Prairie Steward

Farming For Your Future Environment

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Can We Afford 50¢ Nitrogen?

By Tim Nerbas, PAg
Conservation Agrologist

Can we afford 50¢ nitrogen? Or can we afford not to use 50¢ nitrogen? How can we find out? The rising cost of natural gas has many producers fearful of what nitrogen could cost by spring. So what does a producer do?

This past season's tremendous crop growth has most producers feeling that the soil's fertility pool is completely depleted. Neither are heaps of poor quality grain and disappointing grain prices adding any optimism for next year. Add to this the news that El Nino is building once again (a reminder of previous dry seasons across the prairies), and you don't get a very rosy picture for the next crop year.

So how much can we afford to spend on 2005 fertility? As input costs continue to soar it is imperative to make informed decisions regarding what those costs need to be. Soil tests are an important diagnostic tool to help the producer plan accordingly and are therefore a wise input expenditure. A soil test reveals the soil's ability to supply nutrients for the upcoming crop.

Once a soil test has been completed we need to ask ourselves some important questions. First, what is the present moisture situation? Is there any stored moisture? Good to excellent stubble moisture conditions describe many regions of Saskatchewan. A full soil profile of moisture is probably the best indicator that there is potential to grow an average crop in 2005.

Next, the producer should determine how many dollars per acre are available for investment. What is invested in plant fertility will significantly impact the overall yield potential of the next crop.

The tables in this article deal with three fields that were soil tested in late October in the Maidstone area. One was canola stubble, one was pea stubble and one was wheat stubble. Using the PRS nutrient forecaster software supplied by Western Ag Labs a variety of "what if's" were run to look at yield and profitability with 40¢/lb nitrogen and 50¢/lb nitrogen. In table 1 are the crop and fertilizer prices used for determining the yield goals. All yields are based

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In This Issue

Time flies when you're having fun

By Blair McClinton, PAg
SSCA Executive Manager

I thought I would do a little reminiscing in this article about the changes I have seen both with soil conservation farming and with the SSCA. It's hard to believe that it's been 15 years since I joined SSCA as one of the new SSCA soil conservationists in January, 1990. At the time, zero till and direct seeding were almost dirty words in the minds of many people with only the most ardent believers using the practice. I don't think anyone could have predicted that 15 years later, over 50% of the seeded acreage would be direct seeded. Over this time, the SSCA has grown and matured into a highly respected and influential farm organization.

Being at the forefront of the shift to direct seeding was very exiting and rewarding. Over the years, SSCA has taken very innovative approaches to help producers adopt the new system. Focused direct seeding courses or "kitchen table" meetings and half-ton tours were developed to complement our more traditional efforts with the Direct Seeding Conference, field days and demonstrations. In addition, we published the Direct Seeding Manual (along with PAMI), produced soil conservation videos and fact sheets. All of this was done in an effort to provide producers with the best information to support their management decisions.

Of course, none of this would have been possible without the dedication and commitment of the SSCA's Board and staff members. Even though finding the funding to operate has always been an issue for SSCA, we have always managed to attract and retain a strong group of professional agrologists to deliver our programs. With the exception of one, each agrologist currently on staff has been with the SSCA for over 8 years. As well, I have watched the SSCA Board mature into a very professional group who put tremendous effort into not only ensuring SSCA's programs are funded, but also into the soil carbon policy development and lobby effort. The professionalism and dedication of SSCA's Board and staff make my job easier.

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So where does SSCA go from here? We have accomplished so much in a short period of time. Yet, there is still more work to do, helping the remaining producers convert to more sustainable farming systems. We still see a role for SSCA in helping provide extension information and technical support to producers. Carbon offset trading may create new opportunities for SSCA in future although it is not clear how this will play out or what our role will be. We need to find a more sustainable funding source. Is a check-off an option? Or are there other opportunities?

While the past 15 years have had their challenges, I am proud of our many accomplishments. With the direction the Board has set, I am confident the next 15 years will be just as productive. ●

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President's Message

By Darryl Reynolds
SSCA President

As I sit here on a cool mid November morning, I think back to that fateful August (20) morning three months ago and ponder how the temperature isn't much below the -2° C that devastated so many of our crops that night. Some of the oldtimers on "Senators Row" tell me this is the most damaging frost this area has seen generally since 1918. There was a house built here that year when a car load of flax was sent to port and it returned with filled with lumber for a new house paid for with the flax. I wonder what price flax would have to go to today to pay for a house? Our peas and canola, though first in the ground, went through minor drought for six weeks after June 12 and yet they came through in better than expected condition. The coriander was near average except it's light and discoloured. The wheat was seeded last and took it on the chin. Several oldtimers compared the quality of wheat to the rust damaged crop of '54. I don't mind Mother Nature getting us down occasionally, but did she have to put the boots to us?

Anyway, it's hard to talk about "global warming" after what was probably the coldest summer here since this land was homesteaded. But as Canada has signed Kyoto and Russia has now also ratified it, we have targets to meet. So in August we put on our parkas and huddled up in Saskatoon with the Offset Team from Ottawa to discuss the rules for carbon trading. The Offset Team is a senior group of bureaucrats that is writing the policy on carbon trading that is to be in place by early 2005. This will put the framework in place and we will have to live with these rules for the next 30-50 years or as long as Kyoto (or its successors) is in effect. The good news is that the Team is listening to our concerns. Most of the problems we discussed with them about PERLL 1 last March in Ottawa had been dealt with and were no longer an issue.

It has been disappointing that the funded commodity groups and Ag media have been so quiet on this issue. I realize that it takes a lot of effort and gray matter to understand the ramifications of Kyoto. But we will be burdened with the increased costs of fuel, fertilizer and pesticides for the rest of our farming careers because of Kyoto and we should be doing all we can to recapture as much value from our carbon sink as possible to help offset these costs. We had a good cross-section of people attend the meeting in Saskatoon and their participation was very much appreciated. I would also like to thank APAS for their active involvement in this issue. Cecelia Olver, APAS VP has put in considerable effort in understanding the issue and APAS has been there with some funding in our efforts to effect policy. We expect PERLL 2 to be announced any day now, and we are going to give careful consideration to our participation. Having been successful in affecting the rules for carbon trading, it would be prudent to submit an application if the rules are to our liking.

"The 10M tonnes of carbon taken off the top by the Feds has a trading value of $12/TE on European markets today. This means that approx. $100,000,000 annually is coming out of our (Sask) pockets to reduce the cost of Kyoto for the urban voter."

The bad news is that the Federal government is adamant about BAU (business as usual) which appropriates a large amount of the carbon sink to meet federal targets. Late adopters of conservation tillage will receive higher payments for carbon than those of us that were early adopters. We estimate that 85-90% of the cost associated with early adoption of zero till will be on the backs of Saskatchewan producers. The 10M tonnes of carbon taken off the top by the Feds has a trading value of $12/TE on European markets today. This means that approx. $100,000,000 annually is coming out of our (Sask) pockets to reduce the cost of Kyoto for the urban voter. Why? Because we are inconsequential at the polls! This would never happen to Ontario or Quebec producers! This is very much a political problem and needs to be addressed through the politicians and should have the full support of all provincial organizations and media. The federal Climate Change Plan for Canada states "no region or jurisdiction of the country should be asked to bear an unreasonable burden in the realization of our climate change goals." **The $100 million dollars will be an annual cost carried by as few as 10,000 Saskatchewan producers, many who have been or are, our members. By the time we get to our annual conference in February, the rules could be in place and it could be too late to affect policy.**

We will soon know about PERRL 2. If the SSCA does get involved with PERLL 2, we will provide an opportunity for our members to participate. We hope this will add value to your membership and encourage new members and renewals. If we don't become involved in PERRL 2, it means we didn't feel the rules were fair.

Be sure to plan to attend our conference in February in Saskatoon and in the mean time, ask your commodity groups and others to **get involved in this issue before it is too late.** All we can do after the fact is whine and complain and we know what that will get us. You can visit our website at www.ssca.ca to read our position papers and presentations at previous conferences and in past editions of Prairie Stewards.

I wish you all well this winter as I realize it is a trying time on many farms and we need to keep everyone going as better times are ahead. ●

Think Twice Before Cutting Fertilizer Rates Next Spring

By Juanita Polegi, PAg
Assistant Manager & SE Conservation Agrologist

No one will argue the claim that the crop year 2004 was a tough one for many farmers across the prairies. As bills come due and thoughts turn to next year, many farmers are looking at ways to become more efficient. Cutting costs and saving dollars on inputs will be real scenarios for most farmers as they plan for the 2005 crop. But if you're considering cutting fertilizer rates next spring, you may want to give that a sober second thought. While reducing the fertilizer applied throughout the growing season may make good sense now, it may, in fact, hurt next year's bottom line.

Thom Weir, Manager of Agronomic Services with the Sask. Wheat Pool, cautions farmers about cutting fertilizer rates. "While cutting fertilizer rates may seem like the easiest way to save some cash next spring, it is probably going to cost you in terms of yield and profitability", Thom said. "You need to look at the big picture before you arbitrarily reduce fertilizer rates."

As all agrologists will do, Thom suggests that soil samples be taken in the fields where you are considering reducing fertilizer rates. "A soil sample gives a snap shot of the amount of available nutrients in the soil at the time of sampling", he said. "It's a good guide for determining the amount of nutrients used by the last crop and what is available for the next crop." The next step is to determine your target yield. "If you don't know what you're aiming for, you can't know what your optimum fertilizer rate should be, " said Thom.

Part 1. Calculation of Revenue

Yield (bu / ac)	94	77	58	60
Value of Production ($2 / bu)	**$188**	**$154**	**$116**	**$120**

Part 2. Calculation of Variable Costs

Seed ($ / ac)	10.50	10.50	10.50	10.50
Seed Tmt, Herbicide & Fungicide ($ / ac)	26.50	26.50	26.50	12.00
Machinery – fuel & repairs ($ / ac)	15.00	15.00	15.00	15.00
Insurance – crop & hail ($ / ac)	5.00	5.00	5.00	5.00
Marketing ($ / ac)	0	0	0	0
Land cost ($ / ac)	25.00	25.00	25.00	25.00
Fertilizer ($ / ac)				
Nitrogen (lbs / ac)	92 = $35.39	80 = $30.77	58 = $26.16	60 = $26.93
Phosphorus (lbs / ac)	25 = $6.52	20 = $5.22	15 = $3.91	15 = $3.91
Potassium (lbs / ac)	10 = $1.66	10 = $1.66	10 = $1.66	0
Sulfur (lbs / ac)	3 = $0.65	3 = $0.65	3 = $0.65	0
Interest ($ / ac)	3.79	3.61	3.43	2.82
Total Variable Costs /ac	**$130.02**	**$123.92**	**$117.82**	**$96.66**

(Fertilizer price assumptions: N = $.385 / lb; P = $.261 / lb; K = $.166 / lb; S=.218 / lb)

To help farmers calculate their potential costs and profit margins, Thom has created Probability Tables for a variety of crops. The figures in the tables are based on conditions in the **Moist Black Soil Zone**. As an example, he has provided his calculations for 6 Row Malt Barley. The soil test taken in October indicates that the available N is 25 lbs / ac. He begins by calculating the probability of receiving enough precipitation to produce 94 bu / ac (25%), 77 bu / ac (50%) and 58 bu / ac (75%). In this example the target yield is 60 bu / ac.

As the precipitation probability decreases, so too does the need for fertilizer. But in the above example, the 58 bu / ac yield receives all the inputs that the higher yields will. The 60 bushel goal, however, receives no seed treatment or fungicide. The herbicide rate is either cut or the field is only spot sprayed. The potassium and sulfur are eliminated from the fertilizer blend.

Once the Variable Costs have been calculated, the Contribution Margin can be determined.

From Thom's calculations, we see that just cutting the rate of N from 92 lbs / ac to 58 but keeping all other costs identical will not realize a net profit at the end of the year.

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NARROW-LEAVED HAWKS-BEARD CONTROL ... CONTINUED FROM PAGE 8

and chickpeas are a little too sensitive to take that risk. Express, which has a very short-term residual is being investigated as a potential herbicide for use before planting sensitive crops; however, **this is not a registered treatment.**

If the weather turns against you and you can't get this fall application done, Narrow-leaved Hawks-beard, like all winter annuals, can take off early and get big fast, often before burn-off spraying can begin. If this happens, Express mixed with 0.5 L / ac glyphosate burn-off should take care of the problem. 0.75 L / ac of glyphosate alone should be adequate before the winter annual bolts. If it does bolt, up the rate of glyphosate to 1 L / ac. If cereals are being planted, Prepass is another good option.

Since the easiest stage to get rid of Narrow-leaved Hawks-beard is when it is small, it is imperative to be able to identify the seedlings. See fig.1. Some winter annuals and perennials can be difficult to tell apart late in the fall. If the Narrow-leaved Hawks-beard plants are small enough to see the cotyledons, they will be oval in shape with short stalks. The first few leaves have prominent petioles or stalks. They often have a few distinct teeth on the margins of these leaves pointing back toward the center of the plant. The plant begins to form the rosette stage with narrow leaves that have variable margins ranging from sparsely toothed to deeply lobed. One of the distinctive characteristics distinguishing Narrow-leaved Hawks-beard from stinkweed is the milky juice evident when leaves are broken. However, this characteristic is shared with dandelion.

In conclusion, the important point to remember is that like many other winter annuals, the best and cheapest time to control Narrow-leaved Hawks-beard is in the late fall.

THINK TWICE BEFORE CUTTING FERTILIZER RATES NEXT SPRING ... CONTINUED FROM PAGE 4

Thom's description of that scenario is stark. "It's a recipe for losing money when fertilizer is cut but no other inputs," he said. "When deciding to reduce the fertilizer, you have to be very disciplined in resisting the temptation to apply herbicide for cosmetic reasons". On the other hand, a profit may be realized if, in addition to reducing the amount of N, other fertilizer is eliminated, the seed treatment and fungicide are eliminated and herbicide costs are also reduced. This is, however, a short-term solution as in subsequent years, the weeds will need to be fully taken care of and the nutrient bank will need refilling.

Thom Weir (on right), Manager of Agronomic Services, SWP, discussing profit margins with a client.

Part 3. Calculation of the Contribution Margin

Value of Production less Variable costs	$188 - $130.02 = $57.98 / ac	$154 - $123.93 = $30.08 / ac	$116 - $117.82 = (1.82)	$120 - $96.66 = $23.34
Contribution Margin / bu	$0.62	$0.39	($0.03)	$0.39
Price required to cover Variable costs ($ / bu)	$1.38	$1.61	$2.03	$1.61
# bu / ac to cover costs @ $2 / bu	65	62	59	48

"Nitrogen is the key driver of yields. It contributes over 85% of yield generation in most cases. Other nutrients such as P, K and S, in most fields, will contribute slightly to yield, while contributing subtleties such as slight improvement in maturity, straw strength or seed plumpness. In the whole picture, economic return from these is much less than from nitrogen." Weir states.

Granted the cash flow situation this winter is tight. Looking for ways to lower costs is a prudent thing to do even in good years. But cutting inputs without working through the numbers could prove very costly in the end. As Thom recommends, "Farmers need to either sharpen their own pencils or visit someone who can help them work through their cost of production. You don't want to be locking yourself into losing money before you have even put the seed in the ground!"

For more information on calculating costs of production, call Thom at 786-1838 or call SAFRR's Ag Knowledge Centre 1-866-457-2377.

Spray Nozzles & Drift

By Rich Szwydky, PAg
Conservation Agrologist

One of the most notable challenges for producers during the post emergent spraying season is spraying in favourable environmental conditions. The conditions must be conducive to minimizing chemical drift while optimizing herbicide performance. In a perfect world, favourable environmental conditions exist and producers do not worry about chemical spray drift. Since we don't live in a perfect world, off-target sprays and changing wind speeds are a reality for most producers. With greater crop diversity featuring increasing acreage of herbicide tolerant crops, coupled with the use of non-selective herbicides such as Roundup and Liberty and other highly active and volatile chemicals, the problems associated with off- target sprays continue to intensify.

There are several ways to help manage and reduce drift. Producers can adjust their sprayer to affect flow rate, pressure, speed, and boom height. Drift reduction for most applicators, however, begins with the choice in spray nozzle.

Most Ag engineers believe the spray nozzle is one of the most important components of a spray applicator. In fact, spray nozzles not only govern droplet size (the precursor to the amount of drift), they also govern application rate, coverage and spray uniformity. Droplet size plays a major role in the creation of spray drift. Tom Wolf, research scientist with Agriculture and Agri-Food Canada, states the most effective way to reduce drift potential is to apply coarser sprays that minimize the proportional contribution of small droplets. Larger droplets are not as likely to drift off-target when compared to smaller droplets. As such, the newest nozzles entering the market in the last six years produce a spray that consists of larger, coarser droplets with fewer fines. For many producers, the benefits of the newer low drift nozzles could mean fewer drift complaints, timely spraying, and improved protection of sensitive areas such as riparian regions, wetlands and shelterbelts.

Producers faced with the task of purchasing new nozzles for their sprayers may be a bit overwhelmed with the amount of nozzle choices and manufacturers in today's market. Although nozzle designs will differ, the underlying concept of many of these nozzles remains similar. For producers, the ultimate decision is to choose a spray nozzle that will best suit their needs.

According to Wolf, spray nozzles available in Canada are listed under four categories:

a) Conventional flat fan
b) Pre-orifice flat fan
c) Low pressure air induced
d) High pressure air induced

Conventional flat fan nozzles

These nozzles were once the standard nozzles used by western Canadian applicators. The nozzles come with either an 80 or 110 degree fan angle and operate at a pressure range of 20 to 60 psi with optimum spray pressure at 40 psi. The spray produced by these nozzles is categorized as fine to medium sized droplets, which can be drift prone if the right conditions exist. Smaller flow rate nozzles or nozzles operating at higher pressures will produce a spray with finer droplets that are more susceptible to drift. Recommended water volume for flat fan nozzles is greater than three gallons per acre.

Pre-orifice flat fan nozzles

The pre-orifice flat fan nozzle has a drift reduction of approximately 50% when compared to the conventional flat fan nozzles operating at a standard pressure of 40 psi. The pre-orifice flat fan nozzle consists of two orifices - the first is the pre-orifice and the second is the slightly larger exit orifice at the end of the nozzle tip. The pre-orifice is designed to meter the spray at the required flow rate and pressure. The pressure you read on your external gauge will be the spray pressure at the pre-orifice. As the spray solution passes from the pre-orifice to the exit orifice, there is a drop in pressure due to the slightly larger design of the exit orifice. The spray exiting the second orifice is at a lower pressure and, as such, the coarser spray is less prone to drift. The exit orifice is basically forming the spray pattern. These nozzles operate efficiently at a pressure range of 30 to 60 psi and do come with 80 or 110 degree tips. The turbo teeJet, however, operates outside of these parameters enabling applicators to spray as low as 15 psi. It is recommended that producers use greater than five gallons per acre water volume with these nozzles due to their slightly coarser spray quality.

Low and high pressure air induced nozzles

The newest spray nozzle technology on the market has been the air induction nozzles. The trademark of this nozzle is that the spray produced consists of coarse droplets containing air bubbles. When the droplets come in contact with the target, some say they shatter on impact. The resulting coverage is very similar to the finer spray coverage produced by the conventional flat fan nozzle. When compared to the flat fan nozzles operating at 40 psi, the low pressure air induction nozzles have been shown to reduce drift from 50 to 70%, while the high pressure air induced nozzles show a drift reduction from 70 to 90%.

The design of the air-induced nozzles consists of two orifices. The first orifice is designed to meter the spray at the required flow rate and pressure. The second orifice - a larger exit orifice at the end of the nozzle tip - forms the spray pattern. Located between the two orifices is a venturi, which draws air from an aspiration hole on the side of the nozzle body. Located inside the nozzle body is a mixing chamber where the air and spray solution mix. The resulting spray exiting the spray tip consists of coarse droplets with relatively few drift susceptible fines.

Table 1: Nozzle Choices, Pressures and Volume Recommendations

Nozzle	Type	Air-Induced	Smallest Size Available	Optimal Pressure (psi)	Relative Droplet size	Minimum Volume (gpa)
TeeJet XR	Conventional	No	0067	20 to 60	Smallest (*)	3
Hypro TR, VP, Albuz AXI	Conventional	No	01, 015, 015	20 to 60	*	3
Hardi FF	Conventional	No	0075	20 to 75	*	3
ComboJet ER	Conventional	No	0067	20 to 60	*	3
Turbo TeeJet	Pre-orifice	No	01	15 to 90	**	3-5
Hardi LD	Pre-orifice	No	01	20 to 70	**	3-5
Hypro LD, Albuz ADI	Pre-orifice	No	015, 01	30 to 60	**	3-5
ComboJet MR	Pre-orifice	No	0067	30 to 60	***	5-7
Air Bubble Jet	Low Pressure Air Induced	Yes	01	30 to 60+	***	5-7
Greenleaf Air Mix	Low Pressure Air Induced	Yes	005	30 to 60+	***	5-7
Lechler IDK	Low Pressure Air Induced	Yes	015	30 to 60+	***	5-7
Hypro Ultra Lo-Drift	Low Pressure Air Induced	Yes	015	30 to 60+	***	5-7
Greenleaf TurboDrop, XL	High Pressure Air Induced	Yes	005	60 to 80+	****	7-9
Albuz AVI	High Pressure Air Induced	Yes	015	60 to 80+	****	7-9
TeeJet AI	High Pressure Air Induced	Yes	015	60 to 80+	****	7-9
Lechler ID / Hardi InJet	High Pressure Air Induced	Yes	01	60 to 80+	****	7-9
ComboJet DR	Pre-orifice	No	0067	60 to 80+	*****	10
Delavan RainDrop	Very High Pressure	Yes	015	80 to 120+	*****	10

Source: Tom Wolf, What's New with Nozzles 2004

The low pressure air induced nozzles perform best at a pressure range of 30 to 60 psi or higher with a water volume greater than five gallons per acre. The high pressure air induced nozzles operate effectively at a pressure range of 60 to 80 psi or higher with water volume no less than seven gallons per acre.

Table 1 shows that many low drift nozzles are now available from various suppliers. Producers should choose nozzles that best suits their needs, and ensure these nozzles are fully functional with the spray application unit. Some of these low drift nozzles operate optimally at higher pressure ranges; therefore producers must ensure that the sprayer pump can supply the pressure to efficiently operate the nozzles. Using lower than recommended pressure would reduce the activity of the air induction mechanism within the nozzle. This results in a pattern breakdown, followed by reduced coverage and poor weed control. Using higher than recommended pressure would create finer drift prone droplets, although this is not a serious problem with air-induced nozzles. These tips are still very low-drift compared to conventional flat fans even at quite high pressures. For best results, all venturi nozzles should be operated in the middle of their working range. Other factors that should be considered when purchasing low drift nozzles include costs, ease of cleaning, and certainty of fitting with existing nozzle caps.

The preliminary research results on herbicide efficacy for low drift nozzles have determined that the herbicide mode of action groups 2, 4, & 9 herbicides have performed well with low drift nozzles. The herbicides in the groups 1, 6, 8, & 10 that target the difficult to wet weeds such as wild oats, green foxtail, and cleavers require finer sprays to maintain adequate control. Producers targeting these weeds or spraying fungicides and insecticides with venturi nozzles must ensure that higher spray pressures and water volumes are used.

Any single nozzle may not work for all your spraying needs. Many application technologists recommend that producers use multiple nozzles on turrets with differing flow rates to adjust for changes in wind speed, products with differing water volume requirements, and for spraying around sensitive areas. Although low drift nozzles can be used for all your chemical needs, producers should ensure optimum nozzle spray pressures; water volumes, product rates and coverage are maintained.

Narrow-leaved Hawks-beard Control

By Garry Mayerle, PAg
Conservation Agrologist

Narrow-leaved Hawks-beard has often made beginning direct seeders wonder if they made a serious mistake by parking the cultivator. Too many direct seeded fields have looked down right ugly at spraying time because of this weed. A lot of direct seeders are already familiar with this weed infestation, however, there are still parts of Saskatchewan where its arrival comes as a shock. To those who have just recently encountered this pest, there are several good solutions from which to choose and their success depends on how well the weather cooperates.

Hawks-beard flourishes when seedlings can get established in the fall. These seeds are spread by the wind on tiny feathery "parachutes". Wet falls make it much easier for the tiny seeds to germinate and produce viable seedlings especially in low disturbance seeding systems. There seems to be very little dormancy & they germinate soon after falling to the ground. Eric Johnson with Agriculture and Agri-Food Canada at the Scott Research Station says that makes sense because Narrow-leaved Hawks-beard spread out of the Meadow Lake area, a wetter region of the province.

When late fall tillage was practiced, many of these seedlings were destroyed. In low disturbance systems, the best time to take care of this weed is still in the late fall. Narrow-leaved Hawks-beard can take different life cycles but the most common one causing the most damage to direct seeders is the winter annual form. The plant forms a rosette that over winters and starts growing early in the spring. It can get such an early start that by the time burn-off is possible, the plants are harder to kill than in the fall. They can also deplete soil nutrients and moisture that would greatly enhance crop production.

Annual weeds freeze out because ice crystals form inside cells at below freezing temperatures that causes extensive damage to the cell. It is interesting to note that winter annuals survive freezing temperatures by reducing water in the cells so less ice crystals form. They also make a type of antifreeze that drops the freezing point. Winter annuals have a better winter survival rate by keeping plant structure close to the ground. In years with early snow fall, the ground stays warmer and some weeds, such as cleavers, can develop a winter annual form.

Narrow-leaved hawks-beard rosette. Photo courtesy of Westco/ Sasksatchewan Wheat Pool

Table 1 - Soil Moisture & Timing of Winter Annual Weed Control (03-04)

Time of Herbicide Application	Mean Volumetric Soil Moisture (top 5")
Fall	14.5%
Spring	8.5%
Check (no herbicide)	6%

Eric Johnson, Agriculture & Agri-Food Canada, Scott Research Station

At the Scott Research Station, a project was initiated comparing the differences when winter annual weeds were controlled in late fall or spring. See Table 1. The spring application on May 14 did a good job of taking care of the heavy infestation of flixweed, shepherd's purse, and Narrow-leaved Hawks-beard. However, soil moisture was certainly depleted. Permanent wilting point on these Scott soils is about 11%. This is the soil moisture content at which plants can no longer recover from day time wilt during the cooler night. The numbers indicate there was adequate moisture for crop establishment this last year when the winter annual weeds were controlled in the fall but there would certainly not be enough on the spring controlled treatments.

The 2003 Saskatchewan Weed Survey conducted by Ag. Canada in Saskatoon & SAFRR can be compared back to the survey in 1995. This comparison indicates that Narrow-leaved Hawks-beard is becoming more of a problem weed. It moved from an overall relative abundance ranking of 29th to 20th. Other experts say that the winter annual form of this weed is increasing rapidly across the prairies.

An economical option for direct seeders is a late fall application of 2,4-D. Johnson feels that an 8 oz. rate or 0.45 L / ac of a 500 g / L formula will reduce the weeds to a manageable population. Besides the chemical activity of 2,4-D, it also stimulates plant growth so it disrupts winter survival mode giving better control. 2,4-D does have a residue and most literature cautions growers about growing broad leaf crops after a fall application depending on the rate. Johnson however, says their research shows that at this rate in the fall, canola, flax, or peas should be safe to grow anywhere in the province. Lentils

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To Burn, or Not to Burn: That is the Question

By David Larsen, PAg
SAFRR

"I had the stand for 30 bushels of flax, but nothing was in the hopper." Not an uncommon statement this fall. Across the province an early frost ruined what was looking like a good harvest. Fields with high potential were rendered infertile, leaving nothing but large amounts of residue in the field. After Crop Insurance makes their visit, producers are faced with another problem. What to do with the residue in the field?

Whether the field was combined or not, managing residue after (or instead of) harvest involves an extra operation and expense. Spending money on a crop that didn't generate any revenue can be difficult. However, whether you use a match or a mower, cost will be incurred. When determining a method to manage your residue, you must determine how valuable and necessary the residue is.

Residue has an intrinsic and non-intrinsic value. The fertilizer replacement value for the nutrient content of the straw is the easiest value to measure. While all nutrients in residue aren't converted to plant available nutrients, it is an indication of the amount of nutrients lost to the system. Nutrients removed in the straw are a direct economic cost of production for subsequent crops.

Residue also has many non-intrinsic values. It plays an integral part in building soil organic matter, which increases soil quality and tilth. If straw is removed too frequently, soil organic matter levels will decline and productivity of the soil will be reduced. Residue is also critical for erosion control, snow trapping ability and moisture retention.

Table 1. Average nutrient uptake and removal by a 40 bu / a wheat crop with a straw to grain ratio of 1.66 under western Canada conditions.

Grain		N (lb/ac)	P2O5 (lb/ac)	K2O (lb/ac)	S (lb/ac)
Spring wheat	Total uptake	76 – 93	29 - 35	65 - 80	8 -10
40 bu / ac producing	grain	54 – 66	21 - 26	16 -19	4 - 5
3984 lb / ac of straw	straw	22 – 27	8 - 9	49 - 61	4 – 5

*** Source. Nutrient Uptake and Removal by Field Crops, Western Canada 1998. Canadian Fertilizer Institute.**

Decisions on how to best manage your residue should be based on:

- Value of nutrients
- Importance for development of organic matter
- Susceptibility of the soil to erosion
- Required snow trap
- Moisture retention

Residue management techniques available include: Chop and spread, physically remove the straw, tillage or burn.

Table 2. Nutrient content and value of nutrients in one tonne of wheat straw*

Nutrient (lb/tonne)	Price of the fertilizer nutrient ($/lb)	Value of nutrient ($/tonne)
N (12 – 15)	0.39	4.68 – 5.85
P2O5 (4.5 – 5)	0.27	1.22 – 1.35
K2O (27 – 34)	0.17	4.59 – 5.78
S (2 – 3)	0.26	0.52 – 0.78
Total		9.34 – 11.74

*** Values have been rounded. Based on granular fertilizer prices on Nov 4/2004**

Chop and Spread

Chopping and spreading the residue involves the highest upfront cost, but has the advantage of retaining the nutrients and the organic material found in the residue and stubble.

Managing residue is usually done at the back of the combine. Chaff spreaders and straw choppers are an important tool in managing residue for direct seeding. Organic material in the crop residue is important for soil development and nutrient cycling. The chaff and straw provide significant nutritional value. If left to decompose, they will be returned to the soil and be available for use by subsequent crops.

Opening the concaves will convert the combine to a residue management machine without the need to empty the hopper. The combine is effective at cutting, chopping and spreading straw. Costs for running a combine through the standing crop average around $10-$20 per acre.

Rotary mowers also manage residue. Costs for operating rotary mowers range from $8 to $9. Mowers should be set low enough to provide enough stubble clearance for the air drill while staying high enough to avoid creating too much mulch on the surface.

CONTINUED PAGE 11

2005 Direct Seeding Conference:
"Management Practices for the Future"

February 15 & 16, 2005

Saskatoon Prairieland Park, Saskatoon, Saskatchewan

TUESDAY, FEBRUARY 15

8:00 a.m. Registration and Coffee in Trade Show

9:45 a.m. Opening Remarks

10:00 a.m. Keynote Address:
"Celebrating Agriculture" - Michele Payn-Knoper, Agriculturist and Marketing Consultant, Indiana, USA

SESSION #1 FERTILITY AND ROTATIONS

10:45 a.m. "Fertility Effects on Crop & Weed Competition" - Dr. Hugh Beckie, PAg, Agriculture and Agri-Food Canada, Saskatoon, SK

11:05 a.m. "N Minerlization: What's Happening in Your Soil?" - Dr. Fran Walley, PAg, U of S, Saskatoon, SK

11:25 a.m. "Managing Fertility & Rotations: A Producer's Perspective" - Barb Stefanyshyn-Cote, PAg, Producer, Leask, SK

12:00 p.m. Lunch

1:15 p.m. SSCA Annual Business Meeting

SESSION #2 CONCURRENT SESSIONS

A: Advanced Direct Seeding

2:30 p.m. "Direct Seeding Issues & Opportunites" - Marcel van Stavern, Producer, Griffin, SK

2:55 p.m. "Systems Approach to Low Input Crop Production" - Wayne Katernych, Producer, North Battleford, SK

3:20 p.m. "Site Specific Farming: The Next Level" - Rick Pattison, Producer, Lemburg, SK

B: Beginning Direct Seeding

2:30 p.m. "Openers & Packers for Direct Seeding" - David larsen, PAg, , SAFRR, Moose Jaw, SK

2:55 p.m. "Direct Seeding onOur Farm" - Lyle Stucky, PAg, Producer, Osler, SK

3:20 p.m. "Direct Seeding on Our Farm" - Laura Reiter, PAg, Producer, Radisson, SK

4:00 p.m. Coffee in the Trade Show

5:00 p.m. Trade Show Closes

Radisson Hotel

5:00 p.m. Youth Vision for Agriculture: The Environment Challenge - Agriculture in the Classroom (AITC)

6:00 p.m. Awards Banquet & Bearpit Sessions

WEDNESDAY, FEBRUARY 16

SESSION #3 ENVIRONMENTAL ISSUES

9:00 a.m. "EFP's in Saskatchewan" - John Clair, Co-Chair Agri-Environmental Advisory Council, Saskatoon, SK

9:20 a.m. "A Sask Farmer's Experience with EFP's" - Jim Moen, PAg, Producer, Cabri, SK

9:40 a.m. "Insect Biodiversity and Farming Systems" - Dr. Owen Olfert, Agriculture and Agri-Food Canada, Saskatoon, SK

10:10 a.m. Coffee in Trade Show

SESSION #4 CONCURRENT SESSIONS

A: Forages and Livestock

10:45 a.m. "Rejuvenation vs. Re-establishment of a Forage Stand" - Tim Nerbas, PAg, SSCA, North Battleford, SK

11:05 a.m. "Oppotunitis for Forage Crops" - Daniel O'Reilly, Producer, Scout Lake, SK

11:25 a.m. "Warm & Cool Season Forage Crops" - Lorne Klein, PAg, SAFRR, Weyburn, SK

11:45 a.m. "Rotational Grazing in EC Sask" - Duane Thompson, Producer, Kelliher, SK

B: Weed Control Strategies

10:45 a.m. "Principles of Weed Resistance" - Dr. Linda Hall, PAg, Alberta Agriculture, Edmonton, AB

11:05 a.m. "Preventing Weed Resistance" - Dr. Martin Entz, PAg, U of M, Winnipeg, MB

11:25 a.m. "Weed Resistance & HT Crops" - Dr. Neil Harker, Agriculture and Agri-Food Canada, Lacombe, AB

11:45 a.m. "Managing Weed Resistance" - Lyle Friesen, U of M, Winnipeg, MB

12:15 p.m. Lunch

SESSION #5 EMERGING OPPORTUNITIES & ISSUES

1:45 p.m. "New Crops: The Trail from Development to Your Farm" - Dr. Rene van Acker, PAg, U of M, Winnipeg, MB

2:05 p.m. "Biodiesel Fuels: Their Potential in Prairie Agriculture" - Zenneth Faye, Canola Development Commission, Producer, , SK

2:25 p.m. "Pesticides in the Environment: Real or Imagined?" - Dr. Allan Cessna, Agriculture and Agri-Food Canada, Saskatoon, SK

2:55 p.m. "Offset Trading" - Edgar Hammermeister, PAg, 1st VP SSCA, Alameda, SK

3:05 p.m. Closing Speaker: "Soil Conservation in Sask: We've Come a Long Way" - Doug McKell, PAg, Soil Conservation Council of Canada, Indian Head, SK

3:45 p.m. Draw for Conference Prizes

You Must Be There To Win!

2005 DIRECT SEEDING CONFERENCE REGISTRATION INFORMATION

To Register Call 1-800-213-4287
(SK or MB) or (306) 695-4233

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RM# _____

Representing: _____

Producer: Yes ☐ No ☐

SSCA Member: Yes ☐ No ☐

SSCA Members

	(GST Included)	
Before February 4, 2005		
Includes: all meals & conference proceedings.	$85.60	☐
Additional Farm Unit Members Includes: all meals & no conference proceedings.	$74.90	☐
After February 4, 2005 Includes: all meals & conference proceedings.	$107.00	☐
Additional Farm Unit Members Includes: all meals & no conference proceedings.	$96.30	☐

Non-Members

Before February 4, 2005 Includes: all meals & conference proceedings.	$107.00	☐
After February 4, 2005 Includes: all meals & conference proceedings.	$128.40	☐

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SSCA Members

Includes: lunch & conference proceedings.	$64.20	☐
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Non-Members

Includes: lunch & conference proceedings.	$74.90	☐

Extras

Extra Banquet Tickets	$26.75	☐
Extra Conference Proceedings	$10.00	☐

I would like to support the SSCA by becoming a member:
(*no GST on Membership Fees)

3 year membership*	$100.00	☐
Additional faming unit member:	$25.00	☐

Total Amount Enclosed $ _____

Please make cheques payable to:
SSCA
Box 1360, Indian Head, SK, S0G 2K0
Fax: (306) 695-4236

TO BURN, OR NOT TO BURN: THAT IS THE QUESTION ... CONTINUED FROM PAGE 9

Baling/Grazing

Cutting and baling or grazing is an effective way to remove residue. Nutrients and organic material in the straw can be utilized by livestock. Immature frozen crops often have feeding characteristics comparable to good quality hay. Feed testing at an accredited feed testing lab is required to ensure quality. Nitrate and Prussic acid (in flax) levels require testing to ensure they aren't too high. Feed for sale can be advertised on SAFRR's Feed and Forage Listing Service by calling, toll free, 1-800-667-7564. Following grazing or baling, harrowing the field with a heavy harrow may help further break up and distribute the straw.

Tillage

Tillage is not a recommended practice to control residue. Without any other form of distribution, residue levels are too high to be effectively controlled with tillage. Plugging and clumping will occur. Multiple operations will be required, resulting in increased vulnerability to erosion.

Table 3: **Stubble nutrients and amounts lost from a hot burn (for a wheat crop – yielding 5 t/Ha, produces 7.5 t stubble per Ha)**

Amount nutrients in stubble (kg / Ha)	N P K Carbon	56 5.9 109 3450
Percentage lost (%)	N P K Carbon	82% 44% 40% 80%

Taken from Australian Farm Journal December 2003

Burning

Burning can be an effective way of removing residue and reducing upfront costs. Occasional fast and hot burns can be used to control excess residue without causing significant damage to soil structure or inherent soil organic matter.

However, burning does have a cost. Residue is a valuable resource. Removing stubble and chaff predisposes the soil to erosion. Residue is also important for maintaining soil tilth and structure. If the rate of addition is less than the rate of decomposition, the organic matter levels of the soil will decrease.

CONTINUED PAGE 13

A New Look at Stripper Headers

By Eric Oliver, PAg
Conservation Agrologist

On October 14 I attended a field demo of a stripper header study conducted by Wheatland Conservation Area at the Agri-ARM applied research site just north of Swift Current. This study funded by the Saskatchewan Pulse Growers and in co-operation with Agriculture and Agri-Food

Canada (AAFC) at Swift Current, compared harvest losses between the stripper header and the more conventional swathed and straight cut treatments. Although the study looked primarily at lentils and kabuli chickpeas, the field tour also demonstrated harvesting other crops like barley, field peas, and flax using the stripper header. The replicated data was only taken on lentils and chickpeas. The stripper header was a 14 foot Shelbourne mounted on AAFC's 550 MF combine.

Why the interest in stripper headers? They certainly have been on the market for a while, but the cost has kept a lot of farmers from looking seriously at them. However, they are less expensive than some of the draper type headers on the market. They do have some advantages that many farmers might want to take a second look at. Since only the pods or heads of a crop is being stripped off and threshed, the combine can generally travel significantly faster when harvesting as compared to harvesting with a straight cut header or swaths, especially when harvesting cereals. Combine wear is also significantly reduced when using stripper headers and fuel consumption is much less as well. It also appears that a stripper header can also pick up a lot of lodged cereals or cereals lodged from sawflies.

At the field tour, it became quickly evident that the hydraulically adjusted skirt at the front of the stripper header can affect the amount of harvest losses in certain crops like lentils. As noted by Bryan Nybo, farm manager for the Swift Current Agri-ARM site, "It takes a bit of trial and error to find the right height for the skirting when using this header on crops like lentils and chickpeas". Mr. Nybo described how the table and skirt heights adjustments on a stripper header are somewhat similar to the table and reel heights on a straight cut header, however, the rpm of the stripper header is important as well. A slower rpm speed must be selected for pulse crops, and is easily changed right on the header by changing gear ratios.

Stripper header harvesting lentils.

Although the ideal timing for harvesting the lentils was obviously past, there was surprisingly little harvest loss with any of the treatments or equipment used with only about 2-3% header losses for all three of the harvesting headers. A pre-harvest loss (seed that had shattered and was lying on the ground prior to using the stripper or straight cut headers) was another 2%. Although there were negligible pre-harvest losses in the lentils from the swathing operation itself, there was shattering losses under the swath. Lentil swaths can also be very vulnerable to high shattering losses in windy conditions. There was no significant yield differences among treatments,

all yielding about 25 bu / ac. It should be stressed that this is only one year's worth of data and a longer study might see more differences between equipment. Nybo noted that two of the five reps had dirt in the samples with the straight cut header and swathed treatments, but no dirt was in any of the stripper header treatments. Dirt in the yield will require cleaning and if not, earth tag can reduce grade.

The chickpeas were much harder to quantify this year with poor yields of only 8 bu / ac. However, it was also evident that the skirt height, if too low, was knocking pods off, similar to an incorrect reel height. Once the right height of the skirt was achieved, few pods were knocked off. There were essentially no harvest losses from either the stripper or straight cut headers. There was no swath treatment in the chickpeas as this is rarely done with chickpeas.

The stripper header performed very well in the barley and flax. Travel speed in the barley must have been at least 8-10 mph and could probably have gone faster. There is quite a potential for stripper headers. As the stripper header only removes the heads and pods, harvesting at an earlier stage on crops like cereals and flax is quite possible, where the heads are mature but the straw can still be somewhat green. In addition, it could dramatically reduce the burning of flax straw by leaving the stubble standing. Significantly

CONTINUED NEXT PAGE

TO BURN, OR NOT TO BURN: THAT IS THE QUESTION ... CONTINUED FROM PAGE 9

Another consequence of burning is the lost nutrients. Burning releases valuable nutrients including carbon and nitrogen into the atmosphere. Nutrient cycling is critical to maintaining soil fertility and nutrient cycling. Burning removes many valuable nutrients from the system.

If you Must Burn

Agricultural burning *should be used only as a last resort*, says Wayne Gosselin, Environmental Policy Analyst with Saskatchewan Agriculture, Food and Rural Revitalization (SAFRR). If burning is deemed necessary, caution is advised to minimize the impact of the smoke. Burning can create health and safety problems from inadequate smoke dispersion. **Burning should never be done at night**. In fall, smoke can be held close to the ground at night because of the inversion of cold and warm air during evening cooling. **Fires should be extinguished before sunset**.

While smoke may only be a nuisance to some people, it can be a serious health risk for those with respiratory problems, such as asthma and emphysema. Statistics show that 10 to 15 per cent of the general population suffers with some type of respiratory condition.

Smoke can drift across highways causing impaired visibility, and fires can get out of control, particularly if winds come up. There have been instances of serious losses because of agricultural burning

Producers who plan to burn are encouraged to study the Ventilation Index Forecast before they do so. Environment Canada's Ventilation Index Forecast is available on SAFRR's Web site at www.agr.gov.sk.ca/cropresidue/conditions.htm.

For more information on Residue Management:

- *Direct Seeding Manual – A Farming System for the New Millennium, 1999*. Prairie Agricultural Machinery Institute, Humboldt, Saskatchewan. Call 1-800-567-7264.
- Saskatchewan Soil Conservation Association web site: www.ssca.ca
- Saskatchewan Agriculture and Food web site: www.agr.gov.sk.ca
- *Nutrient Uptake and Removal by Field Crops – Western Canada 1998*. Contact Saskatchewan Agriculture and Food, Rural Service Centres or www.cfi.ca

A NEW LOOK AT STRIPPER HEADERS ... CONTINUED

more snow could be trapped by the tall stubble, improving soil moisture reserves in the spring. There is also potential for using the tall stubble for ethanol and fibre production. There may even be reductions in herbicide spray drift, although in heavy cereal stubble there may be problems with the herbicide penetrating the stubble effectively. However, such tall, heavy stubble may also significantly delay or inhibit weed growth, at least weeds early in the season. Although the stripper header harvested field peas at the field tour very well, there were still vines left anchored in the soil and this was extremely dry pea vines.

However, there are some drawbacks to this technology. Very tall, heavy stubble will make seeding with anything other than direct seeding equipment with disc openers pretty tricky. The use of a stubble cutter will likely be necessary for tall, heavy cereal stubble to leave a more manageable stubble height. The use of Straw Track's Smart Hitch™ could also be a good option. This hitch system adjusts the seed drill on the go so it seeds between last year's rows.

Close up of teeth on strippr header.

Further study is needed using the stripper header technology. It is apparent that the cost of the header itself can be offset by savings in fuel, time and reduced combine wear. In addition, some crops could be harvested earlier, as soon as the heads are mature and dry enough. However, there is a need to look further into harvest losses. Are there any advantages in this area? How do we manage the tall stubble for maximum snow trapping and be able to seed through it in the spring? Is there a potential for utilizing the excess tall stubble for ethanol or fibre production? Can taller stubble reduce herbicide drift and still get to the weeds below? Is there a need for a quarter of a million dollar combine behind a stripper header or does this header allow for an older, less expensive combine to do the job just as fast or faster? There are many questions that need answering with this technology, but early indications do suggest that stripper headers can provide many advantages.

Riparian Management in a Cultivated Landscape

By Garry Mayerle, PAg
Conservation Agrologist

In the north east region, SSCA is part of a team working on a project to encourage good management of resources in the buffer areas around seasonal or permanent water bodies in grain production systems. The project, "Riparian Management in a Cultivated Landscape", plans to take theoretical best management practices for these areas and develop them to work practically for grain producers. Although the project is focused on producers along the Carrot River water shed, it is expected that the results will be applicable to all agricultural areas of the province. The process will involve talking to producers individually and in workshops over the next 3 winter seasons to promote and discuss how these practices can fit on their land base. During the next 3 summers, demonstration sites will be set up to further refine these management practices and promote them to producers through field days.

The team is being led by the SSCA and the CLC. A technician, Mitchell Japp is being shared half time with the CLC farm. Mitchell will carry out the day-to-day activities of the project. Another member of the team, the Saskatchewan Watershed Authorithy (SWA), has already put a lot of time into making this project happen. The rangeland agrologist with SAFRR is assisting with the demonstration sites. The Saskatchewan Conservation and Development Association (SCDA) more commonly known at the producer level as the C&Ds have been actively involved in helping make various aspects of the project happen. Ducks Unlimited and PFRA also sit on the steering committee.

Funding for the project is from the Greencover Canada Program. The Canadian government has developed this 5 year program and allotted $110 million to promote sustainable land use and expand the land area covered by perennial forage and trees. Many producers are familiar with the land conversion component of the program where funding is available to seed land down to long term forage. Funds for this riparian project come from the technical assistant component of the program that enhances technology transfer with technical and extension expertise. The technology being transferred is aimed at accelerating the adoption of beneficial management practices for the sustainable use and management of pasture, rangeland, critical areas, and shelterbelts on the agricultural landscape.

"An important benefit of a healthy riparian area is reduced erosion. On streams, rivers, and creeks this translates into bank stabilization. When the riparian areas are functioning properly, they filter or keep sediment and nutrients out of the water. This really helps to maintain good quality water - which has been identified as a key environmental concern."

These buffer areas are called riparian areas. They include the areas of land directly affected by water bodies and water ways. They are wetter transition zones next to areas where water is plentiful. Usually the riparian area is a narrow area of land around creeks, sloughs, potholes, coulees, springs, wooded draws, and rivers. Although the water may only be present for part of the year, or in wetter years, it still influences the vegetation defining the riparian area.

An important benefit of a healthy riparian area is reduced erosion. On streams, rivers, and creeks this translates into bank stabilization.

When the riparian areas are functioning properly, they filter or keep sediment and nutrients out of the water. This really helps to maintain good quality water - which has been identified as a key environmental concern. Other benefits of healthy riparian areas include large amounts of biomass production, groundwater recharge, and stream and wave dissipation. These benefits provide wildlife habitat and support greater wildlife diversity.

In the past, beneficial management practices for healthy riparian areas have largely been targeted at livestock producers. In areas where producers have most of their land base committed to annual grain production, there are still riparian areas that need protecting. This is especially relevant as the pressure to increase land base increases based on grain farming economics and production practices. Producers need to be careful to evaluate sacrificing environmental benefits to increase crop production. The word "environmental" is not necessarily a positive word for producers. However, it seems that there have been benefits for producers adopting good environmental practices. Direct seeding has certainly been a good example. It may well be that as producers adopt other good environmental practices, rewards may also come. It behooves producers to look beyond the short-term gains for more subtle, but perhaps more significant, long term benefits to using good environmental practices. Look to future Prairie Steward articles for further discussion. ●

Is DS an Option for 2005?

By Tim Nerbas, PAg
Conservation Agrologist

What was shaping up to be a great harvest turned into a harvest that grated on producers' nerves. A late harvest meant many fall jobs like fall banding did not get completed. For some producers, spring will mean not only squeezing in the fall jobs, but also completing the 2004 harvest itself, not to mention seeding the 2005 crop. Unfortunately, beyond worrying about these imminent time constraints for next spring, there doesn't appear to be a lot that can be done right now. Or is there? If you've ever considered direct seeding (DS) as an option for your farm, there may never be a better time than the 2005 crop year to make your move. Why? Consider next spring's most limited resource (next to money of course!): time. Establishing a DS operation could save you time and fuel costs next spring, and get the wheels in motion toward switching systems in the years to come.

Photo couretesy of Edgar Hammermeister

Getting started into a direct seeding system may seem overwhelming, but like any other process of change, it needs to be taken one step at a time. The SSCA has adopted five pillars of DS that assist producers to not only initiate the conservation farming system, but also grow and maintain their operation after a DS system has been established.

These five pillars are 1) Residue Management 2) Rotations 3) Seeding Principles 4) Weed Control and 5) Fertility Principles. Each of these pillars will be discussed here in light of both initiating a DS system and what stage your fields may be at this coming spring.

Residue management is handling crop residues so they complement the seeding and crop production process. When residue is properly managed, it becomes a valuable asset that can increase overall production. Because the key to successful DS is proper residue management, the first step in any DS system is not with the seeding but with the previous year's harvest. For producers who still have crop to take off next spring, there remains an opportunity to make adjustments in preparation for crop residue management. Producers who completed harvest will have to establish which of the following categories best describes their residue situation.

1) If you didn't get the straw adequately spread - The goal should be to spread both straw and chaff over the entire width of cut. Research by PAMI found that straw should be spread over 80% of the width of cut and chaff should be spread over 50% of the width of cut. However if straw is not spread sufficiently, fields can be harrowed to provide sufficient spread of straw across the field.

2) If the straw has been dropped – Once spring arrives, you must decide if the straw is still needed for bedding or feed purposes. If it's more important to save time than to bale, then heavy harrows can be used to work the windrows. Remember that a hot, sunny day is required for this so the straw spreads out evenly and doesn't make piles.

3) If you didn't get the chaff adequately spread – While both straw and chaff need to be spread across the width of the cut, ***chaff spreading must occur at the back of the combine***. For those who still have crop to take off in the spring, chaff collection can be an excellent alternative and important cattle feed. Otherwise, if chaff is inadequately spread, you may have to wait until next fall to begin making your move toward DS.

Rotations

The next important aspect of a finely tuned system is rotations. This may mean using more than one rotation. Crop rotations should provide the proper diversity and flexibility for your operation. A cereal-pulse-cereal-oilseed is a simple rotation to start building towards. The cereal can be oats, barley, canary seed or wheat and the pulse can be lentils, peas or chickpeas. The oilseed could be canola, flax or even sunflower. The key is to have a variety of crop types and to alternate broadleaf and cereal crops.

Alternating cereal and broadleaf crops is an important part of an effective control strategy for some soil and residue borne diseases. Appropriate rotations reduce disease innoculum, thereby reducing risk of crop losses to the disease. By diversifying crop types, seeding and harvesting dates are automatically altered which aides in weed control. In general,

CONTINUED PAGE 17

CLC Continues to Grow

By Laurie Hayes, Msc PAg
Manager, Conservation Learning Centre

Big news at the CLC!! By the time you receive this publication, we will have purchased the land and buildings that the CLC has operated since 1993. Early in 2004, the Kinash family approached the CLC and an agreement was reached. Possession date was January 1, 2005. The Board viewed this as an opportunity for the CLC to take a step toward program stability and to have the capability to become involved in more long-term projects.

Now for the not-so-good news – yes, we like many others still have crop out in the field – flax and barley. While it was nice to have the moisture, it effectively eliminated the possibility of finishing harvest in the fall. The crops that were harvested, much as everywhere else, were fair to good in yield but poor in quality. Results of most projects will be published in our Annual Summary available after January 1, 2005.

Introductions

In this issue, we introduce two staff members. Ilene Cantin, our school program facilitator, studied two years in the degree of agriculture program at the University of Saskatchewan and transferred to a Biological Sciences Technology diploma. She has extensive experience in the areas of water quality and genetically modified crops. She brings this knowledge and boundless enthusiasm to our program. She has been coordinating the school program since the fall of 2003 and has made significant changes, with more up-to-date information, hands-on activities, thought-provoking discussions and activities, and current event issues (global warming, sustainable agriculture, carbon sequestration, biotechnology) being incorporated to capture the interest of teachers and students alike. She has also increased the visibility of the program both inside and outside the Prince Albert area. This year, 15 new schools and three new school divisions participated in the CLC's school program.

Mitchell Japp has been hired to coordinate the project "Riparian Management in a Cultivated Landscape" mentioned in the last Prairie Steward. He is in the process of finishing his master's thesis in soil science under the direction of Jeff Schoenau and Mike Grevers. His research topic is "*Soil conditions and early crop growth under repeated manure applications.*" We welcome Mitchell's expertise and energy.

We also introduce our current board: Garry Podbielski (chair), Grant Martin, David Griffin, Philip Mansiere, Sheldon Dowling, John Clair, Tom Boyle (SAFRR), Bob Evans (Gates Fertilizers), Duane Hill (DUC), Diane Knight (U of S), Ian Pickering (PFRA) and Cecil Vera (AAFC). Thanks to the direction of this dedicated group, the CLC continues to stride forward.

Student Activities

Steps have been taken to expand the scope of the CLC education program into other non-science curriculum areas such as social studies, accounting, business and career awareness. To date, two meetings have been held with the local Public and Roman Catholic school division representatives. Discussions have focused on developing a teachers' workshop specific to the Grade 9 core curriculum area of Risks and Limits.

The CLC is developing a module based on "Fertilizer Applications to Agricultural Crops" to assist teachers in incorporating the concept of risks and limits into their curriculum. The concepts, and the methods used to teach them, are applicable to many other curricula for elementary, middle and secondary grade levels. The goal is for students to develop a thought process and become proficient in using a decision-making model. CLC staff will be presenting this workshop at the Prince Albert Teachers' Convention in April 2005. If successful, this will greatly expand our capacity to reach more teachers and students.

The Conservation Learning Centre is grateful to its 49 partners, sponsors and supporters and the eight funding agencies that support its programs and projects.

Stop by our booth during the trade show season to receive more updates on the CLC. Just a reminder to check out our website at **www.conservationlearningcentre.com**.

For Sale

No Till Drill for sale. 1999 Conserva Pak 3912.
2330 Flexicoil tank, new no plug fertilizer tips, poly packers with scrapers.
Bowed packer arms, 1000x20 tires.
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If anyone has direct seedingequipment for sale and wish to advertise in the Prairie Steward, please contact our Head Office at 306-695-4233

broadleaf weed control is more consistent and less costly in cereals and grassy weed control is improved in broadleaf crops. Broadleaf weed control is limited for some broadleaf crops. Each crop type favours and discourages a different spectrum of weeds. Perennial and forage crops can also be added to a rotation. These crops can be excellent tools for controlling certain weeds. A diverse rotation allows for diversity in the herbicide program. Diverse rotations also spread out risk and workload. Crop diversity can also prevent residue from building up and causing difficulty at seeding.

Seeding Principles

The most important thing that seeding equipment does is place seed so it can germinate and emerge with minimal stress and produce the best crop possible. To do this, seed needs to be placed at uniform depth, and be uniformly distributed at the desired rate. However it is often desirable for seeding equipment to do other things. It can minimize soil disturbance to discourage weeds. And when time is of the essence, seeding equipment can be used to place fertilizer. But growers need to be cautious not to compromise crop productivity to meet these secondary objectives.

Every farmer who wants to direct seed will require suitable seeding equipment. Major issues that should be considered when selecting DS equipment include a) crop types, b) soil conditions, c) fertilizer type and application method, d) crop residue and e) power requirements.

Direct seeding equipment must be designed to operate in heavy residue conditions and in soils that have much wetter surfaces when compared to conventional tillage systems. The DS implement must create an ideal environment for seed germination and quick seedling establishment within the row while leaving the opposite conditions between the seed rows to discourage weed growth. **The goal is to give the crop every advantage while leaving the weeds at a distinct disadvantage.**

Purchase priorities must be set when changing to a DS program. Experienced direct seeders indicate that the most common mistake novices make is purchasing good seeding equipment and worrying about residue management later. **Only after residue is properly managed should a producer begin DS.**

Crop established in standing stubble

There are inexpensive alternatives to new equipment and producers should examine these alternatives before making any extensive investments. Often it is possible to adapt existing equipment to seed directly into standing stubble. By using specialized ground openers and mounted packers, you may only require a minimal investment in equipment to begin DS.

A DS system can often require some major changes from previous practices. Consequently it may be best not to convert the whole farm to DS in one year. Start small and then expand DS to more acres, as it feels comfortable. Once the system is working and cash flow permits, you can make the move to more sophisticated equipment.

Weed Control

The first step toward becoming weed-smart is to rotate herbicides. Reliance solely on groups 1 and 2 herbicides should be avoided. However rotating herbicides is simply a first aid measure against weed resistance. In the long-term, being weed-smart means shifting the cropping system towards an integrated pest management system.

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

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

Fertility Principles

Soil nutrient deficiencies must be corrected to achieve maximum economic yields. Soil testing should be conducted to determine nutrient requirements. Producers should refer to provincial recommendations and information from fertilizer companies for details on correcting nutrient deficiencies.

There are many types of fertilizer and methods of application. Side banding, seed placing, and mid-row banding are all “one pass” systems that generally result in efficient nitrogen use. There are two drawbacks of these application methods. The first is the high power requirements needed to place the fertilizer at the lower depth needed with some openers. The second “drawback” will likely be a saving feature for many producers this year: all fertilizer requirements are

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handled at the time of seeding. For many producers, this will be the most advantageous time to apply fertilizer because it reduces the need for yet another operation that must be done this spring.

a) Side Banding

Side banding refers to the placement of the fertilizer to the side and below the seed during the seeding operation. High rates of fertilizer can be side banded without damage to germination or emergence provided that adequate separation of seed and fertilizer is maintained. Seedbed quality can be affected by side banding therefore the system must be properly designed and correctly adjusted to minimize seedbed quality problems. DS openers are available that place both seed and fertilizer at the same depth and rely solely on lateral separation of seed and fertilizer to prevent fertilizer burn. The benefit of these openers is a lower horsepower requirement.

b) Seed Placed Fertilizer

Seed placing fertilizer is an efficient and convenient method of correcting nutrient deficiencies. However the total amount of seed placed fertilizer that can be applied is limited due to the potential for causing damage to the germinating seedlings. Refer to provincial guidelines for the safe rates of seed placed fertilizer.

The most important factor in tolerance to seed placed fertilizer is fertilizer rate. As fertilizer application rate rises, the concentration of fertilizer in the seed row increases, thus increasing the chance of germination and emergence damage. Damage from seed placed fertilizer is very dependent upon conditions in the seedbed. Precipitation shortly after seeding can flush fertilizer out of the area and reduce risk. Very dry conditions increase nutrient concentration in the soil solution and cause much greater damage. For this reason, farmers should be cautious because rates that are safe one year may be very damaging the next.

c) Mid-row Banded

Mid-row banding refers to the banded application of fertilizer between every second seed row. This system allows the application of high rates of fertilizer without risk of damage to the germinating seedlings. Seedbed quality is not affected by this method. However mid-row banding does disturb the soil between the rows and this can stimulate the germination of annual weeds. Where soil nutrient supply is very low, it may be desirable to place some fertilizer with the seed (particularly P) and this typically requires a three tank system. The third tank can be an anhydrous tank or liquid wagon pulled behind existing equipment.

d) Fall Banding

Now that the fall work season has been cut short, many are seeking alternative methods. But it is interesting to note that when a producer is starting into a DS system it may be necessary to address N requirements through a separate operation due to equipment deficiencies. The main consideration is that too much seed-placed fertilizer can reduce crop germination and vigour. However it should be recognized that a separate fertilizing operation can cause seedbed drying, greater difficulty for the seeding unit to move through loose stubble and can cause increased weed growth in the spring. Obviously these are all good reasons to move away from this fertilizer method into a system that is more conducive toward one-pass DS.

So is DS an option for you? Remember the SSCA has Agrologists in the field that would be eager to assist you. As with most things in life, preparation goes a long way in producing successful results. All the best in 2005.

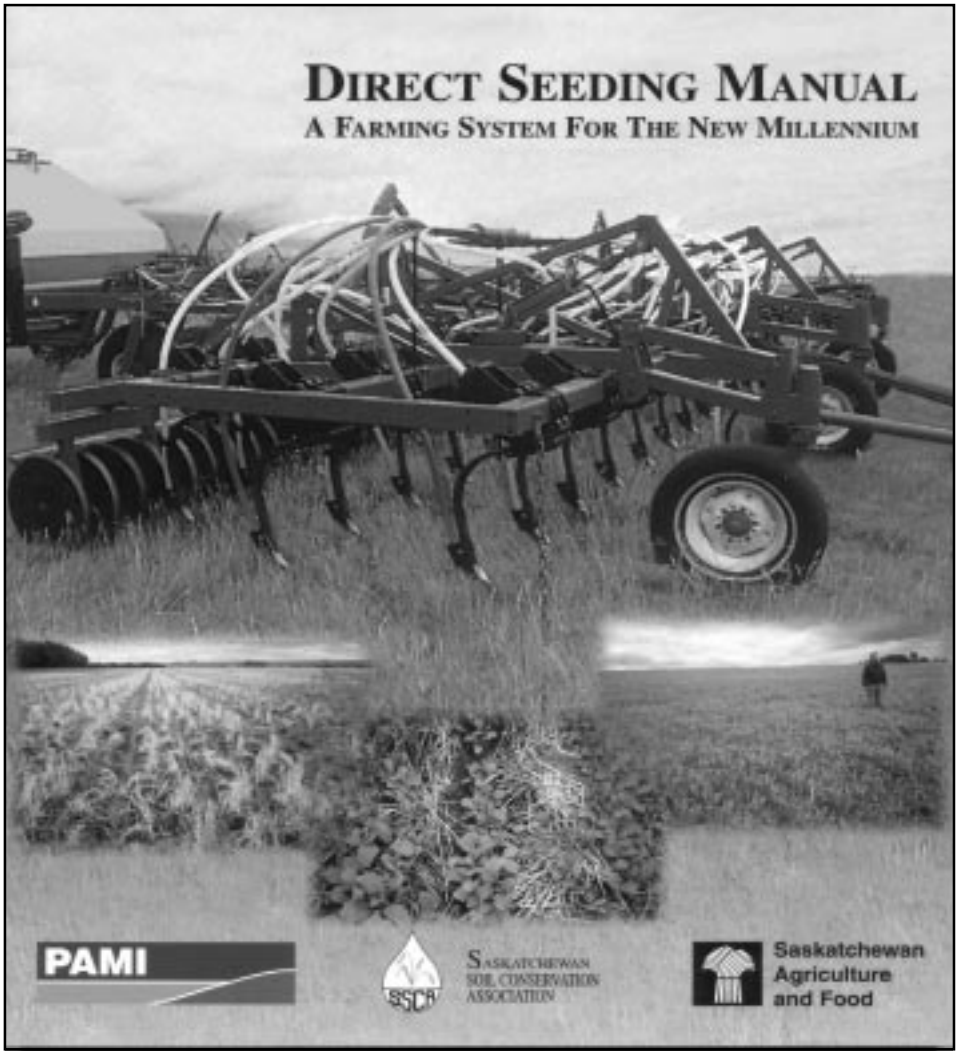

Table 1: Crop and fertilizer prices

Crop	Price / bushel
Canola	$7.00
Wheat	$4.50
Barley	$2.00
Fertilizer	**Cost / lb**
Phosphorus (P_2O_5)	27¢
Potassium (K_2O)	14¢
Sulphur	23¢

on the best fertility combination for the given dollars invested and a total of 8" of water (stored water plus rains in-crop) was used in all simulations.

Growing wheat on the canola stubble sampled showed that with 40¢ / lb N, $25 gives a good yield potential of 38.1 bushels / acre and $146.65 return after cost of fertilizer has been deducted (Table 2). Spending $5 more on fertilizer does increase yield by 2.5 bushels / acre but the return after fertilizer cost is deducted starts to get squeezed. With 50¢ / lb N investing $30 / ac is required to provide not only a similar yield potential, but also a similar return after the cost of fertilizer is deducted.

On pea stubble, investing $20 / acre provides a good yield potential of 39.2 bushels / ac and 36.3 bushels / ac for both 40¢ / lb and 50¢ / lb N, respectively (Table 3). It may be beneficial to spend up to another $5 / ac with 50¢ / lb N to achieve some higher returns, but it becomes a risk management decision. How much risk are you comfortable managing?

On wheat stubble, canola was used as the rotational crop. For each $10 increment of soil fertility applied, significant returns are possible (Table 4). For instance, deciding to spend $30 vs $20 / acre could provide more than $67 and $57 extra revenue over the cost of fertilizer for both 40¢ / lb and 50¢ / lb N, respectively. That is a significant return on the fertilizer investment. The time to invest in fertilizer is when there is potential. While nothing in life is for certain, good stubble moisture is one of the best indicators that there is potential for growing an average crop. Timely rains can make an above average crop. But yield can not be attained without the proper balance of fertility. Once the fertility tank is empty, no more yield can be produced.

It shouldn't be underestimated, barley requires good fertility to grow above average crops. Each $10 investment in fertilizer provides significant increases in yield but also the return over the fertilizer cost (Table 5). By running a number of "what if's" it is easy to see what crop has the greatest to potential to be a money maker and what crop holds the most risk.

When making next year's plans remember that a soil test is an important tool. A tool that can help answer the $64,000 question: Can we afford 50¢ / lb N? ●

Table 2: 40¢ and 50¢ nitrogen, HRSW on canola stubble, 8" total water:

Fertilizer cost	Yield	Return over Fertilizer Cost
Return over fertilizer cost using 40¢ nitrogen		
$20.00	32.7	$127.21
$25.00	38.1	$146.65
$30.00	40.6	$152.62
$40.00	44.0	$159.26
Return over fertilizer cost using 50¢ nitrogen		
$20.00	28.4	$107.90
$25.00	34.2	$129.18
$30.00	38.4	$142.76
$40.00	42.7	$152.76

Table 3: 40¢ and 50¢ nitrogen, HRSW on pea stubble, 8" total water:

Fertilizer cost	Yield	Return over Fertilizer Cost
Return over fertilizer cost using 40¢ nitrogen		
$15.00	32.4	$138.74
$20.00	39.2	$156.61
$25.00	41.5	$161.83
$30.00	43.8	$167.18
Return over fertilizer cost using 50¢ nitrogen		
$15.00	30.8	$123.44
$20.00	36.3	$143.61
$25.00	39.5	$152.72
$30.00	42.0	$159.03

Table 4: 40¢ and 50¢ nitrogen, canola on wheat stubble, 8" total water:

Fertilizer cost	Yield	Return over Fertilizer Cost
Return over fertilizer cost using 40¢ nitrogen		
$20.00	21.8	$132.72
$30.00	32.8	$199.95
$40.00	39.6	$237.03
$50.00	42.5	$247.39
Return over fertilizer cost using 50¢ nitrogen		
$20.00	18.3	$108.41
$30.00	28.0	$166.32
$40.00	35.8	$210.38
$50.00	40.4	$233.01

Table 5: 40¢ and 50¢ nitrogen, barley on canola stubble, 8" total water:

Fertilizer cost	Yield	Return over Fertilizer Cost
Return over fertilizer cost using 40¢ nitrogen		
$20.00	39.3	$58.55
$30.00	61.3	$92.60
$40.00	81.4	$122.92
Return over fertilizer cost using 50¢ nitrogen		
$20.00	34.5	$48.95
$30.00	52.4	$74.81
$40.00	70.6	$101.20

Agri-ARM Update

By Jody McConnell, M.Sc, PAg
Agri-ARM Coordinator

The Agri-ARM research farms have grown with multi-faceted support to become rural focal points for technology transfer, applied research and opportunity awareness. A great deal of community and industry support is received at these rural farms, an indication of the positive feedback the network receives. An Agri-ARM research farm is a positive learning environment where the industry community can converge to discuss emerging issues, provide diagnostic training and evaluate technology and business opportunities.

The past year was a success despite a challenging year in the field for the farm managers. Field day attendance was strong as awareness and programs develop around the sites. During the winter season, we will be dedicated to procuring funding agreements with levels of government and industry groups to continue developing the network.

Goals for 2004-2005

1. Support new business opportunities by applied research and demonstration to local agri-preneurs
2. Continue networking with the College of Agriculture and Agriculture Canada scientists for increased participation at the sites.
3. Deliver on objectives from ADF contract projects.
5. Focus on value added projects at sites - fruit, forestry, etc.
6. Partner with industry groups on an extension / applied research proposal for the Agri-ARM network.

Key Projects

For specific project lists and information, contact the respective sites directly.

Strawberry Crown Project – Redvers, Scott, Prince Albert, Canora, Outlook and Dutch Growers Greenhouse – Saskatoon: To develop production information on capturing the commercial opportunity for crown production.

Flax Fibre Agronomy Evaluation – Canora, Redvers and Indian Hea: To develop tools for producing consistent, quality yields of fibre and flaxseed.

Business development projects

The sites are developing relationships with local agri-business to investigate opportunities and address industry needs of applied research and demonstration.

Agri-ARM Sites

East Central Research Foundation, Canora: Kim Stonehouse (306)563-5551

Indian Head Agricultural Research Foundation: Bill May (306)695-4244

Saskatchewan Conservation Learning Centre, Prince Albert: Laurie Hayes (306)953-2796

South East Research Farm, Redvers: Tyler Kneeshaw, Scott Chalmers (306)452-3161

Seager Wheeler Farm, Rosthern: Brian Weightman (306)232-5959

Northeast Agriculture Research Foundation, Melfort: Randy Kutcher (306)878-8807

Western Applied Research Corporation, Scott: Sherrilyn Phelps (306)446-7475

Wheatland Conservation Area, Swift Current: Bryan Nybo (306)778-7289

For more information on the Agri-ARM network, contact me at (306)778-8291 or jmcconnell@agr.gov.sk.ca

You can also visit our website http://www.agr.gov.sk.ca/agriarm/default.asp

http://www.ssca.ca

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