more concise and gives emphasis to our vision of improving the land for future generations. The new statement says as much as the old one while implying a lot more.

Note: Marv Fenrich is the president of the SSCA and currently farms near Wilkie, Saskatchewan. He is proposing these resolutions to the membership on behalf of the SSCA Board of Directors.

What Is a Riparian Area?

By Juanita Polegi, SSCA Soil Conservationist

Riparian areas are located around sloughs, potholes, and along creek and river beds. Lush vegetation, often very different from the surrounding landscape, is a characteristic of riparian areas.

Maintaining and effectively managing the riparian areas on your land produces many advantages. Riparian areas serve to maintain water quality as the dense vegetation filters out undesirable contaminants, including soil particles. The vegetation's root system controls shoreline erosion. A riparian area reduces flood peaks and helps to recharge groundwater. Wildlife utilizes riparian areas for food, water and shelter.

In order to maintain the productivity of the riparian areas on your land, there are a number of common farming practices that should be avoided. When driving past such an area in the fall, leave the matches in your back pocket. We don't need the extra smoke in the air, anyway! If the trees and shrubs are removed along creek or river beds, the water flow can increase. So, tell the cat operator he won't be paid for any clearing he does along those areas. Avoid cultivating right up to the edge of every water body on the place. Leave a nice ring of permanent vegetation around the sloughs and willow-filled potholes. Allow the livestock into fenced riparian areas for only short intervals. Overgrazing plays a large role in damaging riparian areas.

Riparian areas should be viewed as something more than a nuisance in the field. They are of great benefit to both the water and soil resources. For more information on Riparian Areas, stop by the local Rural Service Centre and pick up a copy of the publication, prepared by the SSCA and PFRA, "Riparian Areas: An Undervalued Resource."

The Newsletter of the Saskatchewan Soil Conservation Association

Issue 17 -- Winter, 1996

Northwest Forage Renovation Meetings

Winning Winter Wheat

850 Attend Direct Seeding Workshop

By Blair McClinton,

SSCA Assistant Manager

Farmers from across western Canada, met at the Regina Exhibition Grounds February 14 and 15 to attend the Saskatchewan Soil Conservation Association's (SSCA) annual Direct Seeding Workshop. With Over 850 in attendance, farmer interest in direct seeding continues to be strong. "The whole idea of the conference was to give farmers the most up to date information available on direct seeding and how to implement these practices on our farms," says SSCA President Lorne Crosson.

There was plenty of information available according to Crosson. "The Direct Seeding Conference provides one of the best opportunities for farmers to get the latest information on direct seeding. Farmers had the opportunity to have their questions answered by researchers, industry experts and other farmers", says Crosson.

This year's conference featured two high profile keynote speakers: Dr. Tim Ball and Dr. Lowell Catlett. Dr. Tim Ball, climatologist from the University of Winnipeg, questions the current climate change predictions being promoted by other scientists. He believes that there is insufficient evidence to be making any conclusions. He also questioned the validity of the climate models currently being used to predict future climate changes. Ball also stated more needs to be done on more serious environmental problems like soil degradation.

Dr. Lowell Catlett, futurist and agricultural economist from New Mexico State University, closed the conference with an optimistic picture of agriculture in the future. He used examples of cutting edge research to show the direction agriculture will take in the future. Precision farming techniques, producing agricultural products for cosmetics and pharmaceuticals are just some of things coming. Producers will need to be more creative to take full advantage of these opportunities.

The conference had six sessions which offered a mixture of farmers and researchers to provide both experience and first hand information. This year's sessions covered topics on crop rotations, agronomy, economics, weed control, openers and packing systems and how to integrate all the information available into a successful direct seeding system.

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

The trade show had over 70 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.

If you were not able to attend the 1996 Direct Seeding Conference, proceedings are still available through any SSCA staff member. The cost is $10. Plans are already under way for the 1997 annual meeting and conference in Saskatoon, February 12 and 13, 1997.

SSCA's 1995 Activities in Review

By Doug McKell, SSCAExecutive Manager

Where does the time go? Another year, another farming season of hope, dreams, successes and failures. I can't remember a year with so much variation in growing conditions. The SSCA's message promoting Low Disturbance Seeding (LDS) to protect our soil resource and maximize yields was driven home in some areas of Sask. where drought was a factor. This message, however, found many deaf ears where excessive moisture stalled seeding operations until well into the growing season. Only in Sask. could you see floods and drought in the same day.

The SSCA accomplished much in the past year. We will soon complete our second year of our three year "Saskatchewan Soil Enhancement Project". With our help, farmers continued to expand the LDS acreage in the province. Currently there are approximately 6 million acres of grain produced using this system. Although this still represents only about ten percent of the cropped acres in Sask., we lead the country in protecting our soil resource.

This result could not have been achieved without the hard work of our staff and dedicated board members. Their accomplishments include: over fifty small field tours attended by over 2100 producers, 166 Direct Seeding courses attended by over 3300 participants, over 300 farm calls, 26 news appearances and many articles in weekly newspapers, major farm publications, provincial newsletters and of course our own newsletter, "*The Prairie Steward"*. We also conducted our annual direct seeding field day attended by over 800 interested producers and our fifth annual direct seeding conference which also attracted over 800 participants. These events have become premier direct seeding events in Western Canada. It is indeed a pleasure to work with these people to organize and conduct these events and I look forward to each planning session or board meeting.

Currently we have a couple of new programs underway. In the fall of 1995 we introduced a 1-800 Direct Seeding line (1-800-213-4287) with help from one of our industry partners, Monsanto Canada Inc. This line allows farmers to talk with our technical staff to obtain the latest information on direct seeding. A program called Farmer Helping Farmer (FHF) allows us to maintain a data base of direct seeding and soil conservation information. Farmers wishing to contact other farmers with experience in cropping practices, rotations or a particular piece of machinery need only call the 1-800 line with their question.

This winter our staff are conducting "Kitchen Table" meetings at selected farms where small groups will discuss direct seeding and other related topics. Our goal is to have these study groups come together in the future to tour fields or discuss other topics of interest.

Finally, our Direct Seeding Field day has grown in size. The machinery industry has approached us to organize and conduct two field days for 96, one in the North and one South. Our North day will be on June 11th near Wilke and our South day will be on June 18th just east of Regina to coincide with the Western Canada Farm Progress Show.

We are optimistic about the future but not blind to the challenges forthcoming. There will be a need for the SSCA to inform producers about farm practices that protect our key resources; soil, air, water and wildlife. The adoption of these practices must , however, allow these same producers to make a reasonable living for themselves and their families. We will work closely with our industry partners, provincial and federal ag departments and other farmer driven organizations to generate and deliver the necessary conservation messages.

The next growing season will soon be upon us and will likely move by as quickly as the one just past. By the time we meet again we will be ushering out the current program and introducing a new one with a new focus. Work with us to design a program that fits your needs and addresses the concerns we all should have; the conservation of our vital natural resources.

I'll leave you with the imortal words of the famous present day philosopher, Red Green: "Keep your stick on the ice"

Conservation Award Winners

By Ken Sapsford,

SSCA Soil Conservationist

At the 1996 SSCA annual meeting and conference once again two conservation awards were presented.

Producer Award

The recipient of the Conservation Producer Award was Ken Allport from Kyle. Ken's long term goal is the elimination of wind erosion and improved soil quality on his farm. He has achieved this goal through incorporation of a number of practices. In the mid 80's he started doing some work with both chemfallow and wide blade tillage to maintain trash cover. Along with this he planted some shelter belts on his fields. As this work progressed he moved to direct seeding to eliminate erosion further. This has been an excellent progression in developing a system that reduces erosion and is also economic. Production of lentils and more recently chickpea, are an important part of the rotations that are contributing to soil quality enhancement.

The addition of straight combining in recent years has given Ken the ability to improve water conservation on his farm. This is critical to the Brown Soil Zone.

Ken was one of the founding members of the Saskatchewan Soil Conservation Association and served as president of the SSCA in 1990.

Congratulations to Ken Allport, well deserving recipient of the Conservation Producer Award 1996.

Group Award

The group conservation award went to the Seager Wheeler Farm from the Rosthern area.

The Seager Wheeler Farm is being operated, restored and developed by volunteers. The Seager Wheeler Historic Farm Society acquired the farm in 1994 which has a history of innovative agricultural conservation practices.

One of Mr. Wheeler's most notable quotes (1922) was: "The soil is ours to make or mar and we should aim to leave it, when the time comes to pass it on.. In as good or better condition than when it first came under our hand."

The land was sitting there since 1947 when Mr. Wheeler left the farm. The Society acquired the farm and is in the process of bringing the farm to the forefront as an agricultural education venue. Soil conservation and a coexistence of nature will be the major themes within the farm.

The official opening of the farm will be held on June 1, 1996. Education venues will be created throughout the farm. Kiosks and information plates throughout the farm will outline the history of agriculture and soil conservation practices. Seeding trends 1996, the third consecutive direct seeding field day will also be held on June 1.

The Seager Wheeler Farm will proudly be displaying the 1996 Group Conservation Award at its Conservation Education Venue.

The Science Behind Precision Farming

by Dr. Hugh Beckie, Saskatoon Research Centre, Agriculture and Agri-Food Canada

Precision Farming, one of the latest 'buzz-words' in agricultural circles, promotes variable management practices within a field according to site or soil conditions. Variable Rate Fertilization (VRF) is the cornerstone of Precision Farming: fertilizer rates are varied across a field to minimize over an under application. In short, VRF puts fertilizer where it can be utilized by the crop. Theoretically, VRF is environmentally sound, but if it doesn't increase yields, reduce costs, or both, it'll never fly.

The technology: Global Positioning System using satellites, yield monitors, automatic fertilizer rate adjustment, etc. is being used to increase fertilization efficiency, but the science behind VRF is less clear.

Would VRF make "cents" on your land? The simple answer is: variation of the factors affecting crop yield must be large and consistent enough to justify the extra costs of collecting information and managing parts of fields differently.

So which factors affect yield?

1. Topography;

2. Soil properties, such as organic matter, available nutrients, texture, salinity;

3. Weed, insect, and disease levels;

4. Cropping history; and of course,

5. Weather - namely rainfall and temperature.

Yield is determined by the factors most limiting to productivity. Some people suggest that yield maps can be used as the basis for varying fertilizer rates for the next crop, but we must remember that yield mapping is helpful only if there is a **consistent yield variation pattern** from year-to-year and crop-to-crop, or you can identify the factors causing yield variation. Is yield variability due predominantly to available nutrient levels? In many instances, it is not. A definite benefit of yield mapping, however, is to evaluate the results of your fertilization strategy, whether it be conventional or VRF.

Soil fertility and the amount of water available to the crop are usually the two main factors affecting crop yield potential. Topography is a primary factor contributing to soil variability, and influences both fertility and available water. Thus, soils on similar slope positions tend to have similar qualities. Fields with significant topography are best suited to VRF. Yield potentials are

usually lower on hilltops (less fertile, less water) and higher on mid-slope or level depressional area (more fertile, more water). Therefore, fertilizer recommendations should take into account both soil available N levels prior to seeding and yield potentials (match crop N demands with soil plus fertilizer N supply). However, unpredictability of weather creates unpredictability of yield responses. In dry years, low areas may yield best; in wet years, mid-slope areas may excel. The question is whether soil fertility or water is limiting yield.

To get started in VRF, you don't have to take the high tech route. A less complicated approach exists that is just as feasible and may give similar benefits. It is relatively simple and inexpensive to manually adjust fertilizer rates on the go.

Research conducted by the Saskatoon Research Centre at the Conservation Learning Centre suggests that VRF, based on soil organic matter and topography, enhance both fertilization efficiency and profitability. The costs of varying fertilizer rates according to topography should be similar to conventional fertilization. Thus for fields with significant variation in soils or elevation, VRF may be the next revolution since subsurface banding for enhancing the efficient use of fertilizers, and has the potential to improve the bottom line while being environmentally friendly.

Farmers Helping Farmers - Surveys Completed

By Bob Linnell,

SSCA Soil Conservationist

All participants at the annual Direct seeding workshop and meeting of the SSCA were asked to complete a copy of the Farmer-Helping-Farmer survey to enable the staff to provide advice to purchasers of equipment or beginning Direct Seeders in their area. This service is at no cost to farmers , and will not be given out to commercial businesses for sales purposes. It has proven itself to be very valuable in the providing of good, solid information that farmers can use in making decisions.

There were 138 forms filled out and returned at the conference representing about 20% of those attending. Draws were make from those completed and the winners were Leonard Thiesen of Hepburn and Bernice Hamilton of Duval. The breakout of those forms returned were as follows:

Forms Completed % Of Total

Southwest 21 15.2

USA 10 7.2

West Central 10 7.2

Northwest 11 7.9

Northeast 9 6.5

East Central 20 14.5

Southeast 57 41.3

Total 138 99.9

Farmer Helping Farmer Database

By Eric Oliver,

SSCA Soil Conservationist

A perennial problem of farmers wanting to purchase new or used direct seeding equipment is "will it work on my land?" As reported in our last newsletter, SSCA has initiated a service called *Farmers Helping Farmers*. With the cost of direct seeding equipment and add-on components, farmers want to make sure the equipment they purchase will work in their specific conditions. This database covers seeding equipment, air tanks, openers, packers, residue management equipment, weed control techniques, and even crops.

Experience is probably the best tool when making decisions, but how does one make use of experience when you are unfamiliar with that piece of equipment, component, or crop? In addition, outside of their immediate neighbours, most farmers will not be aware of anyone who have used the equipment or crop they are interested in. This database tries to address this problem by putting the farmer in touch with other farmers who have used the piece of equipment in question within the same region or soil type. Farmers are very forthright in their opinions about the success or shortcomings they experienced with equipment and are usually willing to share their experience with other farmers.

To access this database, simply contact any of our regional staff or use the 1-800-213-4287 number. There is no fee involved for conducting a database search of the item in question. We will then give the farmer a list of names and phone numbers of farmers who have used that item. The farmer can then contact them directly and find out their experiences with that item. This information can be a very valuable tool, especially when choosing a new opener.

If you are from the Southwest Region, you have received a questionnaire which many of you have completed and returned. There are now over 150 surveys entered onto computer from this region with more to come. We are now receiving many surveys from other regions in the province and from those who attended our Annual Direct Seeding Conference this year. Shortly, we will have a very comprehensive database of information from across the province that farmers can access and make use of. If anyone is interested in participating by completing a survey, simply contact your closest Regional SSCA Soil Conservationist. Although we will release the participants name and phone number to other farmers, we do not release names to private industry for commercial purposes.

We encourage our members to participate in the survey if you haven't already done so. Perhaps you will need to use the service at some point yourself. Good luck with your seeding operation!

Forum 2005 Workshop

By Blair McClinton,

SSCA Assistant Manager

Last November, the Soil Conservation Council of Canada (SCC) held the Forum 2005 workshop in Saskatoon to determine the direction of soil conservation programs over the next 10 years. The workshop had 116 participants from across Canada including 70 producers. As a result of the workshop SCC was able to develop seven "Guiding Principles" and seven "Recommendations". The report is being presented to politicians from across Canada and has been given a favourable reception.

Recommendations

1. A new long-term national strategy for agricultural resource management must be developed and implemented immediately following the conclusion of the Green Plan in 1997.
2. A national network of soil and water conservation organizations should be established. It should consist of producer-driven organizations that are active in each region or province.
3. A strong coalition of stakeholders should be formed to establish a funding strategy so a long-term National Soil and Water Conservation Plan can be developed.
4. A national public education strategy should be developed to ensure that all of society is well informed on issues relating to managing agricultural resources.
5. There must be a conscious effort to carry out applied research on a field scale to provide new information on management practices.
6. An evaluation framework must be developed for any new national agricultural resource management strategy.
7. A national forum should be held triennially to provide an update on progress being made and to identify new initiatives that should be incorporated into a national strategy.

Handy New Internet Addresses

By Bob Linnell,

SSCA Soil Conservationist

Producers looking for the latest information on a wide variety of topics can now do research from their own home computer, thanks to the Internet. A list follows that you may find interesting and potentially profitable.

- Agriculture and Agri-food Canada's home page at **http://aceis.agr.ca/** leads the user to a variety of topics.
- Saskatchewan Agriculture and Food's site at **http://www.sasknet.sk.ca/agfood** provides access to information on crops management and statistics plus related reports.
- Alberta Ag And Food at **http://www.gov.ab.ca/~agric/aginfsi.html** has information on canola, other crops and livestock.
- The National Research Council's Plant Biotechnology Institute can be accessed at **http://www.pbi.nrc.ca/pbi-intro.html**
- FoodNet at **http://foodnet.fic.ca/** is a good website providing links to food market trends and business, to commodity exchanges in Chicago, Minneapolis, and the U.S. Department of Agriculture, Statistics Canada and to a variety of newspapers.
- University of Manitoba is at **http://www.umanitoba.ca/**
- University of Guelph is at **http://tdg.uoguelph.ca/**
- Winnipeg Commodity Exchange is at **http://www.telenium.ca/** provides some business news
- Stat Ag Market Summaries are at **http://stat.mlnet.com/stat/prices.html** and accesses commodity exchanges around the world as well as pulse and special crop prices.
- Sask. Wheat Pool is constructing an Internet site at **http://www.lights.com/swp**
- Proven Seeds div. of U.G.G. has a site at **http://www.provenseed.com**

These are just a few of the many sites you too can access on the Internet to help you in the everyday conduct of your business. You can find a more complete listing in the Sask. Agriculture and Food publication, *The Internet "The Agricultural Magic Bus" Directory*. In fact you can find articles from this paper on the SSCA home page at **http://paridss.usask.ca/sscatmp/sscahome.html**

Happy "surfing".

Minding the Weeds

By Juanita Polegi,

SSCA Soil Conservationist

Great grandpappy knew about it and used it. Grandpappy knew about it and used it. Pappy heard about it. Now we must learn about it again. So, what's "it"? "It" is Integrated Weed Management, the new buzz word in agriculture.

At our workshop in November, a number of speakers made reference to integrated weed management strategies. Gone are the days when we can pull the 1/2 ton up to the dealer's door and load it up with a new herbicide. As the threat of weed resistance to herbicides looms ever larger and as we move to less and less tillage, new strategies must be employed if we are to fool the weeds.

Doug Derksen with the Ag. Canada Research Station in Brandon suggests that we can manage our weeds by using a diverse rotation and alternating the timing of the herbicide. He used the following example:

Year 1 Burnoff preseeding. Seed the **canola**

Year 2 Burnoff preseeding. Seed the **barley.** Apply herbicide in-crop. Apply 2, 4-D post-harvest.

Year 3 Seed the **peas**. Apply herbicide in-crop. Apply Roundup, pre-harvest.

Year 4 Burn-off preseeding. Seed the **wheat.** Apply herbicide in-crop. Apply granules, zero incorporation.

By applying different herbicides at different times of the growing season, no one group of weeds will be selected for or against.

John O'Donovan with the Alberta Environmental Centre in Vegreville put forward a number of cultural practises that will give the advantage to the crop, making things rather uncomfortable for the weeds. His first suggestion is **prevention.** Using clean seed, keeping the equipment clean, tarping grain trucks and ridding the roadsides and field margins of weed species will help to keep the fields free from any "new" weeds.

Management is next. He stresses that herbicides should be used wisely. Ditches and headlands should be mowed. Crops must be rotated. Crop competitiveness can be maximized by planting vigorous seed and seeding competitive crops when possible. He also suggested that biological control and intercropping might be additional components of the management strategy.

Ensuring **early crop emergence** does much to increase the competitiveness of the crop. Research has shown that it's not how may weed plants that are present but rather, whether or not the weeds get ahead of the crop. The old adage applies: "The first one up, wins!"

Increasing the seeding rate ensures a **healthy crop stand.**

Crop competitiveness can be enhanced when **fertilizer rate and placement** are manipulated. Green foxtail decreases as N increases, especially under Direct Seeding. Foxtail barley numbers tend to be reduced when fertilizer is banded rather than broadcast.

Many of the suggestions put forward by Derksen and O'Donovan at the Conference are common sense. It seems, however, that over the years as we have grown to rely on herbicides to take care of our weeds, we have forgotten about these strategies. Good thing Doug and John were there to show us how to get back to the basics.

Direct Seeding Long Term - What to Watch For

by Garry Mayerle,

SSCA Soil Conservationist

One of the interesting presentations at Alberta Conservation Tillage Society's annual meeting was given by Dr. Wayne Lindwall, acting director of the Lethbridge Research Station. He cited many studies done in the western Canadian prairies showing the long term effects of direct seeding. Knowing some of the key findings will give direct seeders a good idea of what changes to watch for in their own system.

Most direct seeders know that direct seeding protects their soil from erosion by keeping residue on the soil surface. And most probably don't need research plots to tell them that direct seeding is one of the best crop production systems to keep residue on the surface of their soils. However one of the disadvantages of direct seeding is that it produces high amounts of small soil clods or aggregates which are erodible. There is no mechanical means of creating larger non erodible clods as in a tillage application. Residue is the best defense against erosion but in a direct seeding system it is imperative to keep the residue in place. If you are going to for example burn stubble be aware of the danger of erosion and get a canopy over that soil as soon as possible. Other studies did show, though, that the aggregates under direct seeding were more stable.

In terms of how soil water contents are affected by direct seeding most of the studies showed an increase in water content in the top layer of soil after 7 or 8 years of direct seeding. For example at Indian Head in the top 120 cm the moisture content went up an average of 6%.

Lindwall sums up soil temperature results by saying , "Direct seeded soil is colder because it is wetter and it is wetter because it is colder." Surface residue keeps the soil cooler and reduces evaporative loss of water. Temperature differences between tillage systems were generally only found in the seed zone of the soil profile. They showed that conventional tillage was warmer during the day but the same or cooler at night as compared to direct seeding.

Organic matter content as measured by organic carbon is another change that direct seeders can watch for in their soil. Research shows that organic carbon increased under direct seeding but the changes took 5-10 years or longer to become evident. Soils which are already higher in organic matter may not change as much as low organic soils. Also, the changes will be concentrated on the top of the soil profiles that is where the residues are being returned. For example, Con Campbell found a 10.5% increase in organic carbon in the top 6 in. of a fine sandy loam near Swift Current after 11 years of continuous direct seeded wheat.

Another interesting finding is that studies show a more active microbial population under direct seeding. In fact one study concluded that 2,4-D was degraded faster under conservation till plots because of increased biological and microbial activity.

These are some of the long term changes observed under direct seeding.

Machinery Bearpit draws good attendance at annual workshop

By Bob Linnell,

SSCA Soil Conservationist

Direct Seeders may have come to kick tires or make sure they attended the speech presentations in the general sessions of the recent SSCA Direct Seeding annual workshop held in Regina, but when it came to asking questions, they made sure they attended one of the three bearpit sessions to ask their chosen questions of the podium speakers leading the bearpits.

An enthusiastic discussion took place over the merits of narrow placements versus the spread technique for fertilizer and seed in the machinery bearpit. Many questions were posed for the leaders about which was the best opener and why it worked where it did. Gordon Hultgreen gave some very good information about a study that PAMI has been jointly conducting over the past years in collaboration with other scientists and some cooperating opener manufacturers. and restated his findings on row spacing and seeding rates in direct seeded fields.

Precision fertilizer applications and the fall monitoring of yield and protein values also generated a lot of questions for Kelly Johnson, a producer from southern Saskatchewan.. Kelly has been working with the technology for the past three seasons on his own and surrounding custom operated farms.

The "Mapping The Future" precision farming conference and field day is being held in conjunction with the Western Canada Farm Progress Show in Regina on June 19 and 20, 1996, to present and demonstrate these technologies to farm producers.

Questions about sprayers, application methods and weed control took up some of the remaining time, and participants seemed hesitant to leave even as the bearpit session came to a close. Many farmers came to the front of the room following the formal session to ask even more questions and hear the remaining comments of the speakers. They said they were very pleased with the bearpit, because they had learned much from it. They are looking forward to next years annual workshop and to the SSCA's summer field days being held at Wilkie and Regina respectively.

President's Message

By Lorne Crosson,

SSCA President

Greetings to all the members of the SSCA. As this is my first report as President there are number of acknowledgments I would like to make. First of all thanks to Marv Fenrich for his dedication and hard work during the past year as President, he leaves big footsteps to follow. Marv now takes over the Past President position. Dean Smith has served his term as Past President and has left the executive. His many contacts in business and government circles and his tireless efforts on behalf of the SSCA will be missed. Thank-you Dean, keep in touch. Clint Steinley left his position as West Central Director to become President Elect. I look forward to working with Marv and Clint on the executive during the coming year.

John Bennett, the 1994 SSCA Conservation Farmer award winner, has been appointed by the Board to fulfill the remaining term of Clint Steinley as West Central Director. Welcome John, your knowledge and enthusiasm regarding soil conservation will be an asset to the Association. Dick Richards was re-elected as Southwest Director, while Dwayne Mitchell retains his position as Northwest Director, Bernie Niedzwiedz retains his position as East Central Director and Greg Kane retains his position as Director at Large by acclamation. The assistance of John and the rest of the directors and the very capable SSCA staff will make my coming year as President of the SSCA a much easier task.

The SSCA staff probably don't get as much recognition as they should for their efforts and expertise. Their professionalism particularly shows in the success of our annual meetings and direct seeding field days. I would also like to include staff members of SDAF who work side-by-side with our staff at these events. It takes numerous hours of planning and labour to put on these events. Planning actually begins over a year in advance. Our annual meeting and trade show was a great success again this year with approximately 900 in attendance. Plan to attend next years annual meeting and trade show in Saskatoon, February 12 and 13. On behalf of the board of directors I wish to congratulate the office and field staff of the SSCA and the SDAF staff for a job well done.

I would also like to express congratulations to Pat Flaten, her co-workers and the steering committee at the CLC, south of Prince Albert. They are carrying out valuable soil conservation research on a field scale and have developed a centre that has become a popular tour destination for many groups. If any of you haven't yet toured the centre I would highly recommend it. Besides being an interesting nature watch area, the conservation related research activities that consider the whole landscape may be of interest to you for adaptation on your own farm.

You are probably wondering what board members do other than hold a meeting now and then since most of the Association's work appears to be done by the staff. Well besides planning the direction of the SSCA and helping the staff at the meeting and field day events, we also sit on

various provincial committees and boards. For example, Garry Nolan is a member of the Urban Awareness Committee, Dean Smith is a member of the Farm Support Review Committee, Marv Fenrich is on the executive of the Agri-Food Innovations Fund subcommittee, Ed Beauchesne is chairman of the Conservation Learning Centre (CLC) steering committee, Greg Kane is a member of the CLC steering committee, and I am a member of the Soils and Crops Management Sub-Council. In addition the board members take part in various soil conservation related meetings throughout the year.

Our Association membership continues to climb and presently stands at about 975. We do not take in enough membership fees to maintain a full compliment of office and field staff and hold our annual meeting and field days. For that reason the SSCA has taken on various contracts in the past to bring in the necessary funding. Our present contract for the Saskatchewan Soil Enhancement Program (SSEP) will terminate in March of 1997. The board of directors and staff of the SSCA have spent a considerable amount of time during the past year planning for activities after SSEP. There are a number of possible avenues that we may take and you will be informed of them as negotiations take place and more information becomes available.

A strong organization makes it easier to bring in outside funding and also gives us a more credible voice when dealing with issues that affect the health of our soils. So encourage your friends and neighbors to join the SSCA and If your membership has recently expired or will do so shortly please consider renewing it.

I look forward to meeting you at the various meetings and field days in the coming months. This year we will have two field days, one at Wilkie on June 11 and the other at Regina on June 18. The two field day format was adopted upon request by the implement manufacturers.

What's New in Weed Management

by Garry Mayerle,

SSCA Soil Conservationist

Mr. Ken Kirkland from the Scott Experimental Farm was one of the scientists updating us on new developments in weed management at our annual conference. What's new ranges from: new ideas about using old herbicides to new weed killers, herbicide tolerant canola, and non-herbicide related ideas such as late fall seeding of spring seeded crops. Some of these ideas you or your neighbour could be using next spring so take note!

One new use for old technology is the non-incorporated use of incorporated granular herbicides. In a three year direct seeding study at Scott non-incorporated Treflan, Avadex, and Fortress reduced wild oat growth as much as on plots where these products were incorporated. Yields of cereals were higher in the non-incorporated plots because of increased water conservation. Yields of oilseeds were slightly lower but Kirkland attributers that to poor seed placement. As some producers already have experienced, it looks like non-incorporated use of these products and Edge might have a good fit for direct seeders. Watch for product registrations!

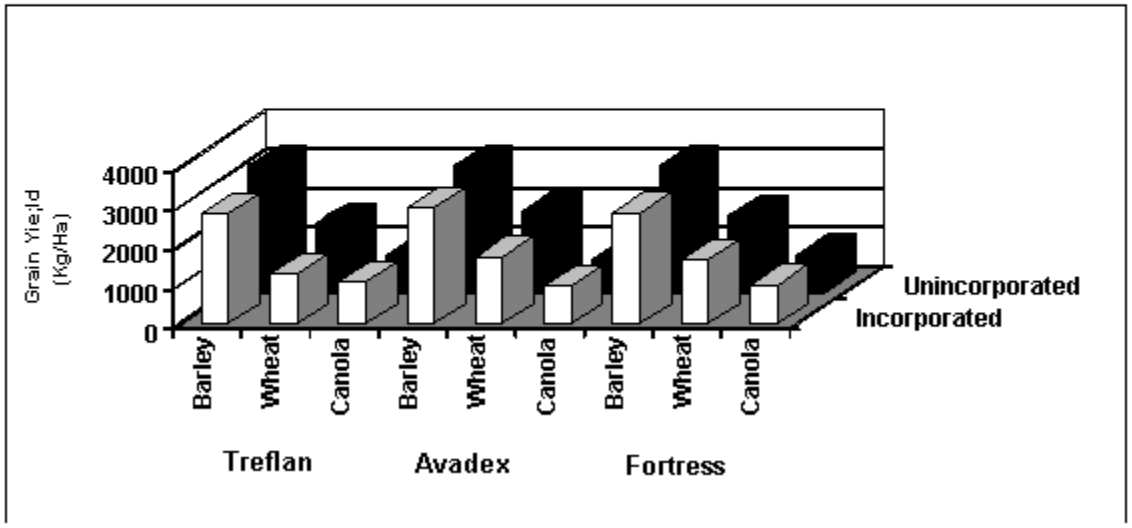
Another new registration for Roundup is preharvest control of dandelion. Kirkland cites Monsanto's data which found 87% dandelion control 10 -12 months after a 1 liter/ac. preharvest application (control ranged from 75 - 95%). Also of interest is Monsanto's report of 84% control of dandelions less than 15 cm in diameter following a preseed or post harvest application of 1 liter/acre. If these results are consistent it will be good news for direct seeders with dandelion problems.

New chemistry coming for weed control includes Horizon which has already received registration. It takes out wild oats and foxtail in wheat and has a good number of tank mix options. Attain put out by DowElanco has not yet received registration. It looks like a good option to control cleavers in the cereal years of your rotation. BASF has a green foxtail product in a new group for herbicide resistance problems. It is to be used in wheat but is not yet registered.

Kirkland lists some interesting rotational techniques that might be useful to direct seeders. Always seeding crops with similar days to maturity can lead to creating a niche for certain weeds. Including a polish canola or barley in a rotation of wheat, peas and argentine canola can disrupt the formation of this niche growing situation. Fall seeded crops can be very useful rotational tools to combat weeds. They are very competitive and start growing very early so they require significantly less herbicide inputs. To take further advantage of this concept research is being done on late fall seeding of spring crops. Results from two years of fall seeded Argentine canola at Scott look promising. Round up tolerant canola could have a very good fit if fall seeded canola works out.

Although some of these techniques are still at the experimental stage, most direct seeders welcome new concepts in weed control. Watch for them at informational meetings and summer tours so you can make wise evaluations.

Effect of incorporation* for annual grass weed control o crop yields from fall applied granular Treflan, Avadex and Fortress on stubble. Scott, 1989-199 (K. Kirland, 1996)



Can Late Applications of Nitrogen Increase Yield and Grain Protein in Spring Wheat?

By Guy P. Lafond, Agriculture and Agri-Food Canada

Judy McKell, IHARF and Saskatchewan Agriculture and Food

Ed Tanner, Saskatchewan Agriculture and Food.

As a rule, high wheat yields are usually associated with low protein concentrations due to a dilution effect. Given the excellent protein premiums and the high nitrogen prices, the strategy to strive for is trying to attain maximum yields and high grain protein levels without having to use excessive levels of nitrogen. The objectives of this study were to examine the effects of late-season nitrogen foliar applications on grain protein and grain yield in spring wheat.

Studies were initiated in 1994 in the Indian Head area on two soil types, an Indian Head Heavy clay soil and an Oxbow loam soil. Four rates of nitrogen (0, 50, 75 and 100 lbs N/acre) were side-banded at seeding time. Liquid nitrogen (28-0-0) was applied just prior to heading (GS45) or after flowering (GS69) using a rate equivalent to 15 lbs N /ac (4.2 gal of liquid N /ac diluted with 5.8 gal of water /ac). The liquid nitrogen was applied during the day using a regular ground sprayer and some leaf scorching was observed. The plots on the Oxbow loam were hailed out in 1995.

Applying nitrogen at GS45 or GS69 had no effects on grain yield except when no fertilizer was applied at seeding (Table 1). On the other hand, late applications of nitrogen increased grain protein. In 1994, only the application at GS45 increased grain protein while in 1995, the increase was observed at both application times. In 1995, we had significant precipitation during the grain filling period. From a practical standpoint, in order to minimize risk, it would be preferable to apply the nitrogen at GS45 because of the greater opportunity to receive precipitation and the ease of identifying the growth stage. Also we had positive results in both years at GS45 while only in one year at GS69.

The other important consideration is the relative economic performance of this management strategy.

Table 2 shows gross and net returns for different initial rates of fertilizer and different foliar application times for the two soil types. Gross returns are determined by yield and price for the particular protein level. Net returns are gross returns minus the fertilizer cost for that treatment.

Generally, foliar nitrogen application at GS45 showed the best net returns on both soil types which initially had low to average fertilizer applied. Application at GS69 and on treatments with higher initial application of nitrogen produced more variable results.

When would it be practical to make use of such a strategy?

Firstly, the size of the protein premiums will warrant the use of such a technique and secondly the price differential between liquid nitrogen and other forms of nitrogen that can be side-banded at seeding time (e.g., urea or anhydrous ammonia) also has to be taken into account as well as the cost associated with the foliar application. On the crop side of things, a good estimate of the yield potential just before GS45 would have to be made and the decision would also have to take into consideration the amount of nitrogen applied prior or at seeding and some estimate of the nitrogen supplying power of the soil. The soil's ability to supply nitrogen would be influenced by factors such as crop rotation and previous use of nitrogen fertilizers.

Table 1. The effects of foliar applied N on grain yield and grain protein concentration at different rates of nitrogen in spring wheat in 1994 and 1995 at two locations.

	Heavy Clay Soil - 1994			Heavy Clay Soil - 1995			Oxbow Loam - 1994		
	Grain Yield (bus/ac)								
Nitrogen Rate lbs/ac	Check	GS45	GS69	Check	GS45	GS69	Check	GS45	GS69
0	21	32	22	25	29	28	28	34	28
50	37	38	38	42	42	43	45	45	43
75	39	41	39	42	43	45	48	42	44

100	41	40	40	46	42	44	50	47	45
Mean	34	38	35	39	39	40	43	42	40
	Grain Protein (%)								
0	12.5	12.8	13.1	11.7	13.0	13.0	12.0	12.3	12.3
50	12.7	13.2	12.7	12.7	13.8	14.0	12.1	13.1	12.1
75	13.1	14.1	13.6	13.7	15.0	15.4	12.8	13.6	13.2
100	13.8	14.7	14.2	15.1	16.0	16.2	13.7	15.0	13.8
Mean	13.0	13.7	13.4	13.3	14.4	14.6	12.7	13.5	12.9

Table 2. The effects of foliar applied N on grain yield and grain protein concentration at different rates of nitrogen in spring wheat in 1994 and 1995 at two locations.

	Heavy Clay Soil - 1994	Heavy Clay Soil - 1995	Oxbow Loam - 1994

	Gross Returns - $								
Nitrogen Rate lbs/ac	Check	GS45	GS69	Check	GS45	GS69	Check	GS45	GS69
0	64.05	97.60	71.50	105.00	128.76	124.32	85.40	103.70	85.40
50	112.85	123.50	115.90	183.12	193.20	205.11	137.25	146.25	131.15
75	126.75	155.39	134.55	193.20	228.33	238.95	146.40	144.90	143.00
100	141.45	165.20	151.60	244.26	223.02	233.64	172.50	194.11	155.25
Mean	111.28	135.42	118.39	181.40	193.33	200.51	135.39	147.24	128.70
	Net Returns - $								
0	64.05	93.85	67.75	105.00	123.15	118.71	85.40	99.95	81.65
50	100.35	107.25	99.65	164.42	168.89	180.80	124.75	130.00	114.90
75	108.00	132.89	112.55	165.15	194.67	205.29	127.65	122.40	120.50

100	116.45	136.45	122.85	209.56	180.01	190.63	147.50	165.36	126.50
Mean	97.21	117.61	100.70	161.03	166.68	173.86	121.33	129.43	110.89

Assumptions:	**1995 Grain Prices**	**1994 Grain Prices**
#1CWRS	4.20 $/bu	3.05 $/bu
12%protein	4.27	
12.5%	4.36	
13.0	4.44	3.25
13.5	4.60	3.45
14.0	4.77	3.79
14.5	5.04	4.13
15.0	5.31	

Note: There are **NO** protein premiums more than 15%

1994 N Price - 25¢/lb

1995 N Prices - Courtesy of Bell Agro Ltd., Indian Head

Liquid N - 28-0-0 - 37.4¢/lb

Dry N - 46-0-0 - 37.4¢/lb

Application cost of Liquid **N** is not included

Final prices for grain grades will affect total income.

Native Plant Society of Saskatchewan Holds Annual Meeting

By Juanita Polegi,

SSCA Soil Conservationist

With an increasing interest in native plants, the Native Plant Society of Saskatchewan came into being in 1995. Its mission statement is: "To increase the understanding and conservation of native plants through facilitation, communication, research and education among interested organizations and the public." The Society's first annual meeting was held in January, 1996.

Much to my surprise, the meeting room was full of people. And when the call for nominations for the Board of Directors ended, a total of 19 people had allowed their names to stand! With a membership of less than 100 people, it seemed to me that this was an organization with a lot of enthusiasm! The diversity of the membership also surprised me. Prior to the meeting, I expected to see many familiar faces -- those of some PFRA, DU and Sask. Ag. and Food personnel. Those people were all present but so were many more. I met university professors, farmers, conservation officers, biologists, business people and energy industry representatives. The day's agenda reflected the members' diverse interests.

A representative from Sask. Energy showed slides of five different sites where Sask. Energy had damaged the environment during construction work. By fencing the areas and seeding native grasses, these sites were reclaimed.

Ducks Unlimited use native plants for their habitat work. When they talk about "sculptured seeding", they mean planting the appropriate plant species in the appropriate ecological sites such as putting the marsh species around the pothole, a different set of species at midslope and the appropriate plants on the prairie.

Wildcrafting is the collection of native plants or plant parts for sale to industry and medicine. There is some controversy over the ethics of such a practise. Some of the members participate in wildcrafting while others oppose the practise.

PFRA Shelterbelt Centre discussed the various native trees and shrubs currently being used or studied for use in shelterbelts.

In Northwestern Saskatchewan, funding from the Green Plan has enabled rangeland agrologists to study site reclamation of land affected by gas and oil well activity. Native plants have played a leading role in this project.

I attended the meeting as a member of the Society and a representative of the SSCA. I believe the SSCA should take an active interest in the Society. Perhaps in future projects, the two

organizations could work together as each has a membership with great knowledge in their respective, yet complementary areas. As more information is gathered about native plants and more seed becomes available, native plants may very well play a much greater role in reclamation and soil conservation.

Bolt-on Side Banding Opener Update

Gordon Hultgreen, PAMI; Adrian Johnston, Melfort Research Farm; Guy Lafond, Indian Head Research Farm;and Garry Hnatowich, Sask. Wheat Pool

(The following article is an excerpt from a paper in the Direct Seeding: "Managing Crop Residues for Profit", 1996 conference proceedings.)

Summary

The first year of a two year study was conducted in 1995 to compare the agronomic performance of five side banding bolt on openers under direct seeding conditions at five locations. With spring wheat there were only small emergence differences due to opener type or fertilizer rate. In contrast, reduced canola emergence occurred with some of the openers at higher fertilizer rates. Reduced canola emergence was likely due to incomplete separation of seed and fertilizer resulting in seedling mortality or the deep placement of seeds resulting from extensive soil disturbance with some openers.

Opener type did not affect canola or wheat yield. Yield response to N fertilizer rate with both wheat and canola was classic with increased yields at each incremental fertilizer rate. The results also indicated that the succcess with an opener may be associated more with the operator than the opener itself.

Introduction

The development of high capacity air seeders for minimum and no till seeding with side banding fertilizer capability has resulted in a high level of producer interest in side banding openers for these machines. Unfortunately, many early generation bolt-on openers performed poorly, with numerous problems including lack of seed/fertilizer separation, poor seedbed quality, poor durability and excessive soil disturbance. Over the past two years extensive research and development has resulted in side banding openers that offer improved performance. Independent agronomic testing is required to assess the performance of side banding openers under a wide range of soil types and geographic areas. This paper will present preliminary emergence and yield data from the first year of a two year study.

Objectives

The objective of the project is to evaluate and demonstrate the agronomic performance of side banding openers under a variety of soil types and conditions using wheat and canola and different rates of nitrogen fertilizer.

Description of Study

Five side banding bolt-on openers were compared under direct seeding conditions using side banded nitrogen rates of 0, 35, 70, and 105 lb/ac N using urea (46-0-0) as the nitrogen source. In addition all plots received 25 lb P2O5, 10 lb K2O and 10 lb S. The first year of a two year study was completed in 1995 at five locations including Watrous (Elsow clay loam), Tisdale (Tisdale clay), Melfort (Melfort clay loam), Indian Head (Indian Head heavy clay) and Yorkton (loam). A 10 ft wide 4 rank air seeder using 12 in row spaces and on row packing was used for seeding all plots.

The plot air seeder used Flexi-coil cultivator components including 550 lb spring trips and shanks. Fertilizer and seed was contained in four custom made boxes metered thorough Amazone seed/fertilizer cups using one cup on each box for each opener. Following metering the seed/fertilizer gravity dropped into a Valmar venturi type pneumatic system for delivery to the openers. Ground driven Valmar 60 speed gearboxes were used for seed and fertilizer rate settings. K-Hart packers were mounted on the rear of the machine and were adjusted to pack directly over the centre of the seed row.

Bolt-on side banding openers used in the project were: Flexi-coil Stealth, Dutch Vern Eaglebuster, Swede SW470, GEN 200, and Morris Edge On Mount. A non side banding knife was also used as a check. All openers except the knife check placed the fertilizer below and to the side of the seed row. All of the side banding openers except the Swede placed the seed to the side and the fertilizer in the centre of the shank. In contrast, the Swede opener placed the seed in the centre of the shank and the fertilizer to the side. A Dutch seed brake was used to reduce seed velocity on all openers except the GEN.

Crop type was Maverick Polish canola and Pasqua hard red spring wheat at respective seed rates of 6 and 120 lb/ac. The Canola was treated with VitavaxRS and blended with Furadan 5 G.

Plot size was 10 x 30 ft with 4 replicates for a total of 84 canola and 84 wheat plots at each location.

Seeding dates were as follows:

Watrous May 15 - May 19

Tisdale May 21 - May 23

Melfort May 24 - May 26

Indian Head May 30 - June 1

Yorkton June 2 - June 4

Data collected for the study included:

Wheat

- Emergence Counts
- Seed Depth
- Haun Scale
- Harvest Height
- Heads/m2
- Biomass Yield
- Straw Nitrogen Percentage
- Grain Yield
- 1000 Kernel Weight
- Grain Protein

Canola

- Emergence Counts
- Leaf Count
- Harvest Height
- Straw Nitrogen Percentage
- Biomass Yield
- Seed Yield
- Green Seed Count
- Protein

Results and Discussion All of the sites were direct seeded into standing stubble with the PAMI plot drill using all five openers and four fertilizer rates at the seeding dates described previously.The seed brake was not used on the GEN opener as this opener plugged with wheat when used with the seed brake.Moisture conditions at seeding were very dry at Tisdale, moderate moisture at Watrous, Melfort, and Yorkton, and wet at the Indian Head site.Due to soil texture and moisture conditions, large lumps of soil were brought up by all of the openers at Tisdale, Watrous, and Indian Head, leaving the plots very rough. The poor seed bed conditions combined with dry soil moisture at Tisdale and Watrous resulted in uneven emergence with some of the openers; especially with the canola plots. At Melfort and Yorkton soil conditions were much better and soil flowed around the openers and no large soil lumps were left on the soil surface. Although Melfort and Yorkton did not have problems with soil lumps, the soil surface was still rough with all side banding openers, compared to the knife check.Herbicide application included pre seed burnoff with Roundup and post-emergent herbicides as required. Weed and volunteer crop control was very good at all sites.**Spring Wheat**When the data from the five 1995 sites were combined, there were no large differences in emergence due to opener type or fertilizer application rate (FIGURE 1)

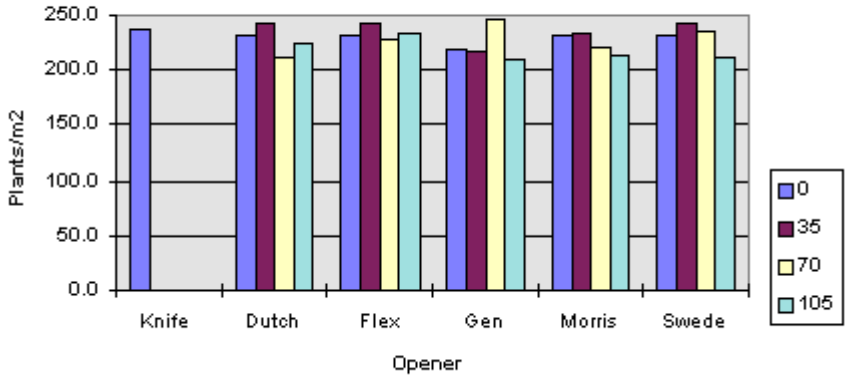


FIGURE 1. Emergence of spring wheat. Mean of five locations 1995.

Emergence differences among the openers ranged from a maximum of 11% above and 4% below the knife check. These results indicate that all of the side banding openers produced satisfactory spring wheat germination and emergence at all fertilizer rates.

When the yield data from the five sites were combined there was a classic yield response to fertilizer rate with all of the openers (FIGURE 2).

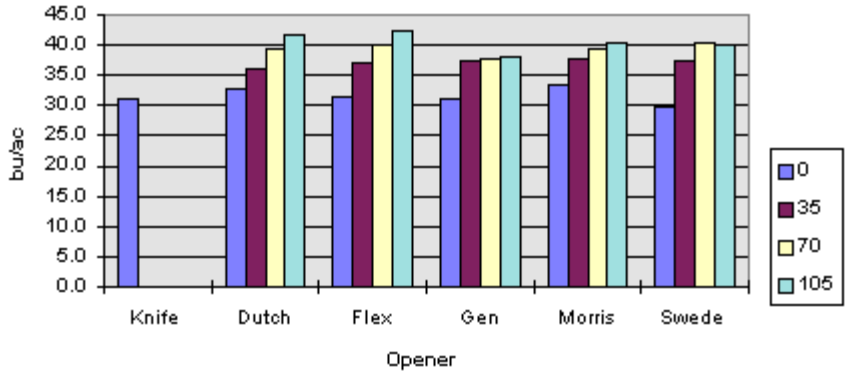


FIGURE 2. Yield of spring wheat. Mean of five locations 1995.

Yield differences among the openers were small with yield increases for each opener at each incremental nitrogen fertilizer rate. The exception was the yield of the Swede opener which had a slightly lower yield at the 105 lb/ac N rate compared to the 70 lb/ac rate. Yield response of the GEN opener was also flat at the 70 and 105 lb/ac N rates.

Canola

When the data from the five 1995 sites were combined, emergence for most openers and fertilizer rates was equal or higher than the knife check (FIGURE 3).

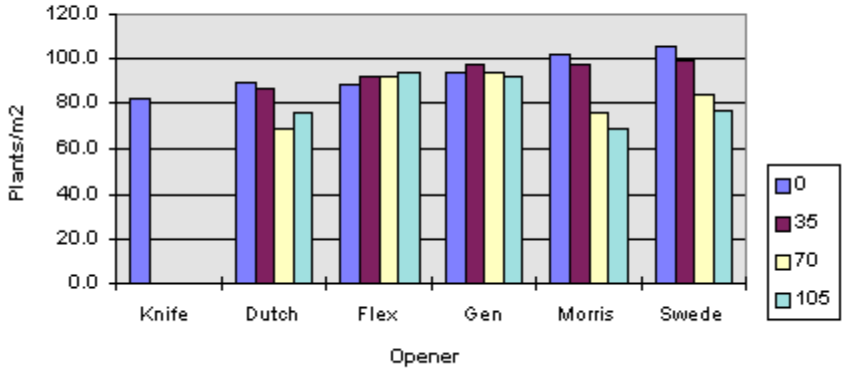


FIGURE 3. Emergence of canola. Mean of five locations 1995.

The Dutch, Morris and Swede openers had emergence lower the knife check at either the 70 or 105 lb/ac N rate with the maximum reduction in stand of 16%. The reduction in emergence was likely due to incomplete separation of seed and fertilizer with these openers. As a 15% reduction in stand, due to fertilizer damage, is considered acceptable, all of the openers provided acceptable emergence except for two treatments who exceeded the standard by 1%.

When the yield data from the five canola sites were combined there was a classic yield response to fertilizer rate with all of the openers (FIGURE 4).

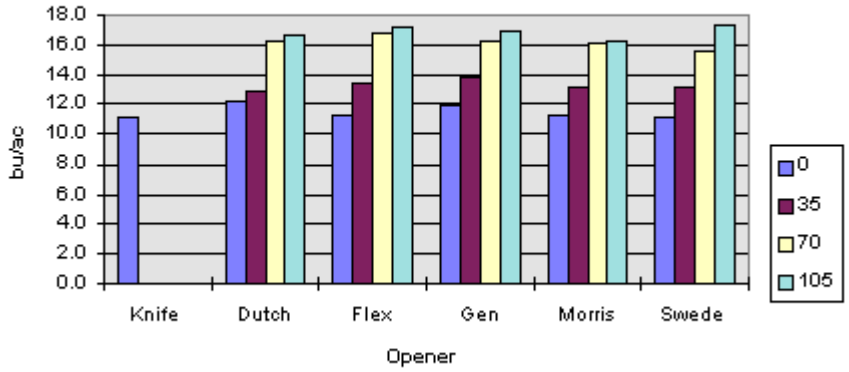


FIGURE 4. Yield of Polish canola. Mean of five locations 1995.

Yield differences among the openers were very small with yield increases for each opener at each incremental nitrogen fertilizer rate. All of the side banding openers resulted in equivalent canola yields in 1995.

Conclusions

The results from the first year of the two year study indicated that there only small emergence differences due to opener type or fertilizer rate with spring wheat. In contrast, reduced Polish canola emergence occurred with some of the openers at higher fertilizer rates. Reduced canola emergence was likely due to incomplete separation of seed and fertilizer resulting in seedling mortality.

There were no differences in canola or wheat yield due to opener type. Yield response due to fertilizer rate was classic with increased yields at each incremental fertilizer rate.

Acknowledgments

This study was supported by funding from the Canada - Saskatchewan Agricultural Green Plan, the Saskatchewan Canola Development Commission and by in kind support from Agriculture and Agri-Food Canada.

Direct Seeding Peas

By Ken Sapsford,

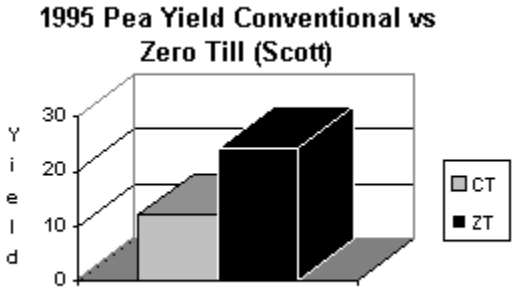
SSCA Soil Conservationist

Many farmers have started direct seeding their cereal crops but have stated they weren't going to gamble with their specialty crops. Peas are one crop that has responded well to direct seeding with increases in yields under most conditions.

When we are seeding peas, we need to ensure that there is at least half an inch of moist soil over the seed. Being a large seed, they require more moisture to germinate and if they are seeded too shallow without good moist soil surrounding the seed, you will get patchy emergence. Some direct seeders who are double shooting say that the draft of the equipment is too great if they are going to seed the peas 2-3 inches deep and the fertilizer knife is running four to 4.5 inches deep. To avoid the heavy draft requirements many are switching the hoses around on their air seeder so the peas go down the bottom opener and the fertilizer is placed to the side. By doing this the peas are placed on a firm, moist seed bed in an optimum growing environment and they haven't sacrificed the seed bed for fertilizer placement.

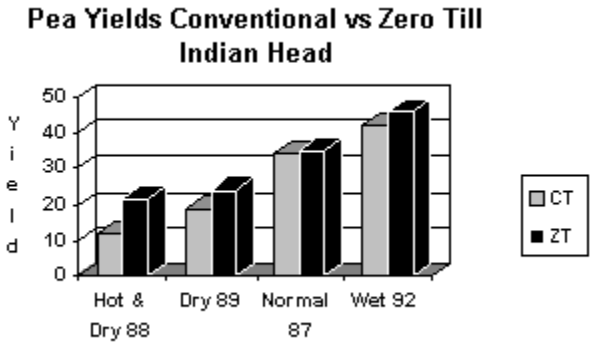
In 1995 we had very dry conditions in west central and northwest Saskatchewan. The pea yields reported by many farmers were double on direct seeded fields over conventional tilled fields. This was also confirmed by data from Scott Research Station. (Chart #1)

Chart 1



Over the past number of years the same results were found at Indian Head under a variety of moisture conditions. (Chart #2).

Chart 2



The advantage that field peas have under direct seeding are not always expressed in final yield. (Table 1) the height of plant and pods per plant were higher in direct seeded peas at Melfort and Tisdale, however, final yields were similar under both tillage systems. Factors other than tillage systems can be important in determining crop yield, however, the advantage of direct seeded field peas seen at test sites in western Canada provide an opportunity for increased yields when conditions occur for good agronomic performance.

Table 1 Pea Growth Characteristics Under Conventional & Zero Till
Melfort &Tisdale 1994

Variable	Conventional Till	Zero Till
Height (cm.) (flat pod stage)	68.7	75.1
Pods per plant (flat pod stage)	7.33	8.93
Nodules (flat pod stage)	17.94	24.62
Yield (bu/ac.)	49.5	50.75

The large seed and relatively early maturity makes peas a good crop to start a direct seeding crop production system.

Organic Carbon Changes in the Black Soil Zone

by Dr. Dan Pennock, Department of Soil Science, University of Saskatchewan

Soil organic matter is one of the most critical components of the soil-plant system. Organic matter is the source of many of the non-fertilizer nutrients used in crop production; it provides the majority of sites for water and nutrients to bind to in soils for later release to plants; it maintains the structure of the soil for successful seedbed preparation; and it increases the resistance of the soil to soil erosion.

Because of the importance of soil organic matter in the plant-soil system, soil scientists are concerned about the decrease in organic matter levels which are associated with many human activities such as agriculture. A recent report published by Environment Canada states that soil organic matter levels in the Prairies have dropped by 40 to 50% since cultivation began. If this level of decrease is true, then the ability of the soil to support plant growth should have been similarly decreased.

Clearly before we can sound the alarm bells over this loss of organic matter we need to ensure that the reported levels of loss are, in fact, true. Hence myself and Dr. van Kessel of the Department of Soil Science at the University of Saskatchewan developed a research project using funding from Agriculture and Agri-Food Canada to assess the actual levels of organic matter decrease in soils of the Black Soil Zone.

One of our principal research sites for this research was located on the Conservation Learning Centre. To assess the losses which have occurred, we compared the current levels of soil organic matter in long-term agricultural fields with the losses from adjacent uncultivated landscapes. In the case of the CLC, we used the soil organic matter levels from the pasture/forested area by the farmhouse and compared these to the levels of soil organic matter in the field just north of the pasture.

This procedure was carried out in the three major types of soil textures and landscapes in the Black Soil Zone: in stone-free silty or clayey soils such as those on the CLC; on glacial till soils, which have many small knolls and sloughs and which commonly have a lot of stones on their surface; and on sandy, stone-free soils. In each case we compared uncultivated to cultivated landscapes, and then further divided up each field into knolls, lower slopes, and sloughs using a computerized mapping system.

Our results showed us that the 40 to 50% estimate greatly overestimates the losses of soil organic matter from this region. In the sandy landscapes, the soil organic matter had actually increased a small amount (about 11%) from their natural levels. The silty/clayey landscapes (such as the CLC) have experienced a moderate level of loss of about 16%. The glacial till landscapes have

experienced the greatest loss - some 35% of the original soil organic matter in these landscapes has been lost due to cultivation.

The losses of soil organic matter differ between the knolls and depressions. In the sandy landscapes, the knolls and lower slopes experience slight losses of soil organic matter; however the sloughs actually show significant gains of soil organic matter of about 38%. In the silty/clayey landscapes, the knolls have experienced high amounts of loss of about 41% of their original soil organic matter; again, however, the soil organic matter levels in the sloughs have increased by about 33%. In the glacial till landscapes, all parts of the field are experiencing losses - the shoulders have lost about 55% of their original soil organic matter and the sloughs about 16%.

What is causing the losses we observe in the silty/clayey and glacial till landscapes? Research we have carried out elsewhere in Saskatchewan would suggest that about 70% of the losses from the knolls is due to soil erosion by tillage, wind, and water; the remaining 30% is due to the change over from deeply rooted perennial grasses in the uncultivated sites to shallow rooted, annual crops in agricultural production systems. In the sloughs in the glacial till site, the losses are due not to erosion (there is nowhere for the eroded soil to go!) but to the conversion from native vegetation to annual crops.

The second question which arises is: Why do the sloughs in the silty/clayey and sandy landscapes show an increase in soil organic matter levels? In part this occurs due to the deposition of eroded soil from up slope in these areas; however a more significant contribution comes from the conversion from the aspen/willow vegetation naturally found in these areas to annual crops. In the case of these two landscapes, the natural fertility levels in the sloughs is very low - much of the nitrogen is lost as a gas back to the atmosphere, and this lack of nitrogen greatly limits natural productivity. As well, the tree/shrub vegetation contributes relatively little soil organic matter back to the soil.

When we convert the vegetation to small grains and add fertilizer to these sloughs we actually increase their fertility quite dramatically (this also explains why initially the yields from these sloughs are rarely what producers expected when they put them into production). This results in an increase of organic matter production, which eventually translates into an increase in soil organic matter. Hence in these landscapes the losses from the knolls are somewhat balanced by the gains in the sloughs.

Overall we can state from our study that the losses of soil organic matter are much lower than originally estimated on a field basis, but the losses from knolls in some landscapes can approach or surpass the 50% level. Given the importance of soil organic matter in the soil/plant system, even these lower levels of loss should be a concern to all of us interested in the long-term prospects for agriculture in Saskatchewan.

Cooperation in Action

By Patricia Flaten

CLC Manager

At one time, demonstration farms were much more common across Saskatchewan. Then, with improved communication and fewer resources, they seemed to almost become extinct. Recently, there is some resurgence of the concept, not because communication is lapsing or resources are plentiful. Instead, perhaps it has more to do with admitting that we still like to actually see crops and results of different management strategies as they are experienced in the field. However, now, due to limited budgets, demonstration farms are seldom possible without several agencies pooling their resources.

The Conservation Learning Centre (CLC) is a conservation demonstration farm which exists only due to just this kind of cooperation. Did you know that your association, the SSCA, is in partnership with Canada's Green Plan and Ducks Unlimited Canada to study and demonstrate conservation issues through the CLC? This demonstration farm near Prince Albert has been a natural extension of the activities and interests of all three groups.

The objectives of the CLC are very broad: to demonstrate and research ways of conserving soil, water, and wildlife. The target audience is even broader, as it is attempting to answer the questions of students of all ages and backgrounds. This includes the producer, the scientist, the schoolchild, and the agrologist. The nature of the CLC then is to function as a dynamic and cooperative entity.

Producers are not only represented through the SSCA partnership, but are also represented on the CLC Steering Committee itself. Half of the committee are producers, and several other members, although representing agencies, are also part-time farmers.

Producers have also shown their interest in the CLC by signing up on a special mailing list through which one can receive results and notification of workshops or field days. These are the individuals who have the most to contribute to the project in terms of practical questions to be answered. They are also the individuals who will adopt the practices which are being tested or demonstrated at the CLC.

Ducks Unlimited Canada has enthusiastically endorsed the project by supplying the site for the farm, 480 acres of land. Due to the representation of Ducks Unlimited on the Steering Committee, the CLC also benefits from their expertise in the area of forage selection, establishment, and management, all of which are included as projects at the site.

Canada's Green Plan, through Agriculture and Agri-Food Canada, provides the basic funding for the project. The Melfort Research Station (Agriculture and Agri-Food Canada, Research Branch) has become involved through the establishment of several research projects. Some of the topics

being pursued are: testing of dense nesting cover forages, direct seeding of forages and annual crops, effects of short-term alfalfas in rotation, fertilizer management within a crop rotation and variable rate fertilization across a landscape.

Agribusiness is involved as students with us, as well as contributors to the ongoing expenses and projects. Several of their researchers have been invited to conduct trials that relate to CLC interests. Equipment manufacturers, fertilizer companies, seed companies, inoculant suppliers, seed treatment companies, and herbicide companies also supply many of the cropping inputs that the farm requires. This helps extend the financial resources of the CLC so that many more projects can be carried out.

The University of Saskatchewan has also contributed, not only through the advice of its representative on the Steering Committee, but also through a number of projects which are in progress at the CLC site. In particular, the scientists provide leadership to the rest of the participants in how to conduct research in variable topography. Also, some specific projects deal with fertilizer placement and monitoring the environmental effects of our cropping practices.

PFRA staff have been very supportive of the project and have committed their resources to the CLC in several ways. The most significant and visible form of support has been through an extensive package of shelterbelt demonstrations.

Saskatchewan Agriculture and Food have been supportive of the project by supplying office space. Although the CLC has developed a field office at the farm site, the provincial office space is used over the winter season. The extension staff are often involved in CLC extension activities.

This kind of cooperation has been critical to the success of the demonstration farm during the first two years of operation. We appreciate the efforts that all of our partners have contributed so far and hope that this will continue for many years to come.

Photo Contest Winners

The SSCA's 1996 photo contest winners were announced at the annual conference held in Regina. Once again there were a number of excellent entries in each of the categories. The categories were Soil Conservation, Soil Degradation and Wildlife. The soil Conservation category was won by Aaron Steinley of Empress, Alberta, with a photo depicting a direct seeded field of peas, second place a photo of native range submitted by Karen Benjaminson of North Battleford, and third place was a photo of plastic mulch used in shelterbelt establishment submitted by Eric Johnson of North Battleford.

The Soil Degradation Category was won by Russ Popoff of Prince Albert with a photo of water erosion on an unprotected summerfallow field. Second place was a photo of water erosion in spring on a summerfallow field submitted by Terry Pearse of Tisdale. Third place was a photo of water erosion in mid-summer taken by Karen Benjaminson of North Battleford.

The wildlife category was won by Terry Pearse of Tisdale with a picture of a Canada Goose family. Second place went to Russ Popoff of Prince Albert with a photo of a partridge in standing stubble and third place went to Mireille Renaud of Prince Albert with a photo of an elk in native pasture.

Each of the first place winners received a professionally framed 11 x 17 copy of their photograph.

Northwest Forage Renovation Meetings

By David Shortt,

SSCA Soil Conservationist

A series of eight forage meetings was held throughout the northwest region in January and February . Over 150 interested producers came out to the informative half day meetings. The meetings were initiated by the Sask. Soil Conservation Association in conjunction with PFRA, Sask. Ag and Food and the New Grazing and Pasture Technology Program (NGPT). The agenda included talks given on pasture management and tame forage varieties by NPGT. A presentation on annual forages for hay production based on research in the Northwest was given by SDAF and an update on Permanent Cover Program policy was given by PFRA.

The SSCA presentation dealt with the importance of proper fertilization to maintain and increase the life of existing forage stands. Lack of fertility of hayfields is the most common reason that they are broken up and reseeded.

Highlights of the presentation detailing the management of using Roundup to take forge fields out of production are as follows. The purpose of using Roundup is to replace the numerous tillage operations to kill the existing forage. Reducing the tillage operations will conserve more moisture and not expose these fields to wind and water erosion.

Roundup works best when applied in mid-August at 1 to 1.5 L/acre on actively growing forages. Roundup is registered to allow for the crop to be cut and harvested. The forage should be cut 3 to 5 days after application. Past this time, hay protein and quality levels deteriorate substantially. One follow-up tillage in September may be required to control regrowth of alfalfa. If the hay crop will not be harvested adding at least 0.3 L/acre of Banvel to the Roundup will give much better control of the alfalfa.

Tillage of these herbicide treated fields may be required to prepare a seedbed if there is no access to a direct seeding drill or hoe drill.

Because a herbicide treated field has not had a year to breakdown and release nutrients through tillage, its fertility requirements are comparable to a stubble crop. However, it will also require approximately 10 - 15 lb. of additional N per acre to assist in the breakdown of root mass the following growing season.

A competitive crop should be grown the following year because some of the grasses, like smooth bromegrass are not completely controlled by these herbicide rates. A crop such as wheat or barley sown slightly heavy and seeded early will out-compete and suppress any regrowth of the grasses and alfalfa. A cereal is a better choice over a broadleaf crop especially if the field had a high level of alfalfa since an in-crop Banvel/2,4-D application gives a good control on any

regrowth of alfalfa. A preharvest application of Roundup will give further control of grasses and alfalfa.

Using herbicides to renovate existing forage stands can save money, time and prevent erosion on marginal lands. The key to success requires proper management of the herbicides and the following crop.

Winning Winter Wheat

By Juanita Polegi,

SSCA Soil Conservationist

"The key to growing winter wheat is timing, timing, timing!" says Lorne Niebergall of Yorkton, the recipient of this year's Winter Wheat Challenge Award. He adds, "Seeding winter wheat should be done about the first of September, not the 28th."

Lorne has been growing winter wheat almost continuously since 1983. That was the year he bought some land where the crop had been devastated by hail. He used a Morris Hoe Press drill to seed directly into the standing stalks. He says everything went well and he got a good crop. In 1984, he used the same equipment to seed into a variety of stubbles. The winter wheat did the best on the flax stubble simply because the equipment could better handle that amount of trash. For a few years, Lorne seeded the winter wheat with an air seeder on 12" spacings by spiking it in. He says that while the crops were never awesome they were never poor enough to be discouraged. Eventually, Lorne bought a Haybuster and has used that the last few years.

At seeding, Lorne applies the P205 with the seed. In the spring, he usually broadcasts 34-0-0 according to the soil test recommendations. One year, he applied about 80 lbs of actual N and it was the one and only time he grew a 60 bu/acre winter wheat crop that graded #1.

His award winning crop, consisting of the Norstar and Kestrel varieties, was seeded Sept. 8, 1994 with a Morris Air Drill. Three days previously, he did a pre-seed burn-off using 1.0 *L*/ac Roundup. At this rate, he achieved an excellent clean up of the grasses and thistles. In the spring of 1995, he sprayed liquid N at a rate of about 70 lbs. Dyvel was applied by air for more thistle control.

At harvest, Lorne reports some differences between the 2 varieties. The Norstar yielded about 47 bushels while the Kestrel yielded about 52. The Norstar produced lots of straw and tended to lodge. The Kestrel was not so tall and, therefore, held up better. A couple of days prior to swathing, strong winds blew. Lorne says it appeared that for every broken head in the Kestrel, there were 2 in the Norstar.

Following harvest, Lorne harrowed the stubble to spread the straw a little better. He says his combine does a good job of spreading the chaff. As Lorne purchased a new Flexi-coil air seeder this fall, he needed a field with heavy trash where he could " do a little experimenting" so he seeded the field with winter wheat again. However, that is not his usual rotation. Lorne says he likes to seed peas into the winter wheat stubble for a couple of reasons. Firstly, he likes to apply some Rustler with a little extra Roundup early in September. To date, he hasn't yet noticed any damage in the peas due to the carry over of the Banvel. Secondly, it seems the peas just do really well in that stubble.

When asked if he had any advise for first - time winter wheat growers, Lorne replied, "If you're leery of the crop, you should be -- just as you should be leery of any new crop. Start with a smaller acreage. Talk to other producers who have grown it. Get it seeded right (direct seed) so you and the crop get started on the right foot. And seed early!"

The Winter Wheat Challenge Award was sponsored by Ducks Unlimited and the Sask. Wheat Pool. In addition to receiving a plaque, Lorne will receive 1 ton of fertilizer from DU and a $250 credit from SWP. For more information on winter wheat, contact your local DU office.

The Newsletter of the Saskatchewan Soil Conservation Association

Issue 18 -- Summer, 1996

1996 Direct Seeding Field Days a Success

By Blair McClinton,

SSCA Assistant Manager

In 1996, the SSCA decided to hold two direct seeding field days, one in the north and one in the south. While the rain, snow and generally wet conditions tested our patience, both field days were a success. Producers were able to see the latest equipment in action and make side by side comparisons. Several producers told us that they were using the field days to help them make their final decision between two or three different machines. The manufacturers commented that they made sales at both field days.

Wilkie Field Day

700 producers attended the field day at Wilkie on June 11. This was the first time a major field day was held in the northwest region of the province. Those in attendance appreciated having the field site having typical soil conditions for the area. However, the residue conditions on the field were low because of the drought in 1995.

Nine direct seeding machines were on hand to demonstrate their ability to direct seed into standing stubble. Each seeder was demonstrated twice during the day. The second demonstration was on the residue management demo area to simulate higher residue conditions. The two seeding demos were the most popular demonstrations with people crowded around equipment jockeying for a better view.

A unique feature of SSCA's field day are the May seeded plots of canola and wheat. Eight commercially available seeders seeded these plots to provide a comparison of crop establishment for the field day. These plots gave producers the opportunity to not only see the seeders working on that day but also see the results from each seeder a month after a crop was seeded. 200 producers toured these plots throughout the day.

There were also plots demonstrating surface applied granular herbicides, direct seeding "Do's and Don'ts", and the effect of stubble and tillage on soil temperature and crop emergence.

The residue management demos were also well attended. Farmers were very interested in how the residue management equipment would work in the very windy conditions at the field day. Organizers unrolled bales of unthreshed wheat to simulate harvest conditions. Each combine made two passes to demonstrate uniformity of the spread.

Spraying equipment was also demonstrated at this years field day. The spraying demonstration featured both high clearance and field sprayers. The windy conditions gave everyone the chance to see how effective the various wind screens are.

Regina Field Day

The Regina field day was originally scheduled for June 18 but 3/4 inches of rain the night before forced us to postpone the field day until June 21. Even with the postponement 250 to 300 farmers toured through the May plots. Some international visitors from Europe were disappointed we were not seeding on the 18th because they wanted to see the equipment work under "their conditions". 350 producers attended the field day when it eventually happened on June 21. Those who attended were able to see the equipment work under some of the toughest soil conditions in Saskatchewan (wet Regina Heavy Clay). The demos at the Regina field day were similar to the Wilkie except there was only one seeding demonstration.

The demonstration site is also the location of two research trials. It is one of five second year locations of the Ag. Canada/PAMI Side-band Bolt-on Opener Trial. Gord Hultgreen, PAMI and Guy Lafond, Ag. Canada, were on hand to explain the experiment and answer any questions. The Indian Head Agricultural Research Foundation are using this site for a high disturbance vs. low disturbance direct seeded special crops trial.

Top School of Ag. Paper Wins SSCA Membership

By Ken Sapsford,

SSCA Soil Conservationist

Congratulations to Sherri Ann Walker of Langham for having the top term paper in the School of Agriculture's SLSC 24 - Soil Conservation and Land Quality class. For her efforts Sherri Ann receives a three year membership in the Saskatchewan Soil Conservation Association. The class is taught by Mike Grevers of the Soil Science Department at the U of S. The majority of the papers were written on wind erosion. However the top paper by Sherri Ann Walker was written on soil salinity.

Sherri Ann's paper describes what causes soil salinity, possible cures and what her father has been doing on her own farm to stop it's spread. Sherri Ann states, "diagnosing a saline soil is quite easy. Factors such as limited or no crop growth. The presence of salt tolerant weeds such as Russian thistle, Kochia, Wild barley and Goosefoot species. The soil has a white crust. Digging into the soil may show white streaks of salts, or periodic or continual surface wetness sometimes accompanied by flow or free water down a slope."

Sherri Ann has identified one of the main ways that saline areas spread. "Summerfallow practices worsen salinity problems due to the increased evaporation rates of blackened soils. Most fallow soils can only hold one to two hundred millimeters (4 to 8 inches) of water in the root zone before it moves down the profile to the water table. It may resurface later as a saline seep."

There are some basic management practices that she addresses in her paper. "To eliminate these problems is nearly impossible. Early detection of a saline soil is essential in eliminating any further spread of the salts." "If a field is not too saline, seeding crops which are more salt tolerant such as 6-row barley, sunflowers, and safflower may prove to be a great advantage. Forage crops are much more salt tolerant than cereal and oilseed crops. Eliminating or lessening summerfallow practices will also help to reduce salinity problems." "The reason why forage crops seem to grow much better is due to the fact that a cereal crop uses most of its water in June, July and August and the majority of the rainfall is in May and June. A forage crop uses much of its water earlier in the season eliminating the pocketing effect of water." The problem is in establishing the forage stand. Many forages are difficult to germinate in saline soils. There is usually high pressure from salt tolerant weeds. Plus the area is quite often flooded for a period of time so the forage must be able to tolerate some flooding.

In conclusion Sherri Ann says, "It is clear that salinity is an increasing problem. Many farmers are unaware of the options that are available to them resulting in many saline soils being mismanaged. It is very important that farmers who have saline soils identify them as soon as

possible and begin to take control measures to prevent the spread of these disastrous soil conditions."

Seed Growers Go Direct

By Juanita Polegi,

SSCA Soil Conservationist

"If we can get a better crop on fertilized summerfallow thanon the unfertilized stuff, why do we have summerfallow?"This is the question Bob and Wendy Eyolfson of Leslie asked themselvesin 1982. Bob had been banding granular fertilizer into stubblebut when he ran out of stubble, he put the remaining fertilizeron some summerfallow acres. Since the crop was much better onthe fertilized summerfallow than that which had not been fertilized,he and Wendy decided to eliminate summerfallow from their rotation.In 1983, their entire acreage was seeded and they moved into continuouscropping.

While the Eyolfsons could see the benefits of continuously cropping,they weren't yet ready to make the switch to direct seeding. "Wheneversomeone began to talk about direct seeding and zero tillage, I'dgo look for someone more intelligent to talk to," jokes Bob.Bob explains that because he and Wendy are pedigreed seed growers,he felt every field needed to be worked to control weeds and volunteercrops. "We used intensive tillage but round about 1990 Ibegan to "see the light" and realized that those directseeders did know what they were talking about," says Bob.That's when he began to attend SSCA conferences and workshopsabout direct seeding.

In the fall of 1992, no stubble was worked on their farm as conditionswere just too wet. That winter, they sold their cultivators andair tank and bought an air drill. In 1993, they began to directseed. Did they have any misgivings when they began direct seeding?Bob says no. "By attending all those conferences and hearingso many producers speak, I knew the system would work. It wasjust a matter of getting out there and doing it for ourselves".

Bob and Wendy have been seeding with a boot that enables themto double shoot and single side band. However, under wet conditions,they found that the fertilizer opener tended to plug. In 1996,they are using a prototype opener designed by Morris. It, too,has the ability to double shoot and single side band with lesssoil disturbance as the seed row will be more compact.

The Eyolfsons have experienced a few drawbacks in their directseeding. "Learning to seed at just 5 mph instead of 7 wasquite an experience", says Bob." And you lose your volumediscount on diesel because you don't use enough!" To counterthese drawbacks, the Eyolfsons point out the many benefits todirect seeding. "We no longer have to watch our dirt blowingpast our window," says Bob, "and our land is in bettershape." Any stone picking these past 2 years has been accomplishedby hand, the stone picker hasn't even been hooked up to the tractor.With the registration of pre harvest Roundup, their concerns aboutthistles have been greatly reduced. Quackgrass is also under control.Bob thinks his weed problems are no worse than those of his conventionalseeding neighbours and certainly wild oats and wild millet areno longer a major problem.

Bob and Wendy have a variety of crops in their rotation includingcanola, peas, sometimes lentils (although weed control is a problem) durum, spring wheat and barley. Wendy says "A direct seedingsystem is a lot trickier when you grow pedigreed cereal seed butit can be done." Bob suggests that rotations be watched closely."When moving from barley to wheat, use a pulse and then anoilseed as isolation crops."

When asked what advise he has for producers thinking about directseeding, he offers this " First of all, don't believe theskeptics! You won't go broke direct seeding. Don't go part way,go all the way! If you buy an air drill, use it. Don't work theground first and then seed. That machine has the ability to seedinto stubble for you so do it. And while you're at it, doubleshoot."

Bob and Wendy Eyolfson farm near Leslie. They have 3 children,Jennifer, Kimberly and Amanda.

State Of The Union Crop

By Bob Linnell

SSCA Soil Conservationist

So, How is your crop coming along? Once again, this is the favorite topic of conversation in rural communities. And then we "get into it".

If you are a newcomer into the world of direct seeding, you are probably out there walking the fields just like everyone else, so really, nothing has changed much has it? Or has it? Depending on the job of weed burndown prior to seeding and if you didn't scrimp, (you didn't, did you), you are probably not feeling all that pressed to get spraying done, because you still have reasonably clean fields. You still have the second chance to go out and control the remainder of the weeds that come at the same time as the crop, which is about now.

Spring seemed to be rather a shortened affair this year, what with cool conditions existing over much of the prairies, and some of the areas under a wet regime, leading to later than normal seeding dates. It's interesting to drive around the country a bit and compare crops right now and see the difference between conventionally seeded crops and direct seeded ones. Conventional crops tend to be seeded just a little deeper than direct seeded and therefor are a little later emerging. Experienced direct seeders could adjust the depth to a shallower level. Providing they traveled at the proper speed (you didn't go 6 or 7 miles per hour did you?) the crops came up very quickly and have a nice even appearance over the whole field. **And That's A Nice Feeling**, especially if you own one of those crops.

Seeding Rates

One other noticeable difference this year are the direct seeded crops that were seeded at slightly higher rates. Heavier seeding rates (1 2/3 bushels versus 1 1/4 bushels previous) increases the proportion of main stems and first tillers in the crop which results in higher yields. There is scientific evidence to prove this and just now, serious direct seeders can began to take advantage of the situation. Under ideal growing conditions (good moisture and fertility), about 87 to 90% of the yield of cereals in this part of the world originate from the main stem and the first tiller, with the remainder of the yield coming from subsequent tillers. A lot of years, there are gaps in one of those required conditions and we see less than record yields. As we all know, direct seeding provides extra moisture for the growing crop by residue management, low disturbance of the soil and good crop rotation. Barley is the exception, because of it's extensive root growing capacity. Barley depends more than wheat on the extra tillers for the extra yield, but still responds to moisture and nutrients. However, experienced direct seeders still tell us that heavier seeding rates for barley pay.

Openers

Manufacturers are still working on "**The Perfect Opener"**, that will work in all conditions , and judging from the appearance of some fields this spring, the emergence factor still requires some perfecting. Plugged fertilizer or seed runs are easily seen from the roadside and stay there as reminders that we should have looked back more often, or at least taken the time to stop and unplug. Ah well, Next year. One ingenious farmer went to the local hockey rink and gathered up all the broken sticks from the winter, went home and painted them white and placed them in his field (The one right next to the highway) to mark out the misses, prompting many of his neighbors to ask what sort of a trial he was conducting in his field.

Direct Seeders -- Be Proud is how you should be feeling after the tremendously rapid rate the crop was placed in the ground when conditions were finally good or at least somewhat workable. If a large part of the province had been seeded with the traditional or conventional methods of more than one pass , there would have been even more delays in placing the seed in the ground. **Direct Seeding works**.

The one pass method allowed the acreage to move from a 30% of the total crop seeded at one point to over 90% seeded in as little as one weeks time. Conventional seeding would not have made that possible unless everyone seeded on a 24 hour basis. We are setting up for a great looking crop, lets hope we can pull it off to take advantage of those favorable prices expected in the fall. Tell your friends what a great direct seeded crop you have coming, or even better, put a few of them into the pickup and travel around to show them. You can contact your local regional soil conservationist with the SSCA and they will probably help you organize and conduct the tour. Watch for a tour near you.

Direct Seeding Doesn't Delay Northeast Director

by Garry Mayerle

SSCA Soil Conservationist

The late wet spring we all just experienced did not mean that all direct seeders took a back seat at getting their crop in the ground. Ed Beauchesne respected direct seeder and SSCA director was very pleased with his grain production system this spring. He says he was able to get on his land 3 to 4 days ahead of his conventional counterparts.

Ed and his wife Marguerite farm north of Prince Albert right next to Albertville. The land they farm is black with mostly a loam texture. Ed says direct seeding has built up the structure of his soil. He is really amazed at the number of earthworms on his land. Increased water infiltration is the reason Ed claims for their success this spring. In fact Ed says after more than an inch of rain one Friday and Saturday morning they were seeding again late Sunday afternoon! They do not mud their crop in but Ed says as long as it wasn't balling up we were able to go and the crops look great.

Seeding shallow is another reason Ed claims for their success at early seeding. They seed with a Flexi-coil 5000 air drill spaced at 7.2 inches and equipped with Dutch Eagle Buster knives. These knives leave a trench which gives the seed good contact with the soil at shallow seeding depths. Ed says draft is very low with these openers and the field finish is smooth enough to spray in any direction. Liquid fertilizer is dribbled on either side of the shank and mixed into the soil as it flows around the shank. (see photograph) This year Ed tried out a blend (90 lbs. N, 30 lbs. P, and 20 lbs. S) on canola on some very sandy land and didn't see any damage.

Residue management is very important to Ed. An article in the Fall 1995 Prairie Steward features Ed's chaff collection system. Ed runs a 9600 John Deere combine and last year the company came up with an straw chopper upgrade that has made Ed really happy. He takes a 25 ft. cut both swathing and straight cutting and has made a general practice of harrowing. All Ed has used are diamond harrows but he travels 15 mph to keep them clean and he is out there right behind the combine if possible, during the hottest part of the day. However, last year the straw spread was so good that he didn't harrow any fields. He says the only field that they had problems with this spring was one of his son George's which had a heavy mat of pea stubble. Something new he tried on this field was using a coulter fertilizer applicator to cut up the vines. This implement had ribbed coulters on 12 in. spacing. They went over the field in two directions but Ed feels once probably would have been sufficient. He eliminated the plugging problem he was having with the drill. The coulters also opened up the mat and brought up a bit of dirt to help warm the soil.

Weed control is the one constant struggle Ed indicates you really need to keep up on. Not many direct seeders in the north east use fall 2-4-D but Ed was extremely happy with the results when

he tried some last fall. In the last week of October he applied 5 oz./ac. and did a good job on Shepherds Purse and Stinkweed. At the beginning of Oct. he also tried 10 oz of 2-4-D and 1/3L Roundup per acre and really laid back the dandelions and got the cleavers. He seeded these fields earlier and didn't need any spring burnoff. He is also very positive about surface applied Edge for canola although he only expects 85% control of wild oats. One of the big benefits he sees is rotating herbicide groups even though he has to spot spray with a post emergent. Preharvest is playing a big part in weed control and harvest management with about 50% of his acreage to be covered each year.

Another important thing in direct seeding is finding the right rotation for your production system. Ed says he sticks with the basic cereal - broadleaf rotation except the for the odd time when they put oats on wheat stubble.

The Beauchesne's started experimenting with direct seeding years ago under the Save Our Soils program. Ed cites benefits such as better yields, fuel savings, reduce machinery investment, less labor and soil conservation. The two things he emphasizes are, "we are better off economically" and "I want the land to be ready for the next generation."

The Role of Summerfallow in Direct Seeding Systems

By Eric Oliver

SSCA Soil Conservationist

Does fallow have a role in direct seeding in the southwest? Well, there are several reasons why farmers summerfallow. Essentially the main reasons why farmers include fallow in their rotation are for weed and disease control and soil moisture conservation. Direct seeding has often been looked on with skepticism in the south west for these very reasons. However, there are many farmers who have adopted direct seeding in the south west that have successfully and dramatically reduced the amount of fallow in their rotation or have eliminated fallow altogether. In addition, in the majority of these cases, the method of fallow has also changed from tillage to chem-fallow.

Weed and disease control has long been one of the primary reasons for maintaining tillage-based fallow. Your success is readily evident and the practice has been around a very long time so farmers tend to be very comfortable with it. Many farmers believe that tillage also helps reduce disease problems. However, research has shown that there is actually less disease problems under direct seeding as compared to conventionally tilled systems. For weed control, there often is a mistrust of relying solely on herbicides by many farmers which also helps justify conventional tillage practices. However, poor weed control using tillage under wet or very moist soil conditions is not uncommon and is very often not given the same criticism. In addition, under low disturbance direct seeding, some factors are generally not acknowledged by those considering changing to this system. First of all, by switching to a low disturbance system (seedbed utilization of 50% or less), many weed problems are significantly reduced. Many weeds rely on mechanical disturbance in order to germinate. Wild millet (green foxtail) and kochia are two good examples of this. Wild oats is another major problem weed that tillage promotes its growth. Low disturbance direct seeding minimizes this problem and combined with shallow seeding, helps to reduce the depth of the "seed bank" in the soil. The narrowing of the depth of the seed bank will also allow the zero-incorporated granular herbicides to be most effective.

Crop rotation is often an overlooked aspect of weed control. For direct seeding to be truly effective and profitable, the cropping rotation needs to be expanded from only cereals. Research indicates that a continuous cereal rotation is the least economic rotation. Once one or two broadleaf crops are included in the rotation, the advantages to weed control and improved soil quality can be realized. Most crops can out compete weeds as long as they emerge before the weeds and form a canopy. Low disturbance direct seeding will improve crop emergence before the weeds. Rotating broadleaf and cereal crops also forces you to change herbicides and the herbicide grouping. This can help control grassy weeds in broadleaf crops and broadleaf weeds in cereals. Changing herbicide groups will also break any herbicide resistance problems that may be developing.

Expanding the crop rotation will also improve the soil by increasing the organic matter and in the case of pulses, add nitrogen to the soil. Every tillage operation breaks down existing soil organic matter. The 50/50 conventional system over the last 70 to 80 years, combined with excessive tillage operations, has been responsible for a significant loss of soil organic matter in our soils. Organic matter in the soil helps retain soil moisture and will be a major factor in how readily many soils will crust. It is also a major nutrient store. Direct seeding helps to maintain and increase the amount of organic matter in the soils. Many farmers have expressed significant changes in their soils the longer they direct seed. "The soil has become much more mellow and doesn't crust as easily" is a common comment I have heard.

Soil moisture is probably the most limiting factor to us in the south west. Conserving this soil moisture is probably one of the major challenges for farmers. Summerfallow has been one of the traditional methods used to conserve moisture. However, it is actually a relatively inefficient system of storing moisture. Usually only about 10-15% of the annual precipitation is stored. If one can store as much or more through snow trapping in standing stubble, why would you opt for summerfallow? Other snow trapping practices can be employed to increase the amount of moisture that can be stored in the stubble. If the organic matter in the soil has increased and there is good surface residue left due to low disturbance direct seeding, the potential for extending your cropping rotation from the traditional two-year, 50/50, to three or four years is definitely there. Maintaining good surface residue will also help keep the moisture that is stored in the soil through reduce evaporation and wind speed. Problems with heat cancor and shearing of the seedlings are virtually nil under direct seeding as compared to crops seeded on summerfallow.

Chem fallow is a good option to consider if fallow is used in your extended rotation. With the relatively low cost of non-selective herbicides like Roundup, it is hard for three or four tillage operations to compete economically. In addition, just look at the amount of erosion from wind and water that occurs on any summerfallow field compared to that of a chem-fallowed field or fields direct seeded. Erosion is a short-term **and** long-term cost!

Now after promoting the benefits of chem-fallow, there are instances where tillage has a role under direct seeding. Some weeds like established stands of foxtail barley are very difficult to control economically with herbicides. In the case of foxtail barley, discreet tillage or spot tillage of patches can be very effective. If there is widespread infestation of this weed across the whole field, it may be more effective to use tillage for that year and get control of it. However, as mentioned before, crop rotations can also be utilized and be very effective in controlling this pesky weed.

The whole concept of direct seeding is still relatively new to farmers in the south west. As in most cases with something new, farmers will watch their neighbour and see how it will work before making the switch themselves. Another constraint to those making the switch is there tends to be a time lag of a few years before some of the benefits of low disturbance direct seeding become evident. However, those that stick with it have all observed and realized the benefits of direct seeding. Although it is unlikely that we will see the elimination of summerfallow in the south west any time soon, we are seeing a reduction of summerfallow acres, more chem-fallow when there is fallow, and more farmers are extending their rotations. These are all positive steps and will help to increase the soil quality and resistance to factors such as

drought and erosion. By remaining flexible in the farming operation, direct seeding can help to improve the bottom line and the soil.

Direct Seeding With Anhydrous Ammonia

by Garry Mayerle

SSCA Soil Conservationist

Herb Bartel and his son Craig of Lanigan have been using anhydrous ammonia in a one pass seeding system for three years with excellent results. The first year Herb seeded with ammonia it was a dryer year and he tried several strip trials of different rates. On cereals he went up to 70 lbs. of actual N. He saw no evidence of fertilizer damage. In fact at harvest time he says he wished he would have used 70 lbs on everything because of the higher yield he observed on the cereal trials. He also went up to 75 lbs on canola. Although he didn't see yield improvement there was no damage!

The Bartels seed with a 4480 Harmon Airdrill. The u nit they are running now has 12 in. spacing. This replaced the previous machine which had 8 in. spacing. One of the main differences that Herb comments on is that the narrow spaced machine sometimes plugged in heavy residue.

The opener that the Bartels use is Harmon's double shoot opener. Fertilizer is knifed in with a bullet shaped eagle beak. A paired row splitter places the seed to either side of and shallower than the fertilizer. This year Herb was able to get his air velocity down to the place where he is getting two distinct rows about 2.5 in. apart. On this particular opener the splitter can be raised or lowered in comparison to the fertilizer beak opener. This allows fertilizer depth to be varied while keeping seed placement depth constant. Another boot has been placed between the knife opener and the seed splitter. It gives Herb the option to triple shoot.

The machine is set to place the anhydrous ammonia about 2 in. deep and most of his seed at the 3/4 in. depth. Herb says when Westco used their ammonia detection kit this year they found that he had separation of about a loony and a half between the seed and the ammonia band. They said a loony would be adequate. One of the problems encountered with using ammonia is that the opener can freeze up and then soil begins to freeze to the opener as well. Eventually the opener becomes a big ball of soil. Herb finds that running the plastic ammonia line all the way to the bottom of the opener so that no ammonia touches the metal of the opener has eliminated the freezing problem. Harmon uses a hollow shank to the fertilizer beak. Herb found that the air delivery system used to place dry fertilizer down with the ammonia blew ammonia out of the soil. Triple shooting has helped to solve that problem.

Herb has spent a lot of time re-manufacturing the air seeder cart and the ammonia tank to make a system that he was happy with. Last year they used a 1500 gal tank with 16.5L-16.1 tires but the rounded surface of the tire cut too deep leaving ruts. Last winter they modified it with 18.4-26 combine tires and Herb says it really reduced compaction and saved them from getting stuck on a wet year like this one. Herb has turned a Prasco air tank into a tow behind 3 tank system using a Morris air delivery system. He has a total capacity of 300 bu. and uses 18.4-26 tires on the front and 23.1-26 tires on the back. The ammonia tank tracks inside the air seeder tank tires.

As far as doing a good job of direct seeding Herb says that one of the critical things is a good residue spread. They use a Kirby spreader but it is difficult to make it do really great job on a Gleaner combine. Herb uses a heavy harrow on heavy residue cereal stubble in the fall. They farm on soils with mainly a sandy loam texture. Although they were able to start seeding as early as their conventional neighbours they could not make as good a time because they had more slippage especially on those fields where there was a mat of residue. Herb feels that more heavy harrowing could really eliminate some of these problems.

Some other important direct seeding practices that Herb follows are a good rotation that looks like this most of the time: pea - cereal - oilseed - cereal. Spring burn-off is also a direct seeding practice Herb follows. He is starting to use more preharvest Roundup and expecting that preharvested fields may not need the spring burn-off.

Herb and Craig seeded about 4500 acres this past spring. 1500 acres were custom work. I'm sure if you have any questions about how they do it Herb would be happy to talk to you.

Science Fair Project

By Juanita Polegi

SSCA Soil Conservationist

While at school one day, Jennifer Eyolfson of Leslie was told that in order to look after the soil properly, the land needed to be left idle and given a rest at regular intervals. That information came as a surprise to Jennifer. "At home, my dad has been continuously cropping for years and direct seeding since 1993. I wondered who was right."

With a science fair project to think of, Jennifer decided to gather information on soil conservation and the benefits of direct seeding. Since the winter of 1995-96 had been so windy, it was easy to see the differences in soil loss between the fields where the stubble had been left standing and those fields that were either summerfallow or had been worked a couple of times in the fall. After compiling her information, Jennifer put together a project entitled "Direct Seeding vs Conventional Tillage: Which is better for us and our environment?"

Jennifer's display featured a graph and charts, a number of photos of soil degradation and soil conservation practises and a news article she found in the Foam Lake Review on the importance of soil conservation. She also had an interesting demonstration at her booth. "I filled 2 plastic tubs with soil and cut holes in the side of each tub. The first tub contained bare, black soil. The second tub held soil with standing stubble. To illustrate how well -- anchored soil is much less susceptible to the forces of water, she poured water over both tubs. While the water not only poured out of the tub with the bare soil, great amounts of soil were carried with it. The tub containing the stubble, however, allowed only a small amount of water out of it and that water had no soil mixed with it."

Jennifer's project showed a lot of people at the Science Fair that some of their ideas about farming and what is good for the land need revising. Hats off to a student who took the initiative to check the facts and present them in a meaningful manner!

New Projects at the CLC

By Patricia Flaten

CLC Manager

New projects are continually being added to the farm at Prince Albert. They address issues in direct seeding, trees, and forages. Some are strictly for demonstration purposes and some are research projects which are managed by scientists from various agencies.

New demonstrations for annual cropping include the SSCA Direct Seeding Do's and Don'ts Plot which Regional Conservationist Ken Sapsford put in with a well-travelled Flexi-coil 'mini-drill'. You may have seen similar plots which Ken established at several sites this spring. It shows what happens to peas, wheat and canola seeded at various depths and with seedplaced and sidebanded fertilizers.

We are also pleased to have a demonstration of three herbicide canolas, about 1-2 acres each, which are looking quite good. The Canadian Wheat Board has set up a very educational cereal variety demonstration plot which goes well with the alternative crops plot that the P.A. ADD Board has sponsored here for three years. The University and Sask. Wheat Pool continue to study the notion of applying anhydrous ammonia in a one-pass seeding system; this is the second year of the study.

Our forage grasses, seeded last year had a tough time establishing during that dry summer, but may be ready for seed harvest this year. The forage species garden continues to grab many people's attention. Two brand new alfalfa research plots have been established by Agriculture and Agri-Food scientists. Bill May from Melfort has seeded Roundup-treated alfalfa seed to see how well it will germinate in field conditions and Dr. Hugh Beckie of Saskatoon is looking at single and dual (nitrogen fixers and phosphorus) inoculants for alfalfa seed.

The trees planted in the last 2 years are really starting to look like something. Of course, it will take longer for the white spruce to stretch up, but the Scots pine, green ash and poplars are quite noticeable. This spring, we added a small demonstration of chokecherries, pincherries and saskatoons. Perhaps we'll have to learn how to make pie in the next 5 years!

Royal Bank, New Partner

We, at the Conservation Learning Centre, are pleased to announce that the Royal Bank of Canada is now joining us as a three year partner in the farm. This partnership allows the farm to do just that much more in terms of the operation itself, sprucing up the grounds and paying some of the costs of bussing out groups such as school classes for their program at the CLC. Thank-you!

Call for Tools 'N Stuff

The Conservation Learning Centre is in need of some basic shop equipment and tools, perhaps even field equipment if it is in excellent shape. If you have an item that you think may be of use to us and you would like to donate it, give us a call. Tax-deduction receipts are available. For instance: hammers, punches, wrenches, other basic hand tools or power tools, liquid fertilizer bandwagon, liquid fertilizer tank, hay wagons (tour wagons). Call 953-2797 for more information.

Thanks again!

As always, the staff and steering committee is grateful for the generous and enthusiastic support of our partners and sponsors. It is through this cooperation that we are able to do as much as we are doing at the CLC. Hats off to these agencies:

Canada's Green Plan

Ducks Unlimited Canada

SSCA

P.A. ADD Board

Agrium

Royal Bank of Canada

PFRA

Monsanto Canada

Canada-Saskatchewan Agriculture Green Plan

Melfort Research Farm Saskatchewan Agriculture and Food

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Zeneca Agro

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National Hydrology Institute

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Zeneca Seeds

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Canadian Forest Service

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Sandoz

Sask. Wheat Pool

Zeneca Seeds

Esso Farm-Tek

Westfield Augers

BASF

MicroBio RhizoGen

Saskatoon Farm and Garden Centre

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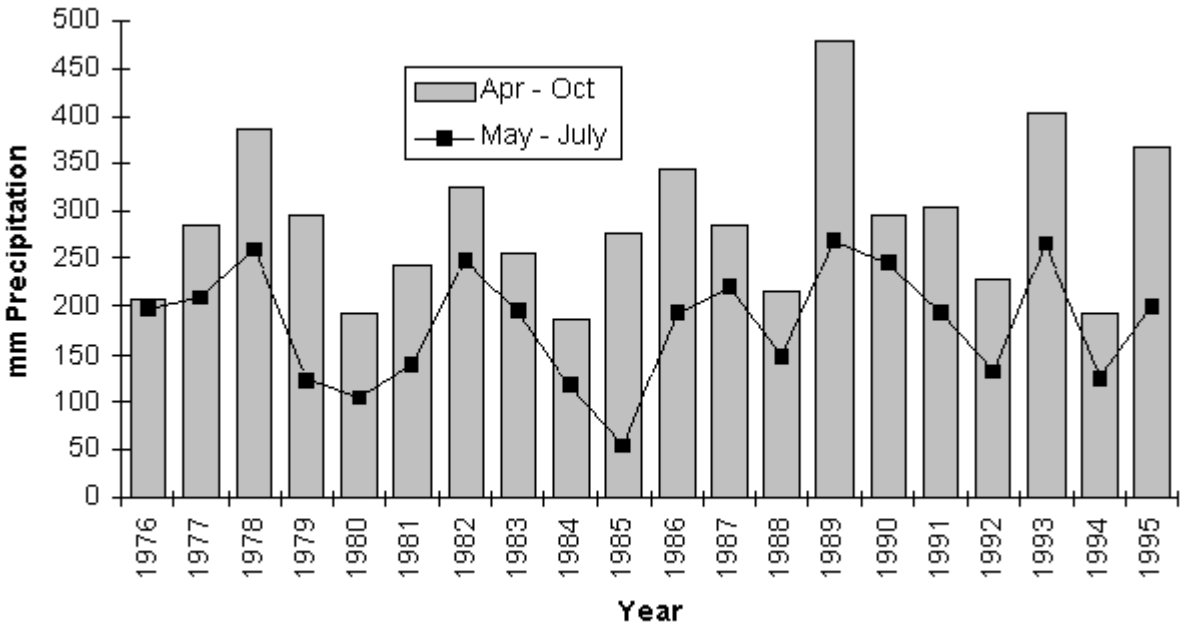
President's Message

By Lorne Crosson, SSCA President

The long cool and damp spring we experienced this year enticed me to have a close look at the precipitation records I have been keeping for our farm since 1976. In the chart below notice how the April to October precipitation varied in regular 4 year cycles between 1978 and 1986. The 4 year trend was broken with a peak 3 years later in 1989, followed by another peak 4 years later in 1993 and another peak 2 years later in 1995. The growing season precipitation (May to July) followed the same general trend with the exception of 1985 when most of the precipitation came after the growing season. This year April precipitation is higher and May precipitation about the same as the 20 year average. What are your guesses for precipitation the remainder of this growing season?

Average April to October and May to July Precipitation

(SW35-8-2-W3)



Precipitation and temperature play a very important role in selecting crops to grow in the brown soil zone where I live. I have been continuous cropping wheat and durum alternately for a number of years even though a cereal-cereal rotation is not ideal. The choice of alternative crops to the cereals is not large. Flax and mustard (and possibly canola) are suitable oil seed crops but a legume crop would be more desirable. Addition of a legume to the rotation would help to maintain the organic matter in the soil and, as a bonus, reduce fertilizer costs in the following crop. Lentils are grown in this area but they leave very little residue on the surface after harvest

subjecting the soil to wind and water erosion until another crop is established. Field peas on the other hand provide a respectable amount of residue after harvest.

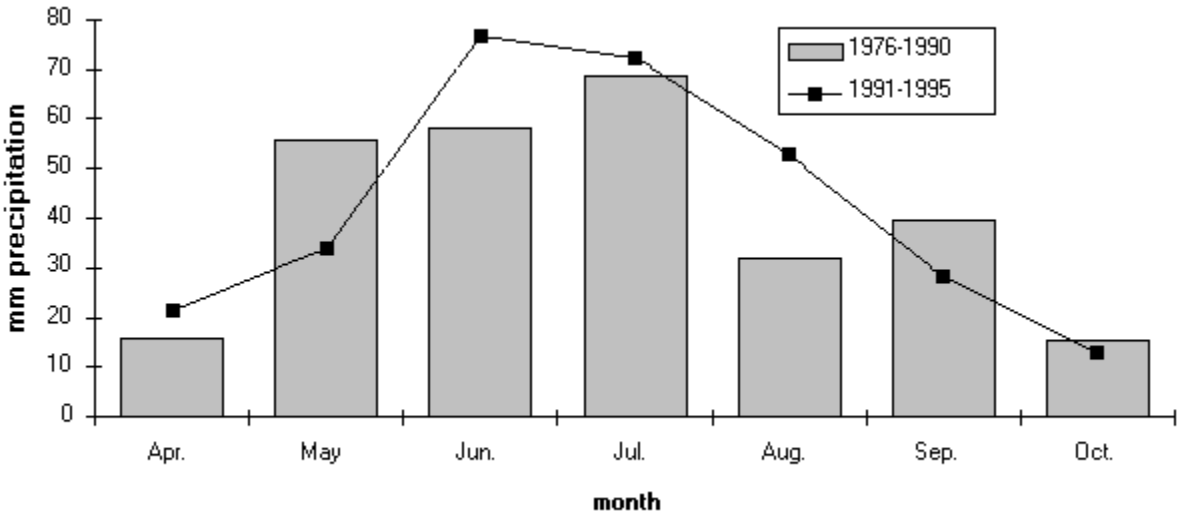
Until recently it has been assumed that the brown soil zone is too hot and dry for growing field peas. The use of direct seeding may have changed that. Cutforth and McConkey at the Semiarid Prairie Agricultural Research Centre (SPARC) reported that wheat seeded into tall wheat stubble yielded 10 to 12% more grain than wheat seeded into a cultivated seedbed. The tall stubble altered the micro climate enough near the ground to provide for more efficient use of moisture. The same may hold true for peas. Recently a number of researchers, including Slinkard (Crop Development Center, U of S), Lafond (Agriculture and Agri-food Canada, Indian Head), Miller (SPARC), McAndrew (Agriculture and Agri-food Canada, Morden) and others, have reported that peas do very well under direct seeding.

In plots at Assiniboia and Swift Current, Miller found that field peas yielded an impressive one third more than wheat when grown on cereal stubble. By direct seeding peas into tall cereal stubble, the pea seedlings are protected from winds and high temperatures and more moisture is available for plant growth. Add early spring seeding to allow the peas to get through the bloom stage before high temperatures hit in July and they may be a success in the brown soil zone.

Miller has advised caution in drawing conclusions from his results since the last few years have been cooler and wetter than normal. According to the precipitation records from our farm about 16 km west of Assiniboia, there has been a change in precipitation patterns over the last five years. As you can see from the following figure, on average between 1991 and 1995 we received less precipitation in May, September and October and more in April, June, July and August than on average during the previous 15 years (1976-1990).

Change in Average Monthly Precipitation over Time

(SW35-8-2-W3)



These changes in precipitation patterns combined with lower than normal spring and early summer temperatures may have made conditions more favorable for growing field peas.

Some of my neighbors have been growing field peas successfully for several years and more and more farmers in the area are adding them to their rotation. Last year I grew peas for the first time and was suitably impressed to grow them again this year. I hope to alternate peas with spring or durum wheat, and maybe add an oilseed in the future. I'm counting on direct seeding to get the peas through the drier years. The ability of direct seeding to moderate the micro climate enough to allow farmers to consistently grow field peas in the brown soil zone is a subject worthy of further research. Tell us about your experience growing field peas in the brown soil zone by writing or calling the SSCA head office or myself.

Soil Conservation - Is it our priority?

By Doug McKell

SSCA Executive Manager

Maybe my kids are right. I guess I am getting pretty dense. Otherwise why can't I figure out the reason conservation efforts and environmental protection movements don't get the priority they deserve. A good example of this is society's reaction to the issue of soil degradation. A few years back the United Nations set out to study the most pressing problems facing the sustainability of our earth. Their report indicated a number of areas where we are in danger. Number one on the list was not war or disease, it was not global warming or pollution. It was soil degradation! The number one problem facing the earth as far as the nations of the world were concerned is soil degradation but not one headline or news report in this part of the world featured this item. I don't get it! We sure get upset about other things like clear cutting the forests, oil spills in the ocean, AIDS (which gets more research dollars than breast cancer but affects only a small percentage of people comparably), even the price of gasoline gets more news copy than soil degradation. Gas in the city of Regina goes over sixty cents a litre and we have MP's initiating studies to satisfy the massive disapproval. Where are our priorities?

Recently I watched a news report from Vancouver where several irate motorists vented their feelings over the lengthy closure of a lane on the Second Narrows bridge resulting in two hour delays getting to work. Noticeably absent in the news report was the fact that most vehicles in the traffic jam were less than half full. Most had one occupant, the driver. I thought, maybe they should close a lane on all the bridges in Vancouver forcing a shift to a more environmentally friendly form of public transit like car pooling, busses or light rail. People are more concerned more about their disrupted lifestyle than the fact they are pumping tons of C02 into the atmosphere which may affect our very future.

We don't have to go out of this province to find examples of questionable priorities. The recent emphasis on innovative programs and diversification faces all government, non-government and commodity groups on the prairies. But should innovation and diversification be the goal if resource sustainability and non-government groups like the SSCA are not given the same billing. Lately the SSCA has had to fight like hell to receive public support dollars for work that certainly will affect the public well being. You're not offering anything innovative or diverse we are told. No, we are not offering anything too diverse or innovative we are just trying to protect the one resource that the world deems is in danger and the one which is tantamount to our eating needs. Sure we must strive to be innovative and diversify out of our resource based economy to sustain ourselves in the future. This is a laudable objective but lets not forget about those important resources like our soil which provides us with our food. We can be as innovative and diverse as anyone on the planet but one fact must not be overlooked. No soil, no food. It's that simple.

I can partially understand ones apathy toward soil conservation. It's not like we haven't previously addressed the issue. The SSCA has recently been working to limit soil tillage by promoting low disturbance seeding (LDS) techniques. Other groups and government organizations like the PFRA have worked for years initiating soil conservation measures. Currently we estimate Sask. has over 17% of our soil protected from degradation as a result of LDS. This is great! Saskatchewan has a better record than anyone when it comes to soil conservation programs. However, people say lets move on and be innovative and diversify. I've heard several people (one of them being an esteemed U of S professor) make the comment that no more funding needs to be placed towards direct seeding initiatives. After all there is now an air seeder on every quarter section so lets move on, lets go do something innovative.... Wait a minute. What about the other 83% of our land that is still being tilled extensively? Shouldn't we still be pushing to get those acres protected? What about the soil we see in the ditches all across Saskatchewan every winter and spring? What about those farmers who are just getting into a soil conservation program like LDS? If we want to foster innovation in agriculture maybe we should help these farmers who will be experiencing new crops and rotations as a result of adopting a seeding system that will seem very diverse and innovative to them.

It's like we have a tumor in the body that needs treatment and after a couple of chemo shots the doctor says, "well I think that's starting to work lets forget about any more treatments. I want to try out this new liposuction technique on that double chin of yours. It will make you look so much better to others." Why do I not get the drift of this picture? Maybe someone smarter than me could explain this. Would you do that, those of you who complain about sitting alone in your car in a two hour long traffic jam, or you who get motivated by the high cost of gasoline or you who build 2000 square foot wood frame homes for a family of three or those of you who complain about farmers spraying pesticides while you wash out your paint brushes in the back yard and keep that gray hair under control with some chemical for which you show no concern? Clue me in please.

In the meantime, those of us who are more concerned about the more important issues to the planet should mention our concerns to the policy makers. Make a little more noise. About the same amount of noise that is coming from those who suggest we should be more innovative and diverse should be about enough.

Soil Temperatures and Emergence

By David Shortt

SSCA Soil Sonservationist

This spring was characterized by cool soil temperatures. Soil temperatures were warming up rapidly at the end of April and early May. However cool conditions and snow showers occurred at the start of May. Minimum soil temperatures for wheat to germinate is 5C. However at this temperature emergence takes up to 21 days from a 1 inch seeding depth. Soil temperatures decreases with depth and wheat takes longer to emerge when seeded deep. Work done at the Indian Head Research Station indicated that soil temperatures could easily fall below 5 C due to adverse weather conditions even though it had reached 5 C. However when soil conditions reach 10 C they did not fall below 5 C

Measuring soil temperatures involves taking the temperature at the depth of seeding. Temperatures should be recorded early in the morning when the soil is at its coolest temperature and later in the afternoon to see how much it has warmed. The coolest temperature recorded should be used as a guideline in making the decision as to when to start seeding.

At the Wilkie direct seeding site May 10, the day of seeding, soil temperatures were at approx. 5 C in the morning. By afternoon the temperature had rose to approx. 10 C. the following three days temperatures cooled off coupled with cold rain and snow showers. Soil temperatures stayed in the 5 to 7 C range. Wheat seeded at the one inch depth did not emerge until May 24 approx. 14 days after seeding. Had the wheat been seeded deeper it would have been more susceptible to seed rots, root rots and possible herbicide injury from preemergents.

Another factor in how fast the soil warms is the texture and the amount of moisture that is present. The soil at Wilkie is a loam soil. Clay soils east of North Battleford were 2 - 3 C colder than the soil at Wilkie due to their heavier textures and higher moisture contents.

Soil temperatures on worked summerfallow were similar to standing stubble this spring. Emergence of wheat was not noticeably faster on these fields when seed at the same depth. Worked summerfallow had wider swings in their temperatures due to the lack of an insulating effect from standing stubble.

Measuring soil temperatures can be a useful tool when making the decision to start seeding. Tracking your soil temperatures is another crop management tool that should be used to evaluate the risk in early seeding.

Incorporated Herbicide Trial at the Wilkie Field Day

By David Shortt

SSCA Soil Conservationist

In response to farmer inquiries on the effectiveness of using unincorporated preemergent herbicides, a demonstration was held at the Wilkie Direct Seeding Field Day.

Four herbicides, Avadex, Fortress, Edge and Treflan were applied to standing stubble in October 1995. The plots had grown approximately 25 Bu of wheat per acre and had the straw and chaff spread uniformly. The original height of the crop was 12 - 18 inches with approx. 3 inches of stubble remaining. No harrowing was done in the plots. The plots were seeded May 10 to canola. Three different types of openers were used, a sidebanding knife opener, a disc opener and a sweep. Because this was a demonstration field sized equipment (40 feet) was used. Due to adverse weather conditions and low soil temperatures crop emergence occurred May 24 and wild oats emerged several days later. Wild oat counts were done June 10. The following table summarizes what was found.

	Spoon/Knife	Disc	Sweep
Avadex	5	5	4
Fortress	5	5	2
Edge	8	3	2
Treflan	12	10	13
Check	37	36	25

This demonstration was not research so only a general trend can be concluded. The fall application of these chemicals gave from 65 % to 85 % control. The type of opener did not seem to affect control or wildoat numbers. Overall one can conclude that fall application of preemergent herbicides without incorporation shows definite promise in zero till systems.

Soil Type and DirectSeeding

By Juanita Polegi

SSCA Soil Conservationist

The other day in the office, while chatting with one of the farmersabout seeding progress and direct seeding, he remarked, "Direct seedingsure is a good thing ... but it won't work on my soil!" When he left,I conducted a little poll among the other SSCA staff members and askedthem how many times they had heard that comment. The answer? MANY!

Why, then, is direct seeding practiced successfully all across the provinceand yet there are those who think their soils are preventing them fromalso adopting the practice? Do they know something that we at the SSCAhave overlooked? Hmmm. Who better to answer this question than the guruof Saskatchewan soils, Les Henry. Les is with the Department of Soil Science,College of Agriculture, University of Saskatchewan.

I asked Les if he could identify any soils in the grain growing regionof Saskatchewan where Direct Seeding won't work. Les replied, "I don'tknow of any specific soil type that can't be direct seeded. It seems ifsomeone has problems with the system, it relates more to management thanthe soil."

Good. Just what I wanted to hear. Soils are not created equally butthey are not the underlying reason for difficulty in Direct Seeding. So,why can many farmers successfully direct seed while others fear the systemwon't work because of their "soil type"? Perhaps the answer liesin a presentation given at our annual conference in 1994. One of the keynotespeakers at the Conference was Dr. Dwayne Beck with the Dakota Lakes ResearchStation at Pierre, South Dakota. In his address, Dr. Beck suggested thereare many considerations to be taken into account when moving form one systemto another. These considerations can be grouped into 3 broad categories:economic, agronomic and psychological.

From an economic standpoint, Dr. Beck suggests an operation's changeto direct seeding will depend upon the ability of the producer to takerisk, the producer' s knowledge about direct seeding, the labour situationand the type of machinery owned.

In terms of the agronomic considerations, Dr. Beck points out that oneset of limiting factors under the conventional system gives way to anotherset of limiting factors under direct seeding. He uses the example of limitedsoil moisture under a conventional system. Once the operation moves todirect seeding, inadequate soil moisture isn't usually a problem but otherproblems such as crop rotation are of greater concern. He adds that a directseeding system should be designed to "take advantage of the (system's)strengths and minimize the (system's) weaknesses."

Psychological considerations must also be factored into the equationwhen moving from one system to another. Commitment is a key factor in determiningthe success of the transition. He

says, "... be sure you are committedenough to expend the effort and gain the knowledge necessary to make thetransition successfully. There will be problems. You will make mistakes.That happened when you conventionally farmed also. Keep in mind that residueon the soil surface did not cause the problem. If that approach is taken,you will sleep more comfortably and the transition will go faster and moresmoothly."

The SSCA has not been promoting a system that will work on only a few,select soils. Direct seeding is a system that has evolved and been developedso that it can and will work on all soils. Any producer contemplating achange from one system to another must overcome the economic, agronomicand psychological barriers associated with that change. At this point,Dr. Beck's concluding remarks are worth repeating: "Nothing is moreimportant in making a change to zero tillage than careful observation,adequate planning and a positive attitude."

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Grazing Alfalfa

by Juanita Polegi, SSCA Soil Conservationist

Cattle grazing alfalfa is usually a recipe for disaster. But is there some way it can be done successfully? Baz Fritz, Livestock Agrologist with Sask. Agriculture and Food said that over the years, beef producers have asked about how to manage alfalfa in a grazing system but no real information has been available. When the Districts 12 & 13 ADD Board Demo Farm needed a livestock component in its operation, Fritz saw the chance to do a little investigating.

"In 1994, we seeded six paddocks", explained Fritz. "One paddock has a pure stand of Meadow Bromegrass and one has a stand of Crested Wheatgrass. The grass paddocks were planted to lengthen the grazing season in both the spring and the fall. The remaining four paddocks were seeded to alfalfa. Of these, 2 paddocks each have a different variety of tap rooted alfalfa and the other 2 paddocks each have a different variety of creeping rooted alfalfa." Some grazing of the paddocks occurred in 1995. In the spring of 1996, 36 steers were purchased by Heartland Livestock Services over a two week period. The first batch of steers was turned out on the Crested wheatgrass May 23. All the steers were turned on to the Meadow bromegrass, May 30. On June 5, all the steers went to the alfalfa.

To reduce the risk of bloat when the animals were turned into the alfalfa, an anti bloat agent had to be introduced. Finding a method of giving the bloat agent that was palatable to the animals proved to be interesting. "We did two things to try to ensure all the animals were getting adequate levels of the Bloat Guard. We mixed the product with free choice salt and tried to feed about 1 lb per day of rolled oats mixed with molasses and topdressed with Bloat Guard. Unfortunately, only about one third of the animals would eat the oats once they had been treated with the Bloat Guard," said Fritz. He, therefore, could not be sure that all the animals were protected.

"The next method we tried that seemed to work was a barley pellet made with molasses and the Bloat Guard mixed right in to the pellet", said Fritz. The cattle were also being fed a limited amount of timothy hay to keep the rumen functioning normally and aid in the expulsion of gas. "The steers were fed the hay in the morning. On days when they were to be switched to a different paddock, we'd feed them again in the evening."

The study with the steers has enabled theADD Board and SA & F staff to make a number of observations about the risks associated with grazing alfalfa. When the alfalfa growth is very fast and the plant is in the pre-bud stage, the risk of bloat increases. Fritz said, "At this time, the alfalfa is at its most palatable so large amounts can be ingested in a very short time. As well, the cattle don't want for anything else so intakes of hay, topdressed grain or salt and minerals can be inconsistent." By feeding the highly palatable pellets to the steers, Fritz feels enough Bloat Guard is being ingested to counter the problems of too much alfalfa in the rumen.

Moving the cattle from one paddock to a fresh paddock also increases the risk of bloat. " The cattle will generally eat more than normal because the leaves are so succulent, " said Fritz. The pellets and hay help to prevent them from eating so much in a short time.

Bloat is also a risk at night when the days have been very hot. "When daytime temperatures are very high, the cattle spend more time resting than grazing. Then in the evening, they graze voraciously because they are so hungry," explained Fritz. Again, the pellets and the hay help because there is already something "in the gut" when the cattle resume grazing.

Do the different rooting styles of the alfalfa make a difference to the bloating potential? The answer is no. "We haven't been able to see a noticeable difference in the incidence of bloat between the types of alfalfa," said Fritz which is in accordance with research done at the Ag. Canada Research Stations in Kamloops and Brandon.

Fitz has been with Sask. Ag and Food for over 20 years. For more information on grazing forages and bloat management, contact Baz Fritz at the Yorkton Rural Service Centre(786-1509).

Low-Tech Method of Direct Seeding

Pat Flaten

CLC Manager

How many times have we heard people say, "....but I don't want to spend $70,000 (or more) on a new air drill! What can I do to get into direct seeding for less money tied up in the seeding equipment?" We decided that the Conservation Learning Centre was the perfect place to demonstrate one way of doing this. We do not have a large land base, only three quarters of land, therefore, a smaller, lower cost machine would make some sense. So, off we went to check it out. If you have been to any of the SSCA Direct Seeding workshops or if you have skimmed the Direct Seeding Manual, you'll know that there's more than one way to skin a cat - or, for that matter, seed a crop.

Our decision? We ended up buying a 14' Edwards Hoe Drill and added a liquid kit to provide a way of applying all of the fertilizer in one pass. Although there is also an air kit available with the Edwards Drill, we opted for the less expensive and simple gravity-fed system - remember them? We have chosen the Atom Jet openers so as to minimize tillage but still create excellent placement of seed. The Atom Jet opener is about 3/4" wide.

In the past, double shooting our fertilizer and seed has not always been a safe bet. We have applied the bulk of our nitrogen fertilizer as a liquid with a spoke wheel or coulter disc applicator. Wanting to avoid the extra pass, we decided to use liquid fertilizer for our chief nitrogen and sulphur source, placing smaller amounts of fertilizer and phosphorus requirements with the seed.

Have you ever visited the Minnedosa/Brandon area and seen all the ways that producers there are applying liquid N with the Edwards Drill? Many are just getting a liquid kit and taping the liquid hoses to the shank or opener, letting it drag in the furrow or to the side of the furrow, dribbling the fertilizer along the way. Others are welding metal tubes for the rubber tube to fit into. It seems that everyone is adopting their own theories of what could work best. In the P.A. area, Ed Beauchesne has designed a liquid splitter for his openers, to decrease the amount of fertilizer by half in any one path, theoretically decreasing the potential for crop injury.

We were able to enlist the experience of our local fertilizer dealer, Gus Gaudet with Wendland Ag. to design a liquid kit that applies the fertilizer under pressure, creating a distinct stream of liquid, rather than a dribble. One advantage of this is that one can then more easily direct the path of the fertilizer. We can direct it into the furrow or off to the side up to 2" away from the furrow. This is done simply by attaching a bent metal tube at the rear of the opener, which is held by a set screw which allows for adjustment of the stream direction. The thin rubber tube, carrying the liquid has a restrictor tip at the end, creating the stream.

So far, we have used this system for wheat and canola, with excellent results. The crops were healthy and we saved one operation, which was more of a blessing than usual this year, having such a compact growing season.

As we've said before, there are many ways of getting into direct seeding - this is just one more. The creativity of the prairie producer has been proven for decades. Good luck with designing and refining your new systems!

Pulses Fix More Nitrogen with Less Tillage

Doug Derksen, AAFC Brandon Research Centre, A. Matus and C. van

Kessel, University of Saskatchewan & H. Loeppky, AAFC Saskatoon

Research Centre.

Research at Indian Head has shown that with less tillage we have found that legumes fix more N. Several explanations exist for this discovery. Firstly, legumes in conservation tillage grow in a less stressful environment. There is more available soil water and less heat stress.

Secondly, the soil surface layer is more biologically active in conservation tillage. This area has not been explored by researchers in Canada, however, soil samples taken from this study are being analyzed by M. Monreal at the Brandon Research Station to see if a difference in microorganisms will explain the difference between the tillage systems.

Thirdly, since cultivation releases nitrogen from the soil, legumes grown in conventional tillage use released nitrogen rather than fix new nitrogen.

To date, a yield benefit from legumes has occurred in the next years wheat crop. This has been about 10%. Coupled with the yield benefits of conservation tillage, putting lentils or peas in your rotation makes dollars and sense. The following long term rotation work was done at Indian Head in the early 1990's.

Crop	Zero-tillage	Conventional tillage
	Yield (t/ha)	
Lentil	1.15	1.12
Pea	1.40	1.36
	% N from the air	
Lentil	72	62
Pea	79	48

Clearly peas were most encouraged to fix atmospheric N without tillage, but the same was true for lentils. This has also been shown true for soybeans in the US and observed with lupins in Australia.

Direct Seeding Do's and Don'ts

By Ken Sapsford,

SSCA Soil Conservationist

Many farmers are moving into a low disturbance direct seeding system.In their first years of zero till we see some direct seeding "don'ts"quite often; seeding too deep and seed-placing too much fertilizer.

This Spring I set out a number of demonstration plots at Kindersley,Zealandia, Perdue, Rosthern, Prince Albert, Tisdale, Yorkton and Saskatoon.Flexicoil donated the use of a 15 ft. air drill (27 ft drill with the wingsremoved) with their side band stealth opener and a 1330 air cart. At eachsite we seeded the crop at the proper depth and separated the seed andfertilizer then we tried to make mistakes. Seeded too deep, seedplacedtoo much fertilizer, seeded peas too shallow, left inoculant in the sunor never inoculated the pulse or we never used a preseeding Roundup burnoff.

There were a number of tours at these sites over the summer. The mostnoticeable observation was **on a wet year it is difficult to make a mistake**.When we get 1 to 2 inches of rain following seeding, the nitrogen fertilizeris washed away from the seed row and does not effect germination and shallowseeded pulses have enough moisture to germinate.

Seedplaced fertilizer did cause yellowing of the crop at Perdue, Saskatoonand Kindersley and reduced emergence at Tisdale, Wadena and Yorkton. Delaysin emergence and maturity occurred in the cereal plots that were seededtoo deep. We saw poor emergence of peas at Yorkton when we seeded themat 1 inch and didn't receive a rain for 3 weeks.

The best results occurred where we seeded the cereals at 1.5 inchesdeep with side banded fertilizer. Canola at .5 inches deep with side bandedfertilizer and pulses at 2 inches deep, well inoculated, with side bandedfertilizer.

We hope to be able to continue with these Direct Seeding Do's &Don'ts plots next year. All the sites are well marked. If you see one inyour travels, stop and make your own observations.

Crop Emergence Under Direct Seeding

By Eric Johnson

Soils and Crops Agrologist

Saskatchewan Agriculture and Food

What impact do crop residues on the soil surface have on crop emergence and crop development in the Black soil zone of North West Saskatchewan? To answer this question, a three year Canada-Saskatchewan Farm-Based Green Plan project was undertaken in the Lloydminster ADD District.

The project started in 1994. The objective of the project was to compare the establishment and the rate of crop development under three treatments. These treatments were:

1. direct seeding into standing stubble;
2. seeding into tilled stubble;
3. direct seeding where the crop residue was mowed and removed.

Seven cooperators were selected for the project. An additional location was established at the 1996 SSCA Direct Seeding Field Day site at Wilkie.

Each cooperator was asked to select a field where spring wheat was to be sown into standing wheat or canola stubble. The farmers cultivated an area in the field prior to seeding. Also, an area 40 feet by 40 feet was mowed and all crop residue was raked and removed from the field. The cooperator then direct seeded the entire field to spring wheat.

Data collected from the sites included soil temperature, seeding depth, plant emergence, and crop development. Crop development was assessed using the Haun stage. To explain the Haun stage, a plant with a Haun stage of 3.5 is in the three and one-half leaf stage.

Fields were also observed as the crop approached maturity to see if there were any visual differences between treatments.

What are the results? First of all, let's look at crop emergence. The treatments that did not involve tillage had slightly higher plant numbers than the pre-tilled treatment (Table 1). Therefore, the presence of crop residues on the soil surface did not have a negative impact on the number of plants that emerged.

What about seeding depth? The treatments that did not involve tillage tended to be seeded slightly shallower than those treatments that had pre-seeding cultivation (Table 2).

	Pre-Till	Mowed	Direct Seed
1994	151	171	163
1995	162	161	176
1996	201	204	209
3 year average	171	178	183

Table 1: Plant emergence (plants/m^2) under 3 different crop residue management treatments

	Pre-Till	Mowed	Direct Seed
3 year average	1.9	1.6	1.7

Table 2: Average seed depths (inches) under 3 different crop residue management treatments

If one looks at the three year average, there was no difference between crop development over all the treatments (Table 3). However, in 1994 there was a slight difference with the direct seeded plots being about 1/4 to 1/3 of a leaf stage behind the mowed and pre-tilled treatments. It takes about a week for a plant to grow a leaf, so in 1994 the direct seeded crop was 2 to 3 days behind the pre-tilled or mowed treatment. There were no differences in crop development in 1995 and 1996.

	Pre-Till	Mowed	Direct Seed
1994	4.9	4.8	4.6
1995	2.5	2.7	2.7
1996	4.3	4.4	4.4
3 year average	4.0	4.0	3.9

Table 3: Average Haun stage of wheat plants under different crop residue management systems

If crop residue is not spread evenly, it can cause uneven crop emergence. We looked at seeding depths and crop development under areas of heavy crop residue and areas of low crop residue in the same field. The plants in the heavy residue area were seeded three-quarters of an inch deeper and were one-half of a leaf stage behind the area with low residue. This illustrates the importance of spreading crop residues evenly throughout the field.

To sum up, crop emergence was not reduced when spring wheat was seeded into standing stubble. Direct seeding did not affect the rate of crop development or crop maturity the majority of the time. In a few instances, the direct seeded crop was slightly behind the crop in the mowed and tilled plots.

To ensure that crop development is not retarded under direct seeding, farmers should do the following:

1. spread crop residues evenly;
2. seed shallow;
3. follow seed-placed fertilizer guidelines carefully - do not exceed recommended rates;
4. rotate high residue producing crops (eg. cereals) with low residue producing crops (eg. oilseeds, pulses).

Half Ton Tours Successful

by Juanita Polegi

SSCA Soil Conservationist

"Let's check the neighbour's field!" Now that was a comment that got everybody back into the half tons in a hurry! Half ton tours were organized by the staff this past summer to enable producers to compare conventionally seeded fields with direct seeded fields. Problems with direct seeded fields were looked at and solutions discussed. Many of the producers in attendance had attended one of the Kitchen Table meetings held in the winter. As a result, the tours provided an opportunity for follow-up from those sessions.

In the East Central Region, the tours occured in the morning with an average of 6 to 8 farmers in attendance. The Extension Agrologists for the respective areas, also invited to attend the tours, answered a variety of questions such as the timing of Tilt applications, identifying insects, potential midge damage and Bertha armyworm life cycles.

To inquire about having a half ton tour in your area next summer, contact your Regional Soil Conservationist.

$$ Herbicide Savings $$

By Garry Mayerle,

SSCA Soil Conservationist

Weed herbicides make up a major portion of the annual cropping expenses on most prairie farms. Wise choices and savings in herbicide use can make a significant difference in net return. Knowing whether certain weed populations are high enough to warrant spraying or not is crucial in making these choices.

Research studying the effect of weed densities on crop yield has focused on the grassy weeds especially wild oats, green foxtail and volunteer cereals. One of the reasons is that herbicides that kill these grassy weeds are more expensive than broadleaf herbicides. Also they tend to be more specific to 1 to 3 weeds. For example considering threshold levels of Target would mean that you would have to consider up to 20 different species but the only species to consider for Avenge is wild oats. Manitoba Agriculture has compiled some recommendations and charts in a fact sheet and in their provincial weed control guide.

Economic threshold determinations have to evaluate the increased value of the crop that can be expected with the use of the herbicide less the cost of herbicide and application. There are a number of other considerations also. Any weed species that reduce grade because they are hard to clean out have a higher economic cost than just crop competition. Also control of species which might not be economic this year but would prevent problems in future years needs to be considered. For example a species difficult to control in next years crop needs to be controlled this year in preparation for the following crop. Along with this the control of new hard to kill weeds before they have a chance to spread is important. A few examples are scentless chamomile and cleavers. Likewise hard to kill perennial weeds that can become competitive quickly should be controlled in consideration for future years.

This leaves us again focusing on wild oats, green foxtail and possibly volunteer cereals as the most economic species to evaluate thresholds levels on before herbicide applications. To come up with accurate evaluations the effect of various population densities in reducing crop yield must be determined. This is what research has focused on. The following charts summarize some of these results. These values have been determined for crops which have good stand establishment and are growing well. If a crop is doing poorly yield losses may be greater than these figures.

Table 1. Effect of Green foxtail density on yield loss in wheat, barley and canola.*

	Green Foxtail Density (plants/sq.m.)			
	50	100	200	300
Crop	Percent Yield Loss			
Wheat	2	6	9	14

Barley	1	3	6	8
Canola	3	5	10	15

* For green foxtail counts if the majority of the green foxtail has not emerged within 1 week of the crop or daytime temperatures at spraying are not equal to or higher than 20°C then yield loss will be insignificant.

Source: O'Donovan, Alberta Environmental Center (Vegreville)

Table 2. Effect of weed density for three weeds on yield loss in canola.				
	Weed Density (plants/sq.m.)			
	1	4	10	14
Weed	Percent Yield Loss			
Wild Oat	3	6	10	12
Vol. Wheat	1	6	11	14
Vol. Barley	3	8	14	17

Sources: Dew & Keys, Agriculture Canada (Lacombe)

O'Donovan, Alberta Environmental Center (Vegreville)

Table 3. Effect of weed density for three weeds on yield loss in flax.				
	Weed Density (plants/sq.m.)			
	1	3	7	10
Weed	Percent Yield Loss			
Wild Oat	6	10	16	19
Vol. Wheat	6	15	27	33
Vol. Barley	6	16	31	39

Sources:Dew & Keys, Agriculture Canada, (Lacombe)

Friesen et al. University of Manitoba (Winnipeg,)

Table 4. Effect of wild oat density and relative leaf stage on yield loss in wheat.				
	Wild Oat Density (plants/sq.m.)			
Wild Oat Leaf Stage	2	6	10	16

Compared to Crop	Percent Yield Loss			
1 leaf ahead of crop	2	6	10	15
same as crop	1	4	6	9
1 leaf behind crop	1	2	3	5

Source: O'Donovan, Alberta Environmental Center (Vegreville)

Table 5. Effect of wild oat density and relative leaf stage on yield loss in barley.				
	Wild Oat Density (plants/sq.m.)			
Wild Oat Leaf Stage	1	5	10	15
Compared to Crop	Percent Yield Loss			
1 leaf ahead of crop	1	5	10	14
same as crop	0	2	4	6
1 leaf behind crop	0	1	2	2

Source: O'Donovan, Alberta Environmental Center (Vegreville)

Changing of the Guard

By Tim Nerbas

SSCA Soil Conservationist

The only thing worse than sampling heavy clay on a rainy day is writing an article about yourself, particularly a letter of introduction. But as the newest Soil Conservationist (David Shortt has moved his coffee mug across the hallway to Lands Branch), I have no choice but to talk about myself.

I had my first taste of dirt with Soil Survey in southwestern Saskatchewan. For five years, I dodged dust storms, wrestled rattlesnakes, and (in my spare time) mapped soil. It was the greatest foundation a soil scientist could ever receive in establishing oneself in the fine profession. (That's my plug for the Soils Department, U. of S.)

I eventually developed agoraphobia on the open plains, so I headed north to the dense, breathless bush. Armed with DEET, pepper spray, and my trusty old auger, I battled black flies and black bears in the boreal forest with the BOREAS (Boreal Ecosystem - Atmospheric Study) project. For I measured gas emissions (from the soil, that is) and dug pits that would make any grave digger proud while studying my masters program.

After too much education and not enough employment, I did what any respectable Ag grad would do - I went farming. I thought it would give me some time to relax, and pay a few bills (yeah, right!). It wasn't long before I was experiencing conservation withdrawal, so I jumped on as research manager of a precision farming project north of the 53^{o}.

That's where I was when the SSCA found me outstanding in my field (literally). I was pleased and proud when they decided to make me part of their team.

And here I am the new guy, taking minutes at the meetings and having been threatened with "we'll make you ride with Juanita". But seriously, it's a relief to be back in the busy hum of the "anti-dust bowl" think tank.

Once a dirt person, always a dirt person.

Machinery Sizing Amongst Direct Seeding Farmers

Adrian Johnston, P.Ag.

SSCA Director-at-Large, Melfort

During the 1995 Innovators conference in Saskatoon, participants were invited to fill out a questionnaire on their seeding operation. The questionnaire asked about machine size, acreage farmed, crops seeded and in what order, and days to complete the seeding operation on both a normal year and late year. Working with Agriculture Economics graduate student Cecil Nagy and Prof. Dick Schoney the survey results were compiled and summarized in a short report.

Farms were divided according to acreage seeded and whether they were located in the Prairie (Brown and Dark Brown soil zone) or the Parkland (Black and Gray soil zone) region. We assigned the designation large farms for those producers seeding an average of 3600 acres, 2000 acres for medium and 1200 for small farms. In general, farms represented by Parkland producers at the meeting were larger than those in the prairie region (see Table 1).

Not surprisingly, the larger the farmer, the larger the tractor, seeder and number of acres seeded each day. Parkland farmers were very consistent in their rate of seeding, at 4 ac/day/ft of implement, while seeding rate ranged from 3 to 5 acres/day/ft amongst prairie farmers as they became larger. While the differences were marginal, prairie farmers tended to seed fewer acres/ft of implement and fewer acres/hp unit than in the parkland, indicating that parkland producers are sizing their seeding implement better for acreage farmed.

However, there were some similarities between all farm sizes and regions. For example, all producers report an average of 6-7 hp/ft of seeder, regardless of soil zone or farm size. This result indicates that seeder sizing with power unit is very consistent across the province amongst direct seeding farmers. It is also interesting to note that medium and large farmers reported similar number of seeding days in both normal and late seeding years. While small farmers spent more time putting their crop in on normal years, there was little difference with medium and large farmers in a late, or short, season.

Questionnaire participants were also asked to respond to, if given the opportunity whether they would change their seeding equipment. More parkland farmers viewed their seeding system as being undersized compared to their prairie counterparts. On average, 1/3 of all producers questioned would consider increasing the size of their seeding system. All of these respondents had lower seeded acres/day/ft than average. Similarly, those farmers who would increase their tractor size had lower tractor hp/ft than average.

Fertilizer placement is an important part of one-pass direct seeding. When asked about the importance of side band application of fertilizer at seeding, 87% of parkland producers rated it as

a high priority, while only 57% gave it a high rating amongst prairie farmers. Higher fertilizer N rates in the Parkland have a profound effect on the ability of producers to seed place all of their fertilizer N.

The results of this survey questionnaire indicate that the participants in general are not over equipped for their seeded acreage. In a future article I will review the survey responses to questions on crop rotation and harvesting.

Table 1. Farm and machinery sizing data collected at 1995 SSCA Innovators Conference, Saskatoon.

Farm Size	Seeded Acres	Tractor HP	Seeder Width (ft)	Hp/ft seeder	Seeding Rate (ac/day)	Seeding Ac/day/ft	Seeded Acres/ft	Seeded Acres/Hp	Seeding Days Normal Year	Seeding Days Short Year
Large Ave.	3594	350	53	7	244	5	59	9	15	11
Parkland	3370	348	52	7	225	4	63	9	16	11
Prairie	3100	351	55	6	268	5	56	8	14	11
Medium Ave.	2008	233	37	6	150	4	54	9	17	13
Parkland	2059	235	36	6	150	4	56	9	16	13
Prairie	1736	222	38	6	149	4	46	8	16	12
Small Ave.	1208	168	26	7	89	3	47	7	18	12
Parkland	1460	187	26	7	94	4	56	8	20	14
Prairie	893	144	26	6	83	3	36	6	14	9

Report on the 1996 National No-Till Conference in the USA

By Bob Linnell,

SSCA Soil Conservationist

The 1996 National No-Till Conference was held in St. Louis Mo. in January of this year. Since I was invited as a minor speaker, I thought our members deserved to know how the two countries compare on the subject of direct seeding.

The conference was attended by about 850 participants that filled out a survey on their operations.

Comparing the results to the previous conference in 1995 the results showed that the average cropped acre by those attending rose to 1775 from 1330 while the acres no-tilled increased to an average of 1250 from 1080. They grew something like 92% corn, 86% soybeans and 59% wheat.

89 % actively operated the farm and their average age was 45. The number of years no-till was eight. 52% applied their own herbicides while 17% had custom application.

67% of the farmers looked to dealerships for their primary information concerning no-till, while 35% looked to other sources. Agriculture publications represented 32% of the 35 in this category.

When questioned whether there were benefits to no-till, 67% said yes compared to about the same for the previous year. Most saw this in terms of labor and money.

When asked to name the challenges for no-till, 33% responded that weed control was number one, 15% said wet soils, 14% said cold soils, 10% said corn yields and 8% said fertilizer placement was their biggest challenge.

Involvement in precision farming showed 28% totally involved , with 18% doing field mapping, 11% utilizing G.P.S. systems and 10% applying variable rate fertilizers as a result. Some 40% of those attending would be planting a biotech crop in 1996, mostly involving corn.

Of those that no-tilled the land, 86% owned the land, with 70% cash renting additional land and fully 20% were operating under a long term lease(about 1/2 were on a 50/50 basis with about 15% on a 60%tenant/40% landlord system) When asked if no-till influenced the lease arrangements, 6% said yes and 94% said no.

Interesting statistics coming out of this U.S. conference led me to wonder just where a Saskatchewan based conference would compare in the numbers columns. In talking to some of

the farmer participants, most felt there was a need to work on the machinery aspect of no-till or direct seeding, as we prefer to call it. American farmers still feel they must do a positive job of moving aside the residue, then place the seed, and then cover the seed again in their field seeding operations. Many were quite envious of our ability to single pass seed and fertilize with one piece of relatively uncomplicated machinery. They, therefor are very interested in acquiring some of our machinery in many field crop seeding situations, especially the air delivery components. The technology is originating in our prairie region, in conjunction with the prairie based machinery manufacturers, and is being exported to not only the U.S. but other parts of the world in an ever increasing number.

The concept is working and you are on the right track; I'm convinced of that. We just have to make sure we work on perfecting all the parts, and the world will begin to beat a path to our doors.

Conservation Learning Centre Update

By Pat Flaten

CLC Manager

What a year! Yes, we also experienced the wet fall that many of you endured. We've all been asking each other, across the province, 'how much do **you** have left in the field?' and, 'how wet is **your** grain testing?'. Often, the answer was 'off the scale' or 'un-testable' -- one neighbour aptly put it as, 'de-testable'! Hopefully, most of you have all of your crops off, for those who don't - hang in there and hopefully the spring harvest conditions will be good.

Thinking back to summertime, the CLC had a good year with interesting projects and lots of tours. Our informal tour style creates a comfortable atmosphere for interaction between and among the resource people and the producers. This summer, approximately 350 people attended these guided tours and numerous others took advantage of the self-guided tours. Special interest was addressed during the different tours towards trees and woodlot management, direct seeding issues, cereal crop choices, forage production, forage seed production, herbicide tolerant canolas and alternative crops, fertilizer management systems, weed management and precision farming.

School teachers and students continue to enjoy the learning experience that our school program coordinator, Jo Detillieux, presents at the site and in the classroom. Thirty classes visited the CLC this year.

Results from field projects are still being worked on for printing in our annual Field Results booklet. Some of these will be highlighted in future editions of the Prairie Steward as well.

At present, we are trying to wrap up the 1996 crop year and make some plans for the future. If you have in mind some topics that the CLC should try to address, you are invited to contact the CLC office at 953-2796 in Prince Albert.

Precision Farming : A First Lesson

(The first in a series of articles.)

By Bob Linnell,

SSCA Soil conservationist

Precision farming offers an exciting opportunity to use new technologies to better manage crop production. Being able to apply more intense analysis and the management of field properties and crop response will enable new efficiencies to be available to producers. The technology may seem confusing at first and some think not practical or too expensive for their farm. They may in fact be right, at least on some things. But then again, we learned to program our VCR's, didn't we.

In crop production, the focus is on site-specific crop management by attempting to identify the variability within a field. Once we have done that, we try to manage the crop according to that variability that we have identified. The tools are the thing that we have a hard time understanding and working with in this often demanding school of farming applications.

Some key technologies make precision farming practical and must be considered before site-specific crop management can become an economically viable practice.

Questions to ask when analyzing any data gathered are:

1. can the variable be identified?
2. are the variables large enough to matter/ and
3. are the variable consistent year to year?

Many techniques are just beginning to be used to identify variation within a field,

and they all have advantages and disadvantages. Tools include:

1. Soil Survey
2. Soil sampling.
3. Grain yield sensors.
4. Position sensors.
5. Computerization with both hardware and software to manage data.
6. Variable rate controllers. and last but not least
7. Technology consultants.

Costs are always a factor and with yield monitors and mapping running around C$4-5000 and differentially corrected GPS systems at 3-5000 and then adding in the ground based support for an initial application (soil sampling) at $4-6 per acre, it may seem expensive. But, and there are

always buts, when you talk to someone who has been utilizing the technology for two or three years and find out they can save 10-20% on their chemical bills and increase the yields in only one particular field by double, it begins to really tweak your interest. Then you begin to think what this could do for the management of your whole farm and then you really get interested, and so does your banker.

You get to generate a very large quantity of data in this exercise, and if that is your only goal, then you will have not trouble being satisfied. The key element is knowing how to look **through** all that data and pick out the pertinent stuff that you can use in your management decisions.

In future articles, I will deal with how you get started, what the specific benefits are and deal with the top ten questions you need to ask to avoid the potential pitfalls of precision farming. Meanwhile attend any conferences you can if you are interested in the concept and learn all you can before you invest in any part of it.

President's Message

by Lorne Crosson

SSCA President

In 1995 many of us complained about the long and drawn out harvest, little did we suspect what was in store for 1996. Perhaps the lesson to be learned is that no matter how bad the situation appears to be don't complain because it could be worse. I hope that by the time you read this issue of the Prairie Steward you will have completed your harvest.

Despite the trying times of a late spring and a harvest that wouldn't end, the SSCA board members have been busy during the last few months working on your behalf. In particular our Past President Marvin Fenrich and our Executive Manager Doug McKell have put in many hours negotiating for funding from the Agri-food Innovation Fund. We are reasonably confident that Marv's and Doug's efforts have been successful. SSCA memberships provide only a small portion of the funding required to maintain staff and projects so looking to outside sources is necessary. The present funding under the Soil Enhancement Project ends March 31, 1997. New funding will allow SSCA to continue to give Saskatchewan farmers the most up-to-date information on techniques for soil conservation and sustainable farming up to the year 1999. Watch for special activities that will be taking place in your region. We are also looking beyond 1999 in an attempt to bring some long term financial stability to SSCA.

On another front, the SSCA, the Southern Prairie Agricultural Research Centre (SPARC) and the TransAlta Utilities Corporation (TAU) are combining forces to look in detail at the changes that take place in the soil as minimum tillage technologies replace conventional tillage methods. More than 100 farmers throughout the province are taking part in the project by allowing their soils to be monitored over a period of several years. SSCA's main contribution to the program is the identification of potential farmer cooperators and ensuring as much as possible that they remain with the project. SSCA other responsibilities include administering a questionnaire on present and past cropping practices to the cooperators, arranging for and ensuring that the cooperators carry out the appropriate tillage operations, and obtaining crop samples from selected fields. At the end of the project we should have a good indication of how much carbon build-up takes place upon conversion to minimum tillage.

We have had a change in our field staff. Effective November 1, Dave Shortt resigned as the SSCA soil conservationist for the northwest region. We will miss Dave's expertise. On behalf of the SSCA board of directors I wish to thank Dave for a job well done and wish him all the best in his new job. Dave's position will be taken over by Tim Nerbas. Tim farms in the area and has a strong background in soils having worked for the Saskatchewan Soil survey for several years. Welcome Tim. It would be remiss to not thank the other applicants for the position, their strong qualifications made the selection of a successful applicant very difficult, we wish each of you success in your future endeavors.

On the administrative side, I will be proposing a number of amendments to the SSCA bylaws at the October board meeting. If the SSCA board approves these changes you will receive notice of the proposed amendments in the form of resolutions. Please read the resolutions carefully and be prepared to discuss and vote on them at our annual conference in Saskatoon, February 12 and 13, 1997.

In the area of farmer apathy, I have a beef to make. The beef concerns an alternate crop plot tour that took place several kilometers north of Assiniboia last summer. The plots in question are operated by researchers from the Agriculture and Agri-Food Canada Research Station at Swift Current. Local information on the viability of alternate crops is available from these plots, but they are set up with a considerable amount of inconvenience and expense so many kilometers away from the research station. I am sure that research personnel were very disappointed when the only farmers that showed up for the morning tour were the cooperating farmer and I. The afternoon tour had a similar turnout. We often complain that information we receive is not relevant to our area, but if we do not show more support for the efforts made by the research people we do not have much basis for complaining.

Finally a comment on what happened to those peas I referred to in the last issue of the Prairie Steward. Despite an average of 46% hail damage in the early blossom stage and a precipitation shortage of 49 mm (1.9") during June, July and August (compared with our 20-year average) the peas yielded twenty-six bushels per acre. The results are encouraging enough to try them again next year.

Project SOILS: A Fine Blend of Learning and Laughter

Soil conservation is serious business but Project SOILS makes it sound like fun. The very names of the games and songs suggested by Project SOILS stir the child in everyone. *Root Race, Soil Circle, Diversitag, and Shelter Skelter* are just a few of the invitations to play and learn about soil, and soil conservation.

"The goal of project SOILS is to add to and complement the resources currently available on the topics of land use, soil degradation and soil conservation in Saskatchewan.," says Lizabeth Nicholls, supervisor of Wildlife and Outdoor Education, Saskatchewan Environment and Resource Management (SERM).

"We aim to create a greater awareness of these vital issues through hands-on, interdisciplinary activities for educators and their students from Kindergarten through Grade 12. We want students to learn accurate concepts about how the ecosystem works, and the importance of diversity: for example, the problems of soil erosion, loss of soil organic matter and soil cover, and some of the new sustainable solutions to these problems."

Project SOILS was initially developed by the Saskatchewan Soil Conservation Association (SSCA) in 1992. A year later, the first edition of the Activity Guide was printed and the accompanying workshops for educators became available. While the SSCA is still an active managing partner, SERM assumed delivery of the program in 1994. The printing of a revised edition of the Activity Guide was funded by the Canada-Saskatchewan Agriculture Green Plan in 1995 and a French edition of the guide will be available this fall.

"The guide and the workshops were developed by teachers, and specialists in such topics as biology, agriculture, and soil. So the best subject was brought together with the best of the teaching practices. The training workshops are carried out by a team composed of a teacher facilitator and an agricultural/soil specialist. Project Soils is recommended by Saskatchewan Education for use as a supplement to the core curricula," says Nicholls.

"The feedback from the several thousand participating educators - these include teachers, education students and youth leaders with groups such as 4-H, Guides and Scouts Canada - is 'good' to 'excellent'. The guide offers 18 activities that are designed to illustrate ecological concepts and are active enough to maintain the interest of students. Teachers like the guide because the games, music, art and activities teach in a way that makes for quick and easy understanding of concepts, and how they apply to real life," says Nicholls.

"This understanding is important because students have to fill their adult role as citizens. They have to have environmental literacy so they can effectively participate in co-management of our resources in the future."

To reserve a Project SOILS workshop - and receive a free Project SOILS Activity Guide on completion - telephone (306)787-5242.

Equipment - One Part of Sustainable Farming System

By Doug McKell

SSCA Executive Manager

The buildings were noisy with the sounds of metal machines and air tools. Everywhere young, energetic men and women were busy with the tasks involved in building the worlds most advanced seeding machinery. Signs on the wall displayed impressive production statistics and work records. This was the scene presented to us this fall as the SSCA regional agrologists toured several of Saskatchewan's direct seeding machinery manufacturing plants. From what I hear from other manufacturers this is the way it is in most of Saskatchewan's agricultural manufacturing plants this year. Each year SSCA staff spend a few days with some of Saskatchewan's major machinery manufacturers to learn the latest developments in their machinery. We do this so that our staff can be well versed on the new seeding developments that will be interpreted and passed on to producers through our information extension programs.

Developments in agricultural seeding machinery have been coming hard and fast in Saskatchewan for over twenty years. Our province is now home to several manufacturers who ship machinery all over North America and overseas to countries like Australia and the Ukraine. We have world leaders working out of places like Saskatoon, Regina, Yorkton and even obscure places like St. Brieux, Indian Head and, Langbank.

There is no single reason for this boom in machinery manufacturing. Saskatchewan has always had a reputation for invention and innovation. "Where there is a will there is a way", "necessity is the mother of invention": these are sayings that maybe weren't born in Saskatchewan but are definitely applicable. But would this machinery been developed without other underlying factors? After all, direct seeding machinery is only part of a direct seeding program. Farmers are constantly taught and reminded that the purchase of a direct seeding machine will not guarantee the success of a reduced tillage farming system. Many other factors come into play such as; residue management, crop rotations, weed control and more. These factors are not simply bought and sold but are part of a learning and adoption process. Without these factors being implemented the package is not complete and the successes of our manufacturing industry may not have been achieved to the extent we see today. These parts of the package have been developed by Saskatchewan's agrologists working in research, industry, provincial extension services, PFRA, ADD boards and in non-government organizations like the SSCA. This team of agrologists has been more than influencial in the development of modern direct seeding systems.

The point here is that farmers need to be aware of all the components necessary to make a direct seeding system successful. Equipment is being ordered at impressive rates. We heard this fall from a major manufacturer that if a farmer wants a machine for spring they had better get their order in by Christmas or they might be out of luck. We hope farmers will also take advantage of

the other tools available to them from the SSCA and other agrologists working in Saskatchewan. This winter we will again be offering small meetings where farmers can get together with industry and extension experts to discuss the components of successful direct seeding systems. In the future we will also be offering conferences, field days and other activities so that Saskatchewan farmers will continue to be ahead of the pack in modern farming systems. In this way our entire agriculture industry from producers to agrologists to manufacturers will be looked on by the world as leaders in modern sustainable agriculture.

Row Spacing for Direct Seeding

By Ken Sapsford,

SSCA Soil Conservationist

"I have decided to buy a new seeder to start direct seeding but I am not sure on what row spacing I should buy." There has been a lot of talk the last couple of years moving to wider row spacing, most to 12" but some even as wide as 16". In conventional till row spacing was not a major concern because we did not have all the crop residue to manage at seeding. The first thing most producers are concerned about is yield.

Dr. Guy Lafond, at the Indian Head Research Station, was one of the first to look at the effect of row spacing in direct seeding. Previously most research was in conventional till systems. Lafond ran his study from 1989 - 1992 with spring wheat, durum, barley and flax. Row spacing were 4", 8" and 12".

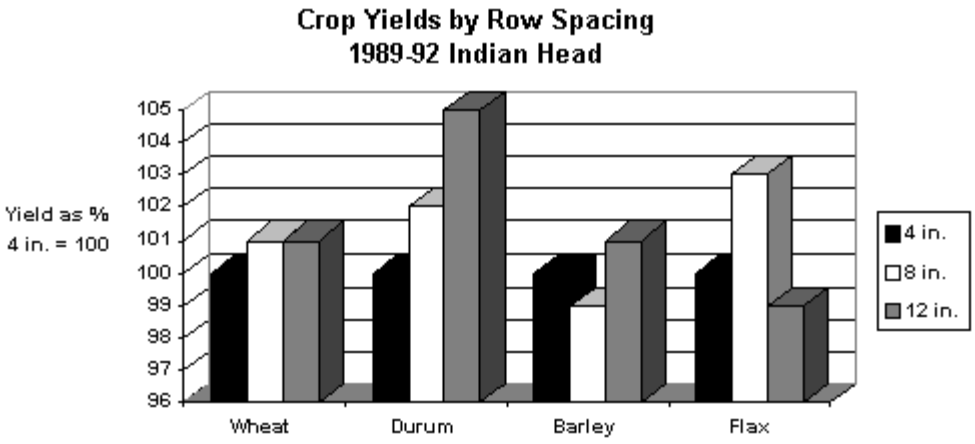
Lafond found that yield of spring wheat was not affected by row spacing.(Figure 1) As row spacing increased, the number of plants established and the number of heads produced decreased. However, the number of kernels produced per spike increased as row spacing increased so that in the end, the different row spacing produced the same yield.

Durum had a superior yield at the 12" row spacing in each of the 4 years. Flax yields were not affected two of the four years but the 8" spacing was favored in the other two years.

Lafond states "Farmers should chose the row spacing that will give them the residue clearance they require for their equipment."

Figure 1

Lafond - Agriculture and Agri food Canada

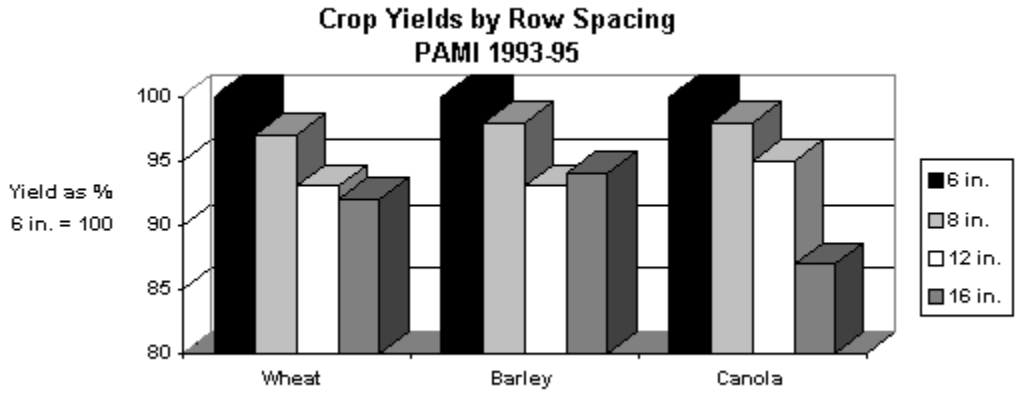


Similar studies were done by Gordon Hultgreen of PAMI from 1993 - 95 with sites at Foam Lake, Unity and Naicam. At these sites wheat, canola and barley were direct seeded at 6", 8", 12"and 16" row spacing. Generally the yields decreased as rowspacing increased, however in some years at some sites yields were higher in the 16" row spacing. (Figure 2)

Hultgreen stated " The decrease in yield may be related to weed competition. At wider row spacing the crop is less competitive with weeds and it is likely the reduced grain yield at wider row spacing is caused by weed competition." This shows that weeds must be controlled and the yield reduction may not be due to row spacing.

Figure 2

Hultgreen - PAMI



Other factors need to be considered

Yield is only one aspect that needs to be looked at when trying to decide on what row spacing to use. Other factors to consider are:

1) Soil disturbance - The wider the row spacing the less soil disturbance there will be.

2) Residue clearance - The wider the row spacing the greater the residue clearance and you will be able to cut your stubble taller without plugging problems next year.

3) Seed place fertilizer - If you are single shooting you can put less fertilizer with the seeds with wider row spacing.

4) Swathing - With wider row spacing 12" to 16" you must be prepared to straight combine most crops because swathing is only an option with canola.

5) Weed Control - spot spraying for weeds such as wild oats is much easier with wide rows because you can easily identify the weed between the rows.

6) Hp. required per ft. - Less horse power is required per foot of seeder with wider row spacing as you have fewer openers per foot.

7) Cost - The cost of a wider row spaced seeder will be less per foot as you are buying fewer openers, shanks and trips.

Today given these considerations many direct seeders are moving to 12" spacing and some even 16".

Bruce Barker, a direct seeder near Saskatoon converted his 8800 Bourgault air seeder to 16" row spacing with mid row banding anhydrous ammonia on 32" spacing in 1996. He used the Atom Jet knife and was very pleased with seed placement and row spacing but would like to try an opener that will give him a little wider seed row. Barker states " I grew the best crop ever this year."

If you would like to speak to direct seeders who have been seeding at wider row spacing phone our Direct Seeding hot line, at 1-800-213-4287, and we can put you in touch with them using our Farmer Helping Farmer data base.

Proposed Extraordinary Resolutions

NOTICE is hereby given that it is proposed to move, and if thought fit, to pass, with or without amendment, the following resolutions as extraordinary resolutions at the Annual Meeting at the Saskatchewan Soil Conservation Association Inc. on Wednesday, 12 February 1997.

The "*Comment*" in italics following each resolution is intended to briefly describe the subject, nature and effect of the proposed resolution. It is **NOT** part of the resolution.

PROPOSED EXTRAORDINARY RESOLUTION #1

Proposed by Lorne Crosson

Whereas Section 16 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. currently defines the number of directors of the Association

Resolved as an extraordinary resolution that Section 16 of the Bylaws be amended to read:

"Number of Directors

16. (1) The board of the Association shall consist of:

a) six regional directors (full members);

b) three directors-at-large (full, associate or supporting members);

c) two directors-at-large (associate or supporting members); and

c) the executive manager (ex-officio).

(2) The executive of the board of directors shall consist of :

a) a president (full member);

b) a first vice president (full member);

c) a second vice president (full member); and

d) the executive manager (ex-officio).

Comment: This resolution is designed to allow a potential presidential candidate to gain more than one year of experience on the executive before seeking office as President if desired. The President, the First Vice President and the Second Vice President would be elected by the board rather than by the general membership. The proposed change comes as a result of suggestions from previous presidents of the Association. The Association has become much more complex

than when it was first incorporated and as a result the duties of the president have become more complicated. The resolution also reserves two board positions for associated or supporting members. The existing board felt that the contribution of past associated or supporting members to the board was such that their positions should be ensured.

PROPOSED EXTRAORDINARY RESOLUTION #2

Proposed by Lorne Crosson

Whereas Section 17 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines a directors term of office

Resolved as an extraordinary resolution that Section 17 of the Bylaws be amended to read:

"Term of Office

17. (1) Each regional director shall be elected for a three-year term by the membership located within his/her region. He/she shall be eligible for a second three-year term only, but must be re-elected.

(2) Each director-at-large shall be elected for a three-year term by the total membership. He/she shall be eligible for a second consecutive three-year term only, but must be re-elected.

(3) The president shall be elected annually by the board of directors. The president shall not be eligible to hold office for more than two consecutive terms**.**

(4) A first vice-president and a second vice-president shall be elected annually by the board of directors.

Comment: *This resolution is designed to complement resolution #1. The resolution also allows the president to seek an additional term in office to complete programs if desired. Previous presidents of the Association have indicated that by the time they were comfortable with the presidential position and could contribute more to the organization their term was up. Annual election of each of the executive positions provides for more flexibility than under the present Bylaws. This resolution defines the terms of office for the board of directors and its executive.*

PROPOSED EXTRAORDINARY RESOLUTION #3

Proposed by Lorne Crosson

Whereas Section 18 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines election procedures

Resolved as an extraordinary resolution that Section 18 of the Bylaws be amended to read:

"Election Procedures

18. (1) Nomination papers for a regional director shall be shall be signed by three members resident in the region and forwarded to the SSCA head office by September 30.

(2) Nomination papers for a director-at-large shall be signed by three members and forwarded to the SSCA head office by September 30.

(3) Appropriate ballots will be forwarded to the membership by October 31.

(4) The president, the first vice president and the second vice president shall be elected by the board of directors from among the full members on the board immediately following the annual meeting.

Comment: This resolution is intended to complement resolution #1 and #2, and defines the process whereby the board and its executive members would be elected.

PROPOSED EXTRAORDINARY RESOLUTION #4

Proposed by Lorne Crosson

Whereas Section 20 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines the qualifications for directors

Resolved as an extraordinary resolution that Section 20 of the Bylaws be amended to read:

"Qualification for Director

20. The six regional directors must be full members in the Association to qualify or hold office, two directors-at-large must be associate and/or supporting members in the Association to qualify or hold office and three directors-at-large may be full, associate or supporting members in the Association to qualify or hold office.

Comment: This resolution complements resolution #1 , #2 and #3 and serves to maintain the board of directors number at eleven. This resolution defines the qualifications for directors.

PROPOSED EXTRAORDINARY RESOLUTION #5

Proposed by Lorne Crosson

Whereas Section 28 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines the duties of the President Elect and whereas extraordinary resolution #1 eliminates the

position of President Elect and adds the positions of First Vice President and Second Vice President

Resolved as an extraordinary resolution that Section 28 of the Bylaws be amended to read:

"Duties *of* the First Vice President and the Second Vice President

28. (1) The First Vice President and the Second Vice President shall assist the president in the performance of his duties. The First Vice president shall act in the absence or inability of the president. The Second Vice President shall act in the absence or inability of both the president and the First Vice President.

Comment: This resolution is designed to complement resolution #1, #2 and #3 and defines the duties of the First and Second Vice Presidents.

PROPOSED EXTRAORDINARY RESOLUTION #6

Proposed by Lorne Crosson

Whereas Section 5. (1) of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines the entitlements of the full membership category of the Association

Resolved as an extraordinary resolution that Section 5. (1) of the Bylaws be amended to read:

5. (1) A full member is entitled to all privileges of membership including the right to vote at the meetings of members, to hold office as a regional director or director-at-large and as President or First Vice-President or Second Vice President.

Comment: This resolution is designed to complement resolution #1 and #4.

PROPOSED EXTRAORDINARY RESOLUTION #7

Proposed by Lorne Crosson

Whereas Section 6 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines the membership categories of the Association

Resolved as an extraordinary resolution that Section 6 of the Bylaws be amended to read:

6. (1) Any person who is a bona-fide farmer and who is interested in soil conservation may become a full member.

(2) Any individual who is interested in soil conservation may become an associate member.

(3) Any corporation, organization, institution or agency that is interested in soil conservation may become a supporting member.

(4) The Board of Directors may at any time or from time to time re-designate any member to a different category.

Comment: This resolution is designed to refine the definition of an associate member and to allow the board to re-designate members to a different category if their membership status changes.

PROPOSED EXTRAORDINARY RESOLUTION #8

Proposed by Lorne Crosson

Whereas Section 34 of the Bylaws of the Saskatchewan Soil Conservation Association Inc. defines the remuneration paid to directors and members while on Association business

Resolved as an extraordinary resolution that Section 34 of the Bylaws be amended to read:

"Remuneration of

34. (1) Remuneration shall be paid to the directors and members of the Association in compensation for travel and sustenance while on Association business at rates approved by the directors.

(2) An honorarium shall be paid to the directors for each day of attendance at a board meeting at a rate approved by the directors.

Opener Selection

By Eric Oliver

SSCA Soil Conservationist

Well, this has been quite the year for farmers! First there was the late spring which delayed seeding and now a harvest that for many farmers will be extended into spring. Hopefully, by the time this issue is out, most everyone will have their harvest in the bins.

As we head into our winter extension program, we will be once again conducting our "Kitchen Table" style farmer meetings. These meetings allow for two-way communication between farmers and ourselves, as well as benefiting from each others experiences. Although the topics and concerns brought by farmers at these meetings are very diverse, some common questions come up at nearly every meeting. A very common question is "What opener should I be using to direct seed?" This can be a very difficult question to address with the farmer and there are no simple answers. Unfortunately, the perfect opener that works in every soil type and moisture condition has not yet arrived on the market. Therefore, the farmer has to make his selection on openers based on several factors.

The first thing in narrowing down the selection is deciding whether to single or double shoot. If the nitrogen being applied does not exceed the recommended safe rates then single shoot openers like a knife, spoon, spreader tips, etc. may be a good option. Single shoot openers are generally less expensive than dual shoot openers and require less draft. However, if the amount of nitrogen that will be applied with the seed exceeds the recommended safe levels, then double shoot openers should definitely be considered. Sidebanding and paired row type openers keep the fertilizer and seed separated so seedling damage from the nitrogen is virtually eliminated. Dual shoot openers also avoid extended maturity problems which can occur when high nitrogen levels are applied with the seed. Utilizing mid-row banding coulters or deep banding the nitrogen in the fall are also options that will affect opener selection. There are now seeding machines specifically designed to use mid-row banding coulters.

The soil texture will also have an influence on opener selection. The opener design will need to be different depending on if you are seeding on heavy clay or a sandy soil. Several manufacturers have tips or openers specifically designed for certain soil types like heavy clays. Make sure that the opener you chose are designed to work in those conditions.

Row spacing can also influence opener selection. Although low disturbance openers combined with wide row spacing can have a positive effect in reducing certain weed populations, it can cause problems if you don't straight combine. However, a wide row spacing improves residue clearance.

Cost is a factor as well. Dual shoot openers are more expensive than single shoot types. However, after the capital investment, usually only replacement wear parts need to be replaced.

Whatever opener you choose, make sure that accurate seed placement will be achieved. Ensure that the packer width matches the opener and provides adequate seed to soil contact. Remember, the opener is only one component of the whole direct seeding system. For direct seeding to be successful, the whole system needs to be implemented. Going only half way will not bring about the rewards and benefits that can be realized from low disturbance direct seeding.

If you need more information, please contact your nearest Regional Conservationist. We can provide more information and there is also the Farmers Helping Farmers Database service that we provide from our offices as well.

Traction, Compaction, and Direct Seeding Wet Soils

By Garry Mayerle,

SSCA Soil conservationist

Many farmers in the black and gray soil zones of Saskatchewan are concernedabout making a direct seeding system work in the wetter springs. The pasttwo springs there have been many comments about the trouble those withstanding stubble are going to have. In spite of the concerns many directseeders have developed solutions and systems that have achieved their goalsof reduced tillage and given them many of the associated benefits.

For some this has meant not adopting a "true" low disturbanceone pass seeding system. They have stayed with a two pass system in whichthey band fertilizer and seed in two separate operations. If they can bandin the fall they move some stubble and open up the ground to get some dryingearly in the spring. One of the most popular banding methods is applyinganhydrous ammonia with knives on 12 in. row spacing. Some have even goneto using every other shank on 8 in. spaced machines. Either of these systemsleaves much of the stubble standing and maintains many of the efficienciesof direct seeding.

For many direct seeders in those areas with concerns about wet fieldsin the spring there has been more reliance on harrows to break up and spreadstraw evenly and to expose the ground to more drying. Heavy harrows canbe used very aggressively but regular tine and diamond harrows at fasterspeeds can also do a lot to breakup straw on hot afternoons.

A number of direct seeders have included other adaptations that allowthem to seed in wetter conditions. One of these is developing seeding unitsthat reduce compaction in moist soil and can travel and seed on wettersoil. To accomplish this they must reduce slippage and be able to transferweight to the ground over a larger surface area. Reed Turner with the AlbertaFarm Machinery Research Center says a principal to keep in mind is thata tractor with tires will pull about half its weight. Triples increaseflotation but reduce ability to pull. So if you want to increase flotationand ability to pull you must increase weight and increase tire size. Triplesis one way to do that but weight may have to be added to maintain traction.

Another easy way this can be done is to run lower tire pressures. Thisin turn reduces the pressure on the ground surface because the tire deflectsto the point where tire pressure equals pressure on the ground. Dr. Wulfsohnat the Agriculture and Bioresource Dept. of the U of S College of Engineeringsays that most manufacturers of agriculture radial tires are reducing theirrecommendations to 8 - 10 . from the older bias ply tire recommendations.Besides reducing surface compaction, fuel efficiencies are improved andtire wear is reduced. Individual recommendations depend on the weight eachtire is carrying. Reed Turner stresses that is

important to have ratedinflation pressures in all tires on each axle. Ask the dealer to show youthe load inflation table for your tires and then set pressures accordingto the weight on each axle.

One of the tire manufacturers claims that their radial gives 17% moredrawbar pull on tilled ground and 41 % more on untilled ground as compareto their bias ply tire. This radial tire should cost you less than 30%more than the bias ply tire. A more conservative figure in PAMI's researchupdates indicates that properly inflated radials are 6 - 8% more efficientthan bias ply tires.

Another tire that some direct seeders have turned to is the Trelleborgtire designed in Switzerland. Ed Wiebe of Eds Ok Tire Store in Morris Manitobadistributes these tires. He says they have a flatter surface and run 7to 12 psi. They have very good cleaning characteristics and deep lugs.Trelleborg makes different tires designed for a wide range of applicationsincluding tractors, air carts and the cultivator seeder. Interestinglythe cost can vary from about 1/3 to double the price of other radials butsome 4 wheel drive owners testify that one wide Trelleborg out performsduals.

Instead of utilizing tires some manufacturers have gone to rubber belttracks. Reed Turner has put out a good summary on the differences betweentires and tracks. Tractors with tracks can develop about 20% more pullingforce. In other words the rubber belted tractor can pull about 70% of itsweight. They also have less slip at lower speeds so they perform to theiroptimum at a wider range of speeds than the tired tractor. Ground pressureis about 6 psi depending on the width of track. Steering control and costare the disadvantages of the belted tracks. Tracks for a 270 Hp Challengercost $12,000 but their salesmen suggest they have twice the life of tireson a comparable tractor with tires..

Soil compaction on Saskatchewan soils is not thought to be a seriousproblem because our freeze thaw and wet dry cycles nullify any of the effectsof compaction from agricultural equipment. There are two types of compactiondamage to soils. One of these is at the surface and depends upon tire pressures.We all know that if a soil is too wet we get balling or crusting especiallyin the wheel tracks. The other type of compaction is to deeper levels ofthe soil and depends more upon the total weight of the machine. Bettersoils with more organic matter have more ability to withstand compaction.Also the wetter the soil and the finer the texture the more damage compactioncan do. Dr. Wulfsohn suggests that if compaction was a problem it shouldshow up in visible differences in crop growth. If you think that you areseeing crop damage that relates to wheel tracks consider compaction asa possible cause.

We all hope for a more reasonable spring next May but we should probablybe prepared to overcome some of the difficulties of direct seeding in wetsoils.

Why Weeds Wage War

By Juanita Polegi

SSCA Soil Conservationist

Every year, new and different herbicides arrive on the market. And every year farmers buy the herbicides and faithfully apply them to the targeted weeds. And if not next year, then eventually, herbicides will have to be applied again to the same weed species. Why are the weeds so successful in doing battle with farmers? Because the most difficult weeds to keep under control have developed an army of resources enabling them to attack on all fronts.

Let's take a look at some of these weeds. The weed that raises every farmer's dander, direct seeder or not, is Canada Thistle. It has a whole arsenal at its bidding to do battle with farmers. It produces thousands of seeds in a single year. One plant can produce up to 5000 seeds and those seeds will remain viable in the soil for 20 years! Its horizontal roots can spread 6 metres as can its vertical roots. Altogether, the roots can produce another 500 metres of new root!

Another weed capable of creating anxiety is scentless chamomile. Pretty little flower to look at along the roadside but a migraine maker if it's in your field. One scentless chamomile plant is capable of producing half a million seeds (I hope some little summer student wasn't asked to sit down and count the seeds one-by-one!). It also has a dense and fibrous root system. And as anyone who has it on the farm knows, scentless chamomile germinates throughout the year because it has a winter annual habit, summer annual habit or short-lived perennial habit.

Stork's bill is another one of those weeds that has numerous growth habits. It likes to emerge in early spring right about the time the crop is also emerging. And its tiny little seeds are difficult to separate from the crop seeds at harvest time.

Field horsetail comes in a variety of forms. The interesting thing about this little weed is that, taxonomically, horsetail is considered a primitive plant! Since it's survived this long, it's obviously very well adapted. Not much research has been done on horsetail in terms of how to control it. Tillage doesn't seem to hurt it much and the plants don't seem very bothered by herbicides, either. However, there are reports of yellowing and a set back after a dose of Roundup. The plant's unusual leaf structure and silica content may be the reasons for its ability to overcome control measures.

Field Bindweed is a perennial. It reproduces by seed and root buds. It has a primary tap root from which lateral roots will develop. These lateral roots can persist even if they are severed form the tap root. Due to the rough texture of the stem and the leaves, the plant is difficult to wet, as with herbicidal sprays.

Foxtail Barley is a perennial with fibrous roots. It reproduces by seed but also has the ability to regenerate itself from little buds in the crown just below the surface of the ground.

Black Medic is another one of those weeds with a variety of habits including annual, biennial and short-lived perennial. Its slender tap root usually has several branches. As the plant continuously produces flowers, it ensures that seeds are available at all stages of maturity at all times during the growing season.

Downy Brome is mostly considered a winter annual although it can also be a spring annual or biennial. Its finely divided fibrous root uses moisture from the upper layers of the soil thereby making it difficult for other species to establish. Its root has the ability to grow throughout the winter so when temperatures warm, the plant has a head start on other species. Downy Brome reproduces by seed and is a prolific seed producer. It matures early in the growing season.

Weeds are a formidable force with which to reckon. Whatever method man employs to eradicate the weeds, the weeds are able to adapt and maintain their position. The war between weeds and man is unlikely to ever end and so far, the weeds have the advantage.

The Newsletter of the Saskatchewan Soil Conservation Association

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Crop Rotations and Harvest Management - Survey of Direct Seeding Farmers

Record Attendance at Direct Seeding Conference

By Blair McClinton,

SSCA Assistant Manager

1150 farmers from across western Canada and northern U.S., met at the Saskatoon Prairieland Exhibition Grounds February 12 and 13 to attend the Saskatchewan Soil Conservation Association's (SSCA) annual Direct Seeding Workshop. This was our largest direct seeding conference ever.

"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 Clint Steinley. "Farmers had the opportunity to have their questions answered by researchers, industry experts and other farmers," says Steinley.

This year's conference featured keynote speaker was Dennis Avery with the Hudson Institute. According to Avery, author of the book "*Saving the Planet with Pesticides and Plastics*," the only way we can meet the food demands of 10 billion people without destroying millions of acres of natural habitat is to triple production on existing agricultural lands. Failure to increase yields on existing lands will result in millions of acres of natural habitat being plowed under in developing countries to produce the food needed. Conservation tillage and integrated pest management will be some of the high yield farming techniques needed to realize this production increase.

The conference had six sessions which offered a mixture of farmers and researchers to provide both experience and first hand information. This year's sessions covered topics on moisture use efficiency, crop rotations, agronomy, weed control, and opener and packing systems. 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 three concurrent "bearpits": How to Start Direct Seeding, Crop Management in Direct Seeding, and Direct Seeding Equipment. These sessions provided farmers with the opportunity to have their questions answered by experts in less formal, smaller groups.

The trade show had 66 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.

Due to the large crowd at the conference this year, we don't have any extra copies of the conference proceedings for sale. However, we plan to have the proceedings available at our web site *http://paridss.usask.ca/consgroups/ssca/sscahome.html#SSCA Home Page* soon. Plans are

already under way for the 1998 annual meeting and conference in Regina, February 11 and 12, 1998.

Kelly and Candace Patrick Big Winner

By Bob Linnell,

SSCA Soil Conservationist

If Kelly and Candace Patrick ever thought they would they would win the 1997 Conservation Farmer Of The Year award, you could have fooled them. This quiet Kelvington area farm team along with their sons Sean and Charles have become something of a celebrity group of late. This is just a natural outcome of a hard working and very involved farm team according to their nominator, when contacted to notify him of the judges selection.

The Patricks were honored at the banquet of the Saskatchewan Soil Conservation Association during the annual Direct Seeding workshop and annual meeting held February 12 and 13 in Saskatoon before nearly 1000 people. They received a gift from The Royal Bank Of Canada and had their name engraved on large plaque beside the names of previous winners. The Royal Bank are new sponsors of the award and were pleased with the number of nominees for both the individual farmer, and the Group Conservation Awards.

Conservation Group Of The Year award went to the Direct-Tech group of Leroy. This group had great success in holding four large field days to raise funds for their local community. These field days introduced direct seeding to many farmers from all parts of Saskatchewan. Ken Crowter accepted the award on behalf of the group at the SSCA banquet.

The Patricks were selected by the judges as a result of their community leadership and their innovative methods of farming. Kelly has been known to invent and redesign machinery to make it work better on his farm. He has been a leader in adopting new technology and has continually strived for maximum economic returns and sustainability on the farm. They believe direct seeding to be one of the most valuable tools in a long term plan to enhance rural living. Kelly has also shown great leadership by helping his community found a diversification project for other farmers in building a large hog enterprise.

The Saskatchewan Soil Conservation Association is proud to assist the Royal Bank Of Canada each year in the identification and selection of outstanding individuals and groups in achievement and support of soil conservation.

Managing Residues to Match your Seeding Tool

By Ken Sapsford

SSCA Soil Conservationist

Hugh Barton from Conquest, Sask. is the developer of the Barton angle disc opener sold by Flexi-coil. This disc appears to hairpin less than most disc drills and does not require the additional weight to force it into the ground because of the angle of the disc it will suck itself in. The Bartons were still not completely satisfied with seeding operation in heavy cereal residues.

In the fall of 1996 they purchased a stripper header to harvest their cereals. They tried to use it on chickpeas as well but they were unsuccessful and had to return to the flex header for all their pulse crops. Harvest speed was increased with the stripper header and Barton stated "we could fill a 200 bushel grain tank on the combine in 8 to 10 min."

With this tall stubble that was left in the field they have trapped more snow this winter and there is very little frost in the ground so they expect the snow melt to move into the soil and not run off.

In the spring of 1997 Bartons will be seeding lentils into these fields, that have 30 in. high stubble, with the Barton disc. They feel the soil will warm up just as quick if not quicker than other fields because there is no residue on the surface of the soil. The sun will be able to warm the soil because when you look down from the top there is black soil between the stalks. They feel the evaporative loss will be reduced since there will be no wind at the soil surface.

The disc seeder should be able to seed through this stubble and have no hairpinning problems. There is no way you could seed through that high of stubble if you are using a hoe or sweep type of seeder.

These fields are on highway #15 east of Outlook. If you are traveling that direction this summer have a look and see what you think. I know I will be watching to see how it works.

How to Get Started Direct Seeding Bearpit

By Eric Oliver

SSCA Soil Conservationist

The questions in this bearpit traditionally extend over a very wide range of topics and this year's bearpit was no exception. This can present a bit of a challenge for the panel members of this bearpit, but there was usually a response based on personal experience or from a research point of view. The four panel members were comprised of Terry and Guy Fletcher; farmers from Conquest, Garry Thiel; a farmer from Shellbrook and Guy Lafond, an Ag Canada Research Scientist from Indian Head. I acted as chairperson for the bearpit and helped fill in a few gaps during the session.

The session started with equipment oriented questions, such as "Which is better to buy for direct seeding: an airseeder or air drill?" Questions on openers and packing also were discussed. Surface roughness after seeding in a direct seeding system was also a concern of some participants in the bearpit. The farmer panelists provided their experiences in these issues and for weed control and cropping rotations. Guy also provided valuable research information from a variety of sources.

There were a large number of participants who were either seriously looking at making the switch to direct seeding or who were about to start direct seeding this year. The valuable aspect to these bearpit sessions has always been that the farmers attending can ask questions that are specific to their individual situation. Although there may not always be agreement on the answers, they do receive information that they can use to help make their own decisions.

Starting direct seeding can be a bit intimidating to many farmers, but those attending the conference and the bearpits are starting on the right track. They are obtaining as much information as they can before they start direct seeding. The blend of technical and practical farmer experience has proven to be a good mix. If nothing else, it allows farmers to meet and exchange experiences that can be implemented on the farm.

Thanks to all the farmers who attended the bearpits and made them a success and I hope to see many of you at the SSCA Field Days in June.

Saskatchewan Soil Conservation Association Inc.

"Care Now For The Future"

This is your chance to take care of your family's financial future, with the introduction of our new

Group Insurance Program for SSCA Members:

"The Member Benefit Plan"

The Saskatchewan Soil Conservation Association is proud to announce that a new Group Insurance Program for Members and their families has been developed, and is now available.

The Program is made up of Core Benefits of Group Life or Group Disability Insurance, with optional benefits of Extended Health, Dental Care, Term Life Insurance, Supplemental Disability benefits, and Accidental Death and Dismemberment coverage.

The Program is being administered by our broker, DW Anderson Consulting Group, who are working with Sun Life of Canada to put together a program that will meet the needs of our members.

Special features that are unique to the Program include Core Life coverage of $25,000 and Core Disability coverage of a $1,000 a month without medical questions, for members under age 50.

- Single, couple or family rates available for most benefits
- Up to $500,000 in Optional Group Life Insurance benefits to Members (and spouses). Dependent Children can be covered for $10,000 each.
- Optional Disability coverage of up to $1500 a month, tax free benefits.
- Up to $500,000 in Accidental Death and Dismemberment benefits with optional coverage for Spouse and Dependent Children.

If you are currently a SSCA member, you are eligible to enroll today! If you would to enroll in the SSCA, and gain access to these and other valuable benefits, please call

Toll-Free to 1-888-878-SSCA(7722).

SSCA Board Restructured

At the 1997 SSCA annual business meeting in Saskatoon on February 12, the SSCA membership approved amendments to restructure the Association's board of directors. The new board of directors consists of six Regional Directors (farmers), three Directors-at-Large (farmers) and two Directors-at-Large (non-farmers). The executive consisting of president, 1st vice-president and 2nd vice-president are elected from by the board. The executive members must be farmers. The old positions of President-elect and Past President were eliminated. The length for a board members term was also increased from two to three years and are eligible to hold office for two consecutive terms.

The new board looks like this:

Regional Directors

Garry Nolan - SE

Bernie Niedzwiedz - EC - 1st Vice President

Don Kelsey - NE

Dick Richards - SW

John Bennett - WC - 2nd Vice President

Dwayne Mitchell -- NW

Directors-at-Large

Lorne Crosson (Farmer)

Clint Steinley (Farmer) - President

Greg Kane (Farmer)

Adrian Johnston (Non-farmer)

George Beauchesne (Non-farmer)

Immediately following the annual meeting, the board met briefly and elected the new executive Clint Steinley, president; Bernie Niedzwiedz, 1st vice president; John Bennett, 2nd vice president. They will serve in these offices for the next year.

ConservationFarmers Helping Farmers

Does conservation farming look difficult? Why not talk to afarmer who has tackled the same situation that you are facing?The **Conservation Farmers Helping Farmers Directory** housesthe names of SSCA members who are willing to accept phone callsabout their conservation farming practices and equipment.

Interested in the kind of equipment direct seeders are usingin your soil zone? Do you have questions about openers orfertilizer? Concerned about quackgrass in your minimum tillageoperation? Get the facts from experienced farmers.

How does it work? Simply call the SSCA Direct Seeding Hotlineat **1-800-213-4287** and ask to use the **ConservationFarmers Helping Farmers** service. You will be able to specifythe conservation techniques, equipment and practices you havequestions about. The SSCA will then search the directory andprovide the names and phone numbers of any members who haveexperience with the conservation methods or equipment inquestion.

Some examples of conservation information and experienceincluded in the directory are:

- direct seeding
- weed management
- conservation equipment
- fertility management
- residue management
- openers
- chemfallow
- forage establishment
- crop rotations
- alternate crops
- and other conservation farming experiences.

This is an ideal opportunity for farmers to take advantageof a large and diverse source of practical knowledge...otherfarmers!

Direct Seeding Internet Discussion Group Established

By Blair McClinton,

SSCA Assistant Manager

Getting questions on direct seeding answered over the Internet can be a frustrating experience. In an effort to help put farmers in contact with other farmers and agrologists, the Alberta Reduced Tillage Initiative (ARTI) recently established a direct seeding discussion group where producers can ask questions about direct seeding on the prairies.

This discussion group is a List Server e-mail list that distributes submissions to everyone subscribed to the list. Only people who are subscribed to the list can post messages. This works similarly to posting to a newsgroup except it works through your e-mail program. Any messages posted to the group are automatically sent to your e-mail address. You will download the message(s) along with your other e-mail. The advantage to this service is that everyone subscribed to the list is interested in direct seeding on the prairies. You will have a better chance of receiving relevant responses to your posts on direct seeding from this list than from posting to an agriculture newsgroup.

When I checked recently there were around 40 people subscribed to the list. Since February 1, I have been receiving around two messages per day. The group has been actively answering any questions posted or at least referring the sender to someone able to answer the question.

If you would like to subscribe to this Mailing List go to the following Web page and follow the instructions. http://paridss.usask.ca/consgroups/arti/discuss.htm

You can also search for other agriculture List Servers (mail lists) at this site: http://www.liszt.com/.

Fertilizing and Direct Seeded Non-cereals -Its just a matter of choice

By Patricia Flaten

CLC Manager

Do you think your biggest challenge in designing your direct seeding system is how to apply the nitrogen fertilizer? This is one of the most commonly asked questions.

However, it may not be because there are too few choices -- quite the opposite. The bigger question is first, what's your goal? And, what will the rest of the system include? As we often say, it all has to work together in a direct seeding system.

Crop safety should be one of your goals. Cereal crops are much more forgiving than non-cereals. Maintaining an excellent seed bed should also be of paramount importance. What is more important to you -- getting the seed into a firm, moist seedbed or placing the fertilizer in the ideal place? If both are equally important, you will be more limited in your choices of equipment. The ideal placement of nitrogen fertilizer is still 1-1.5 inches to the side and 1-1.5 inches below your seed.

The next question may be -- for simplicity sake, can I apply all of my fertilizer down in the seed row? There are bulletins which will help you to decide whether or not it is safe for your crop. In some circumstances you may be able to accomplish it, but with most of the non-cereal crops, it will be difficult unless your nitrogen requirements are very low, you farm wet clay soils, your row spacing is narrow, or your seed row width is wide.

So, what if I know I cannot put it all with the seed? Your next question may be, am I locked into a one pass seeding system or can I live with a two-pass system? There may be many reasons for choosing either approach, but if you did choose a two-pass system, there may be more choices than you think. Some are deep banding anhydrous in the fall, a traditional method with an inexpensive product for sure. Others, especially when thinking about this spring's harvest are wondering if there may be other ways to do it.

If you are wanting or restricted to two passes, you might a liquid N source and applying it after seeding with a spoke wheel injector or coulter system. A big advantage of these implements is that you have the opportunity to apply it after seeding and not disturb the seedbed nor the growing crop. In fact, they leave so little evidence of disturbance behind that you'll have a serious challenge in seeing where you've been unless you have a good marking system.

Some producers will broadcast urea or ammonium nitrate. The efficiency of this method would be lower down the list than other methods. This is especially true in a direct seeding system,

where the N can get tied up by the surface straw residues, but it is still an option. Urea will be less efficient than ammonium nitrate, but more readily available on the market.

What about a one pass direct seeding system? This is a minefield to walk into. It seems that some double shoot openers are better than others in different conditions. Do you prefer one fertilizer source over another? There are advantages to each.

If choosing anhydrous, there have been studies by Saskatchewan Wheat Pool, Agriculture and Agri-Food Canada, Alberta Farm Machinery Research Centre, Ag-Quest, ConservaPac, Westco and PAMI which will say that it can be done! But, there are still many cautionary comments to make and it warrants a completely separate article to sort it out. It would be wise to look into all of the information before committing oneself. Many farmers have successfully applied anhydrous or urea with a double shoot system. All of the companies seem to be able to site examples of their openers being used in this way.

You could avoid the minefield completely and apply the fertilizer in a separate band. A coulter can be used in a mid-row band, sharing a row of fertilizer between two seed rows. Bourgault has adopted this approach, not wanting to commit themselves to designing a double shoot opener that will only work in certain conditions.

Yet another approach would be to mount a liquid kit to your seeder, strap on some hoses and dribble or squirt a liquid product. The hoses can be positioned so the fertilizer is to one or both sides of the seed row. Usually, you can design the system to mix the fertilizer with the soil in the furrow. This often means that the fertilizer is actually above the seed, rather than below or beside it. Those who adopt this method are more concerned with seedbed quality than ideal placement of the fertilizer.

How should you choose to fertilizer your direct-seeded non-cereal crop? Your goals come first. There's a multitude of ways of getting the fertilizer in the ground, the choice is up to you.

Forages - to include or not to include in your rotation?

By Tim Nerbas

SSCA Soil Conservationist

The benefits of forages in the crop rotation have been observed for decades, however today few producers make the effort to capture them. Benefits include increased soil organic matter, improved soil physical properties, reduced soil erosion, suppression of weeds and disruption of plant disease cycles. At the 1997 annual conference, Martin Entz indicated that one of the most effective ways to realize the rotational benefits of forages is to cycle them through the rotation more quickly.

For those of us involved in soil conservation, these benefits match many of the same goals we are trying to attain. But one of the greatest fringe benefits from forages is increased yield of grain crops in subsequent years. In fact the rotational benefits of field peas on later wheat yields was greater where alfalfa had been previously included in the rotation. Increased yields are particularly evident in the black and gray soil zones. However, in the brown and dark brown soil zones the opposite often holds true. Generally the drying out of the soil profile is too great to overcome in these areas for the benefit of forages to be realized.

Weed suppression is another benefit of including forages in the rotation. Organic growers have been utilizing this favorable aspect of forages for years. Research has shown that weed suppression occurs even when the forage stand is only two to three years in duration.

Two of the main factors discouraging farmers from utilizing forages as part of the rotation are difficulty establishing and later difficulty in terminating perennial forage stands. Forage establishment may be improved through direct seeding. And substituting herbicides for tillage has proven to be effective in the termination of a forage stand.

Direct seeding forages rather than using conventional tillage methods, has proven to provide equal or better forage establishment. The superior plant establishment has been attributed to greater surface soil moisture observed in lower disturbance seeding systems. In the past forages have often been seeded with a companion or nurse crop. However a better approach may be to direct seed forages into an annual crop stubble.

In the past termination of forage stands has been expensive and not always successful (particularly in wet years) through intensive tillage. Alternatively, greater success may be realized by terminating the forage with a herbicide treatment and direct seeding an annual crop into the suppressed forage. When stands have been terminated in August/September of the previous year, there is no observed difference in yield between mechanically-killed vs chemically-killed trials. Lower wheat yields were observed if the herbicide treatment was done

immediately prior to seeding. None-the-less, increased weed suppression has been observed where herbicides were used instead of tillage.

As you arrange the pieces of the rotation puzzle for your operation, take some time to consider if and where forages might play a role. It may be worth the time you $pend.

Roundup Ready Canola: Does It Fit In A Direct Seeding System?

By Fred Phillips,

Yorkton, SK

As a farmer who zero tills and has to rely on chemicals for weed control, I am very concerned about weeds that are becoming resistant to certain chemicals. On our farm we are very careful how we rotate crops so that we do not have to spray with the same chemical groups year after year. It is with a great deal of concern that I have been reading about genetically altered seeds that have a built in resistance to certain chemicals.

If, for example, we seed glyphosate resistant canola this year, we may get good weed control this year, but we have to remember that this crop is next year's (and subsequent year's) weed. If we can no longer get a burn down with Roundup in the following spring, what do we use? How about Rustler? Unfortunately that limits what we can seed because of what is in this chemical. We also have to remember that these seeds will be in the ground for a long time -- so we have **now** limited our crop and chemical rotations for years to come!

Another problem I can see with this particular scenario is how do we do fall desiccation if some of the weeds we are trying to burn down and kill happen to be late germinating resistant canola from previous years? If we do not realize that this is a specific type of canola in this field, we will have killed everything else but this, have gained nothing and spent a lot of money!

Other genetically altered seeds are resistant to only one particular broad leaf spray i.e. Pursuit Smart canola, a group 2 chemical. One of the questions I have is " If these seeds can mutate or cross pollinate with other weeds, will these "new" weeds be resistant to all group 2 chemicals?" If this was the case we would drastically cut our broad leaf spray options! The reason I am concerned about this is that we have seen that nature can do this itself **without** any help from us!

I have used these examples to highlight some of the problems that could arise. I'm not saying that genetically altered seeds are bad, but what I do hope will happen is that farmers will look long and hard at the seed choices they are making today because in years to come these choices could come back to haunt them with fields of weeds that cannot be controlled!

Fred Phillips farms with his brother at Yorkton. He is a former director of the SSCA.

Direct Seeding In the Northeast

by Garry Mayerle,

SSCA Soil Conservationist

There are a variety of definitions of direct seeding among those in the agriculture business in Saskatchewan. The variations tend to be related at least in part to the region of the province they are coming from. There is a lot of validity to this regional interpretation. In talking to farmers in my region I am sure clarification on these regional interpretations will help some farmers make much better use of information coming out of the direct seeding movement.

The biggest reason I say this is that I come across farmers who are knifing in NH3 in the fall and seeding in the spring with knives and on row packing but don't consider themselves direct seeding because they are have a two pass system. Because they don't think they are direct seeding they don't utilize information on direct seeding. On the other hand I find some who are spiking with 2" spikes in the fall and then going *direct* into this in the spring with full sweeps and harrow packing and saying that they are direct seeding.

In the strictest definition of the phrase "direct seeding" you can argue that the term itself implies one pass. But I feel that the most important factor in identifying what is and what isn't direct seeding is what is happening to the residue. In the northeast residue is often a limiting factor for one pass seeding. I want to encourage those who are knifing in fertilizer and then low disturbance seeding (a two pass system) that you are direct seeding. This system almost always leaves a lot of stubble still standing.

We also use the term high disturbance direct seeding at SSCA. We are meaning a one pass system that uses full sweeps in the one pass that applies seed and fertilizer. This system disrupts all the residue but still leaves most of it at the surface. There seems to be more farmers using this system where residue levels are not too high. This is not typical for the northeast.

There are many different ideas out there about what is low disturbance seeding. Again for the northeast where residue levels are relatively high any tillage tool that cuts 50% or less of the soil surface I consider as low disturbance. There are a number of Concord-type seeders with 5" or 6" cut off sweeps that are still leaving a significant amount of stubble standing!

To almost all of the direct seeders in the northeast the words "heavy harrows" are not a swear word but an often necessary tool to manage residue for an efficient and practical system. They recognize the down side of promoting weed growth but the benefits of better managed residue out weigh the disadvantages.

Hope this helps clarify what direct seeding is for the northeastern part of the province.

Direct Seeding In the Northeast

by Garry Mayerle,

SSCA Soil Conservationist

There are a variety of definitions of direct seeding among those in the agriculture business in Saskatchewan. The variations tend to be related at least in part to the region of the province they are coming from. There is a lot of validity to this regional interpretation. In talking to farmers in my region I am sure clarification on these regional interpretations will help some farmers make much better use of information coming out of the direct seeding movement.

The biggest reason I say this is that I come across farmers who are knifing in NH3 in the fall and seeding in the spring with knives and on row packing but don't consider themselves direct seeding because they are have a two pass system. Because they don't think they are direct seeding they don't utilize information on direct seeding. On the other hand I find some who are spiking with 2" spikes in the fall and then going *direct* into this in the spring with full sweeps and harrow packing and saying that they are direct seeding.

In the strictest definition of the phrase "direct seeding" you can argue that the term itself implies one pass. But I feel that the most important factor in identifying what is and what isn't direct seeding is what is happening to the residue. In the northeast residue is often a limiting factor for one pass seeding. I want to encourage those who are knifing in fertilizer and then low disturbance seeding (a two pass system) that you are direct seeding. This system almost always leaves a lot of stubble still standing.

We also use the term high disturbance direct seeding at SSCA. We are meaning a one pass system that uses full sweeps in the one pass that applies seed and fertilizer. This system disrupts all the residue but still leaves most of it at the surface. There seems to be more farmers using this system where residue levels are not too high. This is not typical for the northeast.

There are many different ideas out there about what is low disturbance seeding. Again for the northeast where residue levels are relatively high any tillage tool that cuts 50% or less of the soil surface I consider as low disturbance. There are a number of Concord-type seeders with 5" or 6" cut off sweeps that are still leaving a significant amount of stubble standing!

To almost all of the direct seeders in the northeast the words "heavy harrows" are not a swear word but an often necessary tool to manage residue for an efficient and practical system. They recognize the down side of promoting weed growth but the benefits of better managed residue out weigh the disadvantages.

Hope this helps clarify what direct seeding is for the northeastern part of the province.

Topography - A Guide to Variable Rate Fertilizer Application

By Garry Noble,

Extension Agrologist,

Sask. Ag & Food, Assiniboia

A field scale demonstration was used to compare yield response to applied fertilizer on three slope positions (low, mid, upper). The demonstration simulated how an air drill with variable rate application capability could change rates with changes in slope position.

The demonstration was located on W1/2 26-01-24-W2, southeast of Coronach, Saskatchewan on a Fife Lake clay loam soil. Under crop insurance the land is class J, Risk Area 03, with an area average wheat yield of 22.9 bu/ac on summerfallow and 15.1 bu/ac stubble.

Soil tests were done for the three slope positions on April 24 and May 8. Columbus spring wheat (70 lb/ac) was direct seeded in wheat stubble on June 1 with a Flexi-coil 5000 air drill equipped with 3 inch paired row openers on a 12 inch row spacing. Three rates of fertilizer (35-15-0) were used on low (44lb N/ac), mid (70 lb N/ac) and upper (60 lb N/ac) slope positions to achieve the yield goal of 35 bu wheat/ac. on all slope positions.

An altimeter was used to measure elevation along the slope. samples were taken for plant tissue analysis on July 30. An aerial infrared photograph was taken of the site in August.

The wheat was harvested and weighed on October 9. A combine with a straight-cut header was used to harvest several strips, the length of each treatment. Grain samples from each treatment were taken to the local elevator for protein determination.

Results

Soil Test Nitrogen Levels - April 24 & May 8		
	Actual (lb/ac)	Recommended (lb/ac)
Low	20	45
Mid	16	65-75
Upper	19	60-70

Plant Tissue Analysis - July 30				
	Variable Rate		Check	
	Tissue N (%)	N Rate (lb/ac)	Tissue N (%)	N Rate (lb/ac)

Low	2.15	44	1.70	28
Mid	2.47	70	1.72	28
Upper	2.41	60	1.96	28

Grain Yield - October 9		
	Variable Rate	Check
	bu/ac	bu/ac
Low	27.60	26.84
Mid	29.72	26.19
Upper	26.06	24.13

Grain Protein (#1 CWRS) - October 11		
	Variable Rate	Check
	%	%
Low	14.2	13.4
Mid	13.8	11.4
Upper	13.6	11.5

Return on Variable Rate Fertilization		
	Variable Rate	Check
	$/ac	$/ac
Low	117.30*	108.16*
Mid	123.04*	101.09
Upper	107.89*	93.14
* protein premium included		
urea ammonium phosphate (35-15-0) $339/tonne		

Elevation - Field Profile
Upper - 2657 to 1665 ft

Mid - 2625 ft

Low - 2602 feet

Precipitation (mm) Coronach Poplar River Power Station (10 miles west)							
	April	**May**	**June**	**July**	**August**	**Sept.**	**Total**
1996	27.9	36.2	84.8	44.8	11.8	32.5	238
Normal	25.6	51.2	66.2	42.2	36.0	29.1	250.3

Comments

At the Coronach site in 1996 there was a trend for grain yield and protein to decline as elevation rose. In contrast, plant tissue analysis revealed nitrogen content increased on the check and the treatment strip as elevation rose.

The net dollar return applying different rates of fertilizer on different slopes compared to a single uniform rate across the field was $2.21/acre, low-slope; $3.47/acre, mid-slope; and $0.12/acre, upper-slope.

Protein premiums improved the dollar return from variable rate fertilization. The greatest yield increase, 3.5 bushel - mid slope ($13.51), earned an extra $8.44/acre from higher grain protein.

At the rates of fertilizer used, nitrogen did not limit the crop yield potential. Lower rates of fertilizer may have improved net dollar return on the different slope positions. If this assumption were true and changes in elevation across the field may guide variable rate fertilization. Changes in elevation can be measured accurately in the field with a simple inexpensive altimeter.

Thanks to Cam Winter, project coordinator and Don Kirby, Coronach Conservation Cooperative for the time and effort they invested in this project. Thanks to Terry Kowalchuck, PFRA Soil Conservationist, for measuring field elevations. Thanks to Brian McConkey, SPARC, for project consultation and data analysis.

Funding for the project was provided by the Canada-Saskatchewan Agriculture Green Plan Agreement.

Nutrient Cycling and Direct Seeding

By Tim Nerbas,

SSCA Soil Conservationist

Do fertility agronomics change when one moves to a direct seeding program? The idea that fertilizer practices may require fine tuning when one changes from a conventional seeding system to a low disturbance seeding system was addressed at the Farm Technology Expo in Red Deer (Feb. 6 - 8/97). Tom Jensen and Jeff Shoenau presented some of the latest insights into this issue.

The simple answer to the fertility agronomics question is probably not. However less mobile nutrients may require some special attention. In low disturbance seeding, the goals are to retain the maximum amount of surface litter and to keep the entrenched standing stubble in place (the soil erosion eliminator). This means much of the plant decomposition will take place on the soil surface. For mobile nutrients like nitrogen, sulfur, boron and chloride, a reduction in tillage will have little effect on availability to the crop. For crop residues such as wheat and canola which have a high carbon to nitrogen ratio, maintaining the residues on the surface may actually increase the availability of nitrogen to the subsequent crop. This is particularly true if the nitrogen source is placed below the thatch layer (at seeding time) and not spread on the surface. If the nitrogen source is spread on the surface, a percentage of the nitrogen will be temporarily tied up in microbial decomposition of the plant material. This is similar to the nitrogen that would be tied up if the residues were mechanically plowed into the soil. However for plant residues like pulse crops, the carbon to nitrogen ratio is much tighter, which results in faster microbial breakdown. Also it may supply 10 to 20 lbs. of nitrogen to the subsequent crop.

For less mobile plant nutrients like phosphorous, potassium, copper and zinc, direct seeding can lead to the stratification of these nutrients in the soil profile. The few inches of surface material tend to be relatively higher in these less mobile nutrients than the subsequent 4 or 5 inches in depth, as compared to the plowed layer of a cultivated soil. In conventionally-tilled soil, all plant nutrients tend to be homogeneous throughout the plow layer because the plant residues are mixed uniformly within this layer. Research has found this stratification in direct seeding, but it is not known whether or not the concentration of less mobile nutrients near the surface is less available to crops. It appears the greatest disadvantage will occur under dry conditions, as the less mobile nutrients will remain stranded in the dry surface layer. However with direct seeding, good spring soil moisture coupled with shallow seeding may make these nutrients more available than anticipated. Where the stratification is deemed to be a concern, occasional tillage as part of a rotation may be beneficial to redistribute these less mobile nutrients from the enriched surface layer throughout the plow layer. The type of direct seeding opener one is using will likely be an integral part of any stratification problem which may exist. Future research will need to address types of openers when looking at nutrient stratification as there may be differences between the opener designs (ie. disc vs hoe opener).

Precision Farming: The Second Lesson

By Bob Linnell,

SSCA Soil Conservationist

Precision farming offers us many exciting opportunities to use new technologies to better manage crop production. In my last article, you will recall I talked about some key technologies and costs associated with the various pieces of equipment needed for an accurate analysis of a field problem and how to respond to those problems in the field, along with the "ground-proofing" necessary to verify the problem. I mentioned the very large amount of data that is generated from the yield monitors and the site specific equipment. Being able to "see through" the pile of data paper is an area where you are likely to have to employ the services of a professional agrologist to help you respond to problems, plan your farming operations, and quantify the expected payback.

These "expert" agrologists are few and far between at present, and are more than likely to appear first at the dealer level in the person of your fertilizer agent or the service that provides you with your chemical crop protection supplies. These dealers will likely charge you a minimal fee for analysis, in the hope they may continue to supply you with your regular farm needs. In this case, you both win. The important thing to remember is that**You own the data.**

Okay, so now you know where to look for help, but how the H.....do you get started? First, you should attempt to learn something about site specific farming by reading, going to seminars or through crop management clubs. The Internet is another source if you are connected. You can often acquire the right information from the same source you already use to help you make your decisions in the day to day planing and operation of your own farm, albeit the designated agent who is specializing in precision farming will have a much greater and more applicable knowledge.

One of the first methods suggested is to start by getting a hold of a yield monitor for your combine or asking your custom harvester for the data card from his machine. He may charge you something for the card, but it may still be much cheaper than owning a new combine with a yield monitoring function already built in.

A number of people in the industry seem to think that you need 3 years of data before you can start to analyze your farm and "write a prescription" for fertilizer application, or try something to correct what the problem might be.

I maintain that you will probably begin to realize differences right away from having a knowledge of your fields. You automatically know where old fence lines were or areas of forage were located in the past, and this is simply a matter of proving what you already thought; in other words, you suspect that the old alfalfa ground might produce more yield than a field that was cropped 50:50 for the past 20 years Some common sense tells you things about your farm

without all the expense of another electronic gadget. Low areas are also more likely to produce higher yields than hills especially in years of minimal rainfall. Yet, in spite of all this, the dang monitors really capture your attention when you are operating the combine in the field. In fact, some days you can't remember going up and down the field at all, because you spent all day watching the monitor spit out the information on yields. and all the while, recording the stuff on a little bitty card that fits in your pocket

At the end of the day or the harvest you take the card and carry it to a computer set up to do analysis and draw maps to help you visualize just what the results are. This is where the cross reference with "ground -proofing" comes in. The pretty map may show you that an area near a slough yielded 142 bushels per acre, but it didn't tell you that the guy doing the swathing left a big wad of crop right there and tends to throw the results off. Don't get me wrong; the map will likely give you a lot of areas in question, and you may get a very high yield in a certain area. That is the point that you begin to "Put it all together" and figure out just how you achieved the result, (either good or bad) and what you plan to do about it. You can sit down and then begin to plan how to get more yield in the areas that did well and you can possibly adjust to deal with areas of low yield.**The name of the game is maximizing yield economically.** This concept is merely a tool to help you do just that.

Areas that can be identified include high or low nutrients, rock locations, weed problem locations, possible compaction problem areas, different varieties, slopes in the field, insect pest areas, crop moisture levels and many others. The Global Positioning Systems that can be aligned and attached to the monitor information is capable of generating large amounts of pertinent information about your field or farm. Making use of that information is then the task that falls on you shoulders or between you and your "Geo-Processor" (the guy that owns the computer and helps you analyse your data)

Develop a field recording system if you don't already have one. A book in your pocket or in the machine will help you remember what happened. Start to form learning partnerships with others that have some knowledge of site specific farming. These could include other farmers, agri-business people, crop consultants, university people etc.

Next time I will tell you more about the many benefits of precision farming , but in the meantime, here are some questions to ask that can help you avoid potential precision farming pitfalls.

1. Can you justify the expense?

2. Will it pay on the farm?

3.How fast do I jump in?

4.How do I start?

5.Will the price of the technology drop?

6. Have I done my homework?

7.Is the yield monitor for my combine user-friendly?

8.Are the electronic pieces compatible?

9.How do I handle and store the raw data?

10. How fast do I change?

Answers to these and other questions will follow in the next articles. Happy Farming.

Precision Farming and Soil Conservation

By Doug McKell,

SSCA Executive Manager

What will farming look like ten years from now? Ten years does not seem like a lot of time for significant change to take place but, just think about where we were with computers in 1987 and compare that to where we are today. The 286 chip computer was just coming on the scene, the web was something that collected in the corners of your walls and communications were still done primarily by telephone. Today there are a few indicators involving computer technology that may give us an indication of things to come in the next ten years. One of those indicators is the growing interest in precision farming techniques.

Precision farming involves the use of GPS equipment to geo-reference soil and crop information. Based on this information, the manager develops a plan to manage soil and capital resources more efficiently. Really what all this fancy technology does is collect more and better information about our farms, our soils and crop production. The unique thing about this new technology is the way it allows us to manipulate this information and ultimately how it will help us to make better production decisions.

Because we have technology advancing in leaps and bounds, the equipment to acquire farm production information is leading the decisions as to what to do with the information received. We can now develop yield maps for our fields as we harvest. These maps will help us more accurately determine which parts of our fields produce more than others and will also help us develop strategies for analyzing the soil in these areas. We will soon be able to make crop management decisions for areas within fields rather than the broad based field scale assumptions that are common in farm management today. What is still needed, however, is the research to help agrologists come up with recommendations for how to treat these areas within fields to optimize crop production.

How important is this change in farming? In 1997 it is estimated there will be 8000 combines in North America equipped with GPS receiving equipment and yield monitors. By 2000 eight out of ten combines sold will be equipped this way. Suffice it to say, the space age has come to farming and it is here to stay.

So where does that leave the average farmer? And what does this have to do with the SSCA? We see the techniques involved with precision farming as having a good fit with soil conservation practices. Precision farming techniques, when they are refined, will allow farmers to apply nutrients and pesticides where they are most needed and where they will provide the most impact. The potential for over-application or residual pollutants moving into non-targeted areas will be drastically reduced. This will address the increasing concerns of urbanites and environmental groups who view intensive agriculture methods as potentially harmful to the

environment. Also the shift to precision agriculture will give the average farmer more tools and ideas when making decisions regarding crop rotations, inputs and field operations.

The SSCA will be involved in the precision farming game. Our staff are attending workshops and training sessions on precision farming techniques and the geo-processing of information created from GPS and GIS technologies. We will be part of a team involving Sask Ag and Food agrologists, the U of S and industry experts in developing extension programs to pass on the latest information in precision farming to our members. We will also work with researchers to develop programs aimed at answering the questions farmers will have when they look for ways to interpret the information coming from their new technology. For producers this means they will have a place to turn to sort out this new and exciting information when they look for assistance to develop strategies that will put this space age technology to work out in the field. Stay tuned to the SSCA for developments down the road in precision farming. We aim to stay abreast of this technology as it's value to Saskatchewan's innovative farmers becomes more clear.

Row Spacing -- The Ongoing Debate

By Ken Sapsford,

SSCA Soil Conservationist

It appears that every time you open a farm newspaper this winter you are faced with an article by a researcher or farmer stating how good or bad wide row spacings are. When asked why the row spacing effect on grain yield varied among the various studies done in Western Canada , Dr. Guy Lafond recently wrote in a paper for the Manitoba North Dakota Zero Tillage workshop Proceedings: "All field experiments have some inherent biases built into them. In some cases these can have significant influence on the results. Examples of biases in the context of row spacing studies might involve: **(1)** confounding effect of seeding rate **(2)** error in the calculation of effective harvest area **(3)** border effect which becomes magnified when only a few rows are used per plot **(4)** problems with fertilizer placement favoring one spacing over another due to availability or damage."

Regardless of yield there are other factors that may determine whether a wide row spacing will fit into your operation.

Advantages of wide row spacing.

Residue Management: The wider the row spacing the more residue you can clear with a hoe type seeder. This definitely has an impact if you are farming in the moister areas of the province where there is traditionally a large amount of straw is grown.

Water Conservation: This is important to the drier farming areas. you can trap more snow with taller stubble and hence increase soil moisture levels in the spring. It is also reported that stubble cut 10 - 16" can reduce wind speed at the soil surface by 60%.

Time required to seed: If you are pushed to the limit of your time in the spring to get all of your crop into the ground, moving from an 8' to 12' row spacing seeder allows you to increase your implement width by 33% with the same number of openers. The draft will be similar. You also have to make a judgment call on whether you believe you can have a better crop on the entire farm if you are able to seed it in a shorter time period compared to having some crop seeded early and some seeded late.

Weed Control: Some farmers have indicated that spot spraying of particular weeds is easier with a wide row spacing. Weeds are very easy to identify between the rows.

Disadvantages of wide row spacing

Swathing: If you plan to swath some of your cereal crops each year the wide row spacing will not work, especially on a dry year with a short crop. Most farmers that move to wide row spacing are committed to straight combining.

Fertilizer Placement: When you move to a wider row spacing the maximum amount of fertilizer that can be seed placed is reduced. Once you move to a 12" row spacing you can not apply all the nitrogen required for the crop with the seed. With these wider row spacing you need to have a seeder with double shoot capabilities or apply your fertilizer in a separate operation.

All of the trial that have been reported have used row spacings of 4" - 6" - 8" - 12" or 16" row spacings to compare. In the commercially manufactured drills on the market there is many 9" and 10" row spacings. Maybe these are a good compromise?

Whatever you choose for a row spacing on your seeder you can have a larger impact on yield with many of your other management decisions. i.e. rotations , herbicide applications, fertilizer rate and placement etc.

President's Message

by Clinton Steinley

SSCA President

Greetings SSCA members. Since this is my first address as president of the association, I'd like to tell you a little about myself. My wife and I farm with my brother and his wife in the R.M. of Chesterfield, about 60 miles south west of Kindersley. We have been direct seeding for five years now, all the while trying to improve and fine tune our system. We produce a diverse mix of crops, some of which are non-traditional for the middle of Palliser's Triangle. However with the inherent benefits of direct seeding, we have had pretty good success with these crops. My interest in soil conservation started like a lot of others with concerns about soil degradation which were in our face (literally) in the 1980's. Our move to zero till, direct seeding and extended rotations was an evolutionary one, we went through all of the other soil conservation exercises first until we realized that it was the tillage that had to go.

I got involved in soil conservation initially by being appointed to the District 17 A.D.D. Board SOS Committee. It was a good learning experience and this is where I became familiar with SSCA. Garth Patterson, with his energy and enthusiasm got us really thinking about moving our farm to the next level of soil conservation namely direct seeding. Three years on the SOS committee seemed like just an initiation, and by now I had attended several SSCA events including field days and workshops. In the fall of 1994 I joined the SSCA board as the West Central Regional Director. After a short apprenticeship as a director for just over a year, some president's past began to encourage me to take a position on the executive. I'm not sure if I was more flattered or terrified, however, I agreed to have a go at it.

This organization has been led by exceptional men since its inception, many of whom I have gotten to know and who have been a lot of help to me. For this I thank them very much.

The SSCA will continue to grow as the recognized leader in the area of soil conservation and sustainable production systems not only in Saskatchewan, but in all of Canada. The credibility our association has gained has, in my opinion, been the result of three things. First, our strong membership which continues to grow and now exceeds 1000. Secondly, the quality of people we have been able to attract to serve on our board of directors. The combination of producer majority together with our directors at large representing research, government departments of agriculture, and the crop production input and manufacturing industry have given us a good cross section of views and opinions that has proven very successful. The third and most important reason for our success is our staff. When you look at the statistics indicating the uptake and adoption of soil conservation practices across Canada, you find Saskatchewan leading the nation in all areas. The SSCA can't take all of the credit for this but we can take a lot of it. I attribute this to the fact that the SSCA has the people in the field "walking the talk". I am referring to our six regional soil conservationists, CLC manager and our head office staff. They have designed

extension programs, services and events that have gotten the message out, and then they have been there to follow up and assist with problem solving and technical assistance.

As our Association continues to grow, we have been able to forge stronger alliances with other organizations, these include departments of agriculture, the research centers, implement manufacturers, the crop input industry, and other conservation organizations. These people are always willing to work with us at our various events to help us achieve our goals.

I see bright skies ahead for our association and our industry, so let's all have a good and prosperous year.

Saskatchewan Soil Enhancement Research Project

by Juanita Polegi

SSCA Soil Conservationist

How cold can it be standing in the middle of a field watching a crew take soil samples? The answer: Pretty darned cold! But it sure was interesting! In late October, I had the opportunity to accompany Colette and Rick Stushnoff of the Sask. Soil Survey to a field near Gorlitz when they took soil samples for the Sask. Soil Enhancement Research Project. The objective of the project is to determine the level of Carbon in the soil after 3 years of direct seeding.

SSCA staff involvement in the project began in the summer of 1996 when we began to search for cooperators in the project. Our mission was to find cooperators willing to be invoved in several layers of a study. Cooperators in the Level 1 study have fields that were direct seeded for the first time in 1996 or will be in 1997. Once 100 of these fields were identified around the province, crews from Sask. Soil Survey and Ag. Canada went out to take six soil cores in each field. These cores will be dried in the lab and then stored until 1999. At that time, these samples, together with six more soil cores taken from those same fields, will be analyzed for their C content . It's expected that the C content of the soil cores removed in 1999 will be higher than those removed in 1996 or early 1997.

Level 2 cooperators have a little more commitment to the Project than do the Level 1 folks. The fields marked for Level 2 will provide a direct comparison between the amount of C stored in a direct seeded system versus that in a conventionl till system. Once again, the fields involved must have been direct seeded for the first time in 1996 or 1997. The cooperators will cultivate 2 acre sites in their fields. The amount of tillage should reflect the norm in the area (one pass in the fall and then seed in the spring or two passes in the fall and one in the spring prior to seeding). Soil cores will be taken in the areas that have been tilled and in the standing stubble. Again, these cores will go back to the lab to dry and then be sealed until 1999. Unlike the Level 1 sites, however, these Level 2 sites will be analyzed for more than what the soil tells us. Prior to harvest in each of 97, 98 & 99, we staff will collect biomass samples from various locations within the fields on both the direct seeded area and the areas that had been worked. These biomass samples will then be carefully bagged, tagged and sent to Brian McConkey at the Semiarid Prairie Agriculture Research Centre in Swift Current. Brian and his staff will measure biomass C & N, thresh samples and do grain quality analysis (oil content and protein).

In each region, we have one Level 3 cooperator. This farmer has been direct seeding atleast one field for 6 years or more. Just across the fence from that field is a field that has been conventionally seeded for that time. The two fields will be sample once and their purpose in the project is to confirm the anticipated relationship between the adoption of a direct seeding system and increasing soil carbon levels.

While the results from the study won't be available for a few years, I'm sure they will prove most interesting.

The Soil Enhancement Research project is a joint venture between SSCA, Agriculture and Agri-Food Canada and GEMCO (Greenhouse Emissions Management Consortium) managed by TransAlta Utilites.

Stork's Bill

By Garry Mayerle,

SSCA Soil Conservationist

Direct seeders must be on the lookout for Stork's Bill. If it isn't already a problem weed for you it has the potential to become one very rapidly! Understanding its characteristics and control options are important to keeping an infestation from developing.

Data from G. Thomas's Saskatchewan Weed Survey indicate that Stork's Bill showed up in 0.8% of the Saskatchewan fields surveyed. However, the concern is that in fields where it occurred 44 % of the locations per field had an average density of 20.7 plants per m^2. This density ranged as high as 59 plants per m^2. The survey also identifies three areas where Stork's Bill is a significant weed problem. These are southeast of St. Walberg, southeast of Big River, and north of Humboldt. The concern for other farmers is that it could spread.

Stork's Bill has a flexible life cycle that is particularly adapted to reduced tillage grain production systems. It can survive as an annual, winter annual, or biennial. It can only reproduce from seed but there can be several flushes per season. Emergence is optimal in moist soil so rainfall tends to bring on another flush. Individual plants can produce 200 - 600 seeds which do not have any dormancy unless placed deep in the soil. Once established the plants are drought tolerant so in dry years they can take over knolls and significantly reduce yields.

One of Stork's Bills competitive advantages is that it can emerge and thrive under low soil and air temperatures. This adaptation along with the winter annual form means that it can be quite advanced when other weeds are at the burn down stage. The seed also has a burial mechanism that gives it an advantage in reduced till systems because it can wiggle through residue layers. A long awn attached to the seed twists when dry and uncoils when wet. This action is significant enough to tend to corkscrew the seed toward the soil surface.

As seedlings a distinguishing feature of Stork's Bill is the three lobed cotyledons. It has finely divided leaves very similar to Flixweed and Scentless Chamomile. At maturity Stork's Bill can be a large low plant 2-3 feet in diameter. It produces seed stalks about 1.5 feet tall that produce small pink to purple flowers. From the center of the flower a long pointed capsule forms that resembles a stork's bill. At maturity this capsule contains 5 seeds and splits somewhat explosively throwing the seed up to 1.5 feet from the plant.

With these competitive advantages it is evident that direct seeders must reduce the chances of this weed infesting their farms. Probably the first advice is to be on the lookout for the weed in your neighbourhood. Explore all the options for control. Because Stork's Bill is not a common weed problem very few herbicide companies have pursued registration. As for in-crop control, there are certainly more options in cereal crops. So be sure to use products that give suppression

or control as soon as you see any sign of Stork's Bill. Mowing ditches and other sanitation measures might also be considered if you see plants coming in from the edges of fields.

It will be well worth your time to avoid the problem of Stork's Bill on your farm now rather than fight it after it is an infestation!

Crop Rotations and Harvest Management - Survey of Direct Seeding Farmers

By Adrian Johnston, P.Ag.

SSCA Director-at-Large

During the 1995 Innovators conference in Saskatoon, participants were invited to share some of their farming practices in a survey questionnaire. The survey was prepared by Cecil Nagy, a graduate student studying in the Dept. of Agriculture Economics with Prof. Dick Schoney. In an earlier article I reviewed those aspects of the survey which dealt with machinery sizing and the seeding operation. In this article I would like to discuss some of the information gathered on crop rotation used and harvesting practices.

Of the 53 producers surveyed, 58% followed a regular crop rotation, while the remainder made cropping decisions on a year-to-year basis. While 34% of the farmers surveyed came from the Prairie region (Dark Brown and Brown soil zones), and 66% from the Parkland (Black and Gray soil zones), 91% of the group continuously cropped. When asked to respond to crop rotation followed, 52% reported a rotation with an equal proportion of broadleaf and cereals, usually cereal - pulse - cereal - oilseed, where occasionally flax was grown in place of the pulse crop. The majority of these farmers (70%) were from the Parkland, indicating that rotating between high and low residue crops is working as an effective management tool for direct seeding in high production regions. Four percent of the participants reported growing a winter cereal in place of a spring cereal (cereal - pulse - winter cereal - oilseed).

When asked about seeding dates of crops grown, 86% of producers reported that a cereal or pulse crop would most likely be seeded first, with wheat and peas seeded first and second the majority of times. This was followed by canola and flax, with barley seeding dates evenly distributed throughout the seeding sequence. From a question regarding beginning and ending seeding dates for each crop, it was a surprise to find that producers in the Thin Black soil zone reported the longest seeding window for cereals and pulse crops, while Black and Brown soil zone respondents report the shortest seeding window. It would appear that delays due to cool and wet spring weather, and fear of fall frost, limit the number of seeding days for producers in the Black and Gray soil zones. Alternatively, fear of mid-summer drought and heat stress in the Brown soil zone limit the number of desirable seeding days in that region.

Participants were questioned about the harvesting period on their farms. It was interesting to find that regardless of location in the province, farmers reported about 27 harvesting days available in a normal year and about 17 to 18 days in a short (weather limitation) year. Those producers in the Parkland, using pickup combines and without grain driers, reported the longest harvest days. Of the farmers who responded to the harvesting question, 81% had the capability of straight combining. There were 76% of the Parkland farmers who had a grain drier, compared to 32% of the Prairie farmers. All of the Parkland producers who reported using a straight cut combine also

had a grain drier, indicating the importance (or dependence) of these two technologies on one another. A review of the days required for harvesting revealed that the combination of straight cut combining and drying could add from 4 to 8 additional days to harvest, a major management tool during challenging harvest seasons.

In summary, the survey results on crop rotation and harvesting indicate that most direct seeding farmers are incorporating many of the agronomic and technological advances which are available. These include rotation of high and low residue producing crops, optimizing spring wheat and pulse crop quality with early seeding, and utilization of straight combining and drying at harvest. While some of these management tools may be minor when considered alone, there combined influence can have a significant effect on enterprise efficiency and profitability.