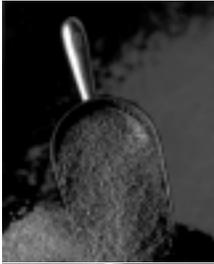


Saskatchewan flax Grower

Saskatchewan



*Gordon Cresswell
Chair,
Saskatchewan
Flax Development
Commission*

Chair's Report

Once again the fall season is upon us and the activities of the growing season are, for the most part, behind us. The various activities of SaskFlax kept all directors involved over the past few months.

A Board member was invited to travel with a representative from the Flax Council to follow the progress to date of the joint feed trials with the Flax Council of Canada and Kansas State University using flax meal in cattle feed. The report back was that this project is progressing very well and the next step is to assess the quality of the meat after slaughter. Barry Karol was very enthused with the project, details of progress to date and with the follow up to be done.

Members of the Fiber Committee met with representatives of the Alberta Research Council exploring the use of flax and hemp fibers as an alternative to wood fibers in the pulp and paper industry. These fibers renew quickly and are readily available. Also, there continues to be a growing demand for flax fiber globally and a great potential for Saskatchewan flax growers.

On the Food side, our Executive Director, along with representatives from Bioriginal and STEP attended a baking seminar in

Mexico City encouraging the baking and milling industry to include flax in their products while promoting the health benefits from using flax.

The Field Day was a great success - no rain or snow this year. On behalf of the Board, "thank you" to all who helped make this a most positive day.

A reminder to all flax members - we have two vacancies on the Board for the coming election. One whose term is complete and the other who has decided not to stand for re-election. November 3, 2003 is the deadline for filing nominations so please keep this in mind if you would like or know someone who would like to be part of directing a growing dynamic organization.

I have chosen not to mention much about the flaxseed markets other than they have moved sympathetically along with the canola oilseed markets. No strong demand has come forward from our traditional European markets although that could change any day.

Look forward to talking to many of the growing and trade in the coming months.

P.S. Need the most recent flax cookbook? Call the office at 306.664.1901.

Gordon Cresswell

October
2003
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*A Saskatchewan flax
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Saskatchewan
Flax Development
Commission*

A Word About Check-Off

The flax check-off (\$1.18 per tonne seed; \$.50 per tonne straw) supports research, communication and market facilitation activities to further enhance Saskatchewan's flax industry.

Should you wish the check-off returned, you must complete the application form and return it to our office within the specified time frames.

SaskFlax is now operating within Period 1 (flax sold August 1, 2003 to January 31, 2004). Applications must be received by the Commission on or before February 28,

2004 to be eligible for check-off return. Applications not received by the deadline or covering flax sold outside the August 2003 to January 2004 time frame are not eligible for rebate.

Application forms are available by contacting SaskFlax at:

306. 664.1901

306. 664.4404 Fax

saskflax@saskflax.com

Saskatchewan Flax Development Commission

A5A - 116 - 103rd Street East

Saskatoon, Saskatchewan

S7N 1Y7



SaskFlax



The Fiberfile

The Fiber File

Flax fibers can be used for a wide variety of end-uses. By far the oldest and most well known use is for the production of pure linen fabrics and garments. This end use pays the highest prices for flax fibers but also requires the highest levels of management and investment in specialized field and processing equipment because of the need for very fine, long and consistent fibers that are kept aligned from field to spindle.

Although textile grade flax fiber has not yet been commercially produced in Western Canada, small scale research carried out by Biolin Research Inc. in the last few years indicates that the potential does exist to do so, if the proper techniques and machines are used. Given the promising results to date, the Agricultural Development Fund of Saskatchewan Agriculture, Food and Rural Revitalization agreed to provide funding in 2003 and 2004 to carry out a series of large plot trials at five locations in the province to see what problems might be encountered when an attempt is made to go to full scale commercial production of textile quality flax fiber. Biolin Research Inc. was contracted to provide the specialized machinery and management required to carry these trials out. The following is a brief description of this project up to the end of September 2003.

Plot sites were selected near Preeceville, Canora, Churchbridge, Redvers and Indian Head. At each site there were four one-acre (0.4 ha) plots, with each one-acre (0.4 ha) plot planted to one of four different European fiber flax varieties that has shown superior performance in previous Biolin trials. In addition, eight newer and/or untested fiber flax varieties were planted in small plots, each

plot having an area of seven square meters. The small plots were replicated three times at each site. All plots were seeded between May 10th and May 23rd, depending on logistics and weather conditions.

Several sites were seeded with air seeders and plot seeders that had been modified to place the seed in a wide ribbon pattern instead of in narrow rows. The remaining sites were seeded with a small French hoe drill that is used in France specifically to seed flax for fiber production because it has the ability to place seed in three inch (7.5 cm) bands at a very shallow, even depth. The seeding rates in all cases varied between 98 and 116 pounds/acre (110 and 130 kg/ha) depending on the size of the seed. This is roughly three times as heavy a seeding rate as most farmers use when seeding oilseed flax.

Once the flax emerged, it was sprayed for weeds with the same herbicides and at the same rates used for oilseed flax. Between the second and fourth weeks of August the fiber flax stalks start to turn from green to yellow. When this color change is about half complete, the fiber bundles inside the stems are almost fully formed but the pectins holding the fibers together have not yet dried up and the coarser fiber bundles can still be quite easily separated into finer fiber bundles. At this stage, a specialized flax-pulling machine was used to pull the entire flax plant out of the ground. In these trials, a five foot wide tractor operated flax-puller was used to pull the flax (eight foot wide self-propelled models are available but they are considerably more expensive to buy). Flax pulling machines put the flax stems in even rows flat on the ground with the stems parallel to each other in a manner that looks somewhat like a wooden snow fence. All the heads are at one end of



Alvin Ulrich
Fiber
specialist SFDC

Top left to right
Fiber Flax Field
Processing

1. Flax Field
2. Flax Puller
3. Swathed Field
4. Turning



the row and all the roots are at the other end of the row. Almost all the surface area of the field is covered with these thin rows of flax stems in much the same way as one might cover a piece of floor with rolls of carpeting.

When the flax was being pulled, it became evident that the plots seeded with the French seed drill generally had much higher and more evenly spaced plant populations than plots seeded with the modified air and plot seeders. The French seeder consequently produced plants with thinner diameter stems that were much more consistent in size. This is a good thing because thinner, more even stems generally have higher fiber content, ret faster in the field and are easier to process in a consistent way and thus have higher potential value than unevenly sized coarser stems.

After the straw was pulled, it bleached in the sunlight and started to ret (a Dutch word for slow rotting). The retting process is necessary to make it easy to extract totally clean, long fibers from the flax stems. After several weeks of retting, another specialized machine called a "turner" was used to turn over each row of flax stems so that the side that was exposed to the sun could come in contact with the soil surface. This turning procedure helps ensure that the flax stems are retted evenly on both sides of the stems. It also loosens the flax stems from any weeds that may have started growing through the rows of straw and from tight contact with the ground (which would induce fast rotting and hence destroy the straw and fiber inside the straw).

Since the flax stems were turned in mid-September, they have been left to ret until the fiber can be easily separated from the stems. When retting is complete, the straw will be baled in a special round baler that puts continuous twine between each layer of straw as

it enters the bale chamber. The straw will be picked up and formed in a bale at right angles to the forward direction of the baler. This is in contrast to the normal round baling process in which the straw is picked up and enters the bale chamber pointed in the same direction as the forward motion of the baler to keep the straw aligned the same way as it was pulled. The belts inside the specialized flax straw baler move slower than in a conventional round baler because the straw being picked up is from a five foot wide strip instead of a 12 to 30 foot strip. The bale chamber is also only four feet wide instead of the more common widths of five or six feet. The four foot width makes it easier to form a nice even bale with fiber flax plants that are normally 28 to 40 inches (70 to 100 cm) in height.

By the end of September flax at three of the five sites was almost ready to bale. The remaining sites have had very dry weather after the flax was pulled and hence the straw is only partly retted.

During the course of this growing season, we have learned many new things about fiber flax and the machinery and management that are needed to make this crop a financial success in Saskatchewan. Given the results to date, we appear well on the way to making this happen.

The straw and seed from the small plot variety trials were harvested by a combination of hand and plot combine methods. The results from these lesser known varieties will be compared to the results from the larger plots.

Two more trial locations, similar to those described above, were planted near Tisdale and were funded by CEDAP, CARCI and the Tisdale REDA. However, funding for these Tisdale sites is only in place for 2003.

The Flax Advantage

This year's program "The Flax Advantage" provides ample opportunity for you to catch the latest in market information and industry operations; learn about value-added operations from a feed and fiber perspective as well as networking with flax researchers regarding flax breeding programs.

Registration: \$15.00 available at the door. Lunch and refreshment breaks included in the registration fee.

Monday, January 12, 2004
Canadian Room
Saskatoon Inn
Saskatchewan, Saskatchewan

Program Moderator: Bob Linnell

- 8:00 a.m. Registration/Refreshments
- 8:45 a.m. SFDC Annual general Meeting (Gordon Cresswell)
- 10:00 a.m. Flax Council of Canada Update (Eric Fridfinnson)
- 10:15 a.m. AmeriFlax Update (Kaye Effertz)
- 10:30 a.m. Saskatchewan's Fiber industry (Alvin Ulrich, SFDC)
- 11:00 a.m. Enviro - Shingles
- 11:30 a.m. Straw Sales - What the Buyer Needs! (Joe Hogue)
- 12:00 Noon Lunch
- 1:00 p.m. There's Value in Value-Added - Flours (Bioriginal Food and Science Corp)
- 1:30 p.m. There's Value in Value-Added - Toasted Goodness (Cecil Werner, CanMar Grain Products)
- 2:00 p.m. There's Value in Value-Added - Lignans and More (Glen Pizzey, Pizzey's)
- 2:30 p.m. Flax Breeding: Past, Present and Future (Dr. Scott Duguid, AAFC Morden)
- 3:00 p.m. Refreshments
- 3:15 p.m. The Market - TBA
- 4:00 p.m. Closing Remarks



The Language and Literature of Flax

During the Olden Days of Europe, prior to the arrival of Christianity, peoples depended on various gods and goddesses to provide structure and meaning to their lives. Of particular significance is a Germanic goddess by the name of Holda and her story of "The Gift of Flax."

It is told that Holda lured a poor shepherd to a magical cavern high in the mountains. Upon entering the cavern he came upon Holda who appeared as a beautiful woman, resplendent in fine clothes and bedecked with jewels. The room was filled with precious stones and golden decorations and she was attended by a gathering of 'lovely maidens.'

The poor shepherd was overcome in these surroundings and it is said that he sank to his knees in awe and honor. Holda smiled down upon this humble man and told him that he might choose anything within these surroundings to claim as his own and take

away with him. The shepherd was dazed, but his eyes kept returning to the bunch of blue flowers that Holda held within her hands. He shyly asked that he might return home with the flowers. Holda smiled again and told him that he had chosen wisely. She gave him the flowers and a bag of seed, telling him how to plant and tend the crop and bade him farewell.

The shepherd returned to his family, telling his wife the story of his adventure. His wife was bitterly disappointed that he had not come home with any of the jewels, but not to be discouraged, the shepherd carefully sowed the seeds that Holda had given him. He watched with interest as the plants grew through the summer and often wondered what would be produced. As the summer progressed the field bloomed and once again the man marveled at the beautiful blue flowers. Soon after, Holda paid another visit, this time to the man and his wife, explaining to them how to harvest the seeds for food and how to make linen cloth. The man and his wife lived long and prosperous lives, ever grateful to Holda for bringing flax to humankind.

Resource Materials

SaskFlax has resource materials available for producers and consumers. The information is available free of charge and in reasonable quantity. To order, call, write, fax or email your request providing the complete mailing address information, the resource(s) you'd like and in what quantity.

Flax World Class Recipes

Flax, historically has contributed to many of the world's cultures and cuisines. Beer and caraway make it German; wine and tomatoes make it Italian; sticky rice and nori make it Asian . . . Flax makes it all good. This collection of twenty seven world class flax recipes lets you experience a sampling of global cuisines. Enjoy the journey.

North American Flax Facts

"North America Flax Facts . . . Important Questions and Answers for Improved Health and Nutrition" is a collaborative effort of producer funded flax organizations - AmeriFlax and SaskFlax. The booklet, written for us by Kelley Fitzpatrick, M.Sc., (Richardson Centre for Functional Foods and Nutraceuticals) reviews flax's role in health and nutrition.

Growing Flax

"Growing Flax - Production, Management and Diagnostic Guide" presents information on flax growth and development; weed control; pests; seeding and harvesting as well as environmental disorders and varieties. This latest guide revision was made possible with the cooperation of the three prairie provinces, BASF, Aventis, Monsanto, Saskferco, Simplot and Syngenta.

First Class Recipes

Flax - whole, milled, brown or golden, raw or toasted makes for great eating. Oil can be added to shakes, drinks and dressing too.

We'd like to know how you utilize flax and flax components as part of your healthy lifestyle! From soups and salads; appetizer and snacks to main entrees and desserts, we're looking for great flax recipes to publish.

The top five winning recipes submitted will receive their own grinder to mill flax.

Contest Details

- Entries are to be received by December 1, 2003
- Entries are to be original.
- Entries are to be typed or neatly printed.
- Entries are to be identified (name, address, telephone, fax, email). Individuals may submit up to five recipes each.
- All entries submitted become the property of the Saskatchewan Flax Development Commission.
- Winners will be announced at Saskatchewan Flax Development Commission Flax Day, January 12, 2004

Steamed Boston Bread

325 mL	all purpose flour	1 ½ cups
325 mL	whole wheat flour	1 ½ cups
75 mL	ground flaxseed	½ cup
25 mL	brown sugar	2 tbsp.
7 mL	salt	1 ½ tsp.
5 mL	baking powder	1 tsp.
5 mL	baking soda	1 tsp.
125 mL	raisins, chopped	½ cup
400 mL	water	1 ½ cups
50 mL	fancy molasses	¼ cup

- Grease 3 540 mL (19 oz.) cans.
- In a large bowl, combine all purpose and whole wheat flour, ground flaxseed, brown sugar, salt, baking powder and baking soda.
- Toss in raisins to coat.
- In a measuring cup stir together water and molasses.
- Add to dry ingredients. Stir only until combined.
- Fill tins ¾ full.
- Cover with wax paper, then a layer of aluminum foil. Secure with kitchen string.
- Place tins on rack inside a Dutch oven.
- Fill Dutch oven with boiling water to halfway up the tins. Cover with lid.
- Bring to a gentle simmer and steam for 2 hours.
- Remove bread from tins.
- Serve warm.

Yield: 3 servings per loaf

Serving Size: 2 2 cm (¾ inch slices)



**First
class**

*Flax
Recipes*

With the approach of old main winter, there's nothing better to ward off those chilly days than the wholesome goodness of freshly baked bread. Whether it's a hearty whole grain bread or this Steamed Boston Bread, flax adds great taste and texture! Enjoy!

Table 1: Variation of mucilage indicator value, plant height and seed weight in the flax world collection of PGRC.

	Mucilage (cS*ml/g)	Height (cm)	Seed weight (g/1000 seeds)
n	1689	1677	1660
Minimum	22	20	3.5
Maximum	343	130	11.5
Mean	134	62.6	6.0
Standard deviation	51	17.5	1.2
Coefficient of variation (%)	38.1	27.9	19.9

Variation of Mucilage Content in the Flaxseed Coat

A. Diederichsen¹, J. P. Raney¹ and S. D. Duguid²

¹ Plant Gene Resources of Canada (PGRC), Saskatoon Research Centre, Agriculture and Agri-Food Canada, 107 Science Place, Saskatoon, Saskatchewan, S7N 0X2, Canada

² Agriculture and Agri-Food Canada, Morden Research Station, 101 Route 100 Unit 100, Morden, Manitoba, R6M 1Y5, Canada

High content of mucilage in the flax seed coat is of interest from a Canadian perspective, because flax mucilage could replace imports of guar gum and gum arabic. Flax with low content of mucilage is of interest, because low mucilage flax is better suited for feeding poultry, swine and fish, since such flax can be given in larger quantities. The Flax Council of Canada supported several research projects in this area in the early 1990's. The large flax

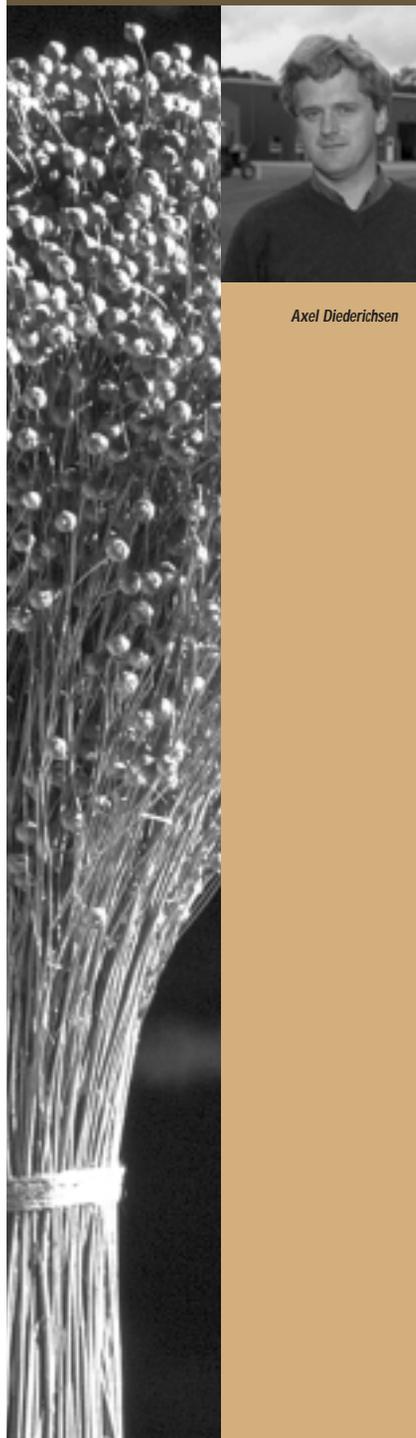
germplasm collection at Plant Gene Resources of Canada (PGRC) which has recently been rejuvenated and characterized offered an excellent opportunity to investigate the range of variation available for mucilage in the gene pool of cultivated flax. A teaspoon of flax seed in a cup with hot water turns the water into a thickened, highly viscous liquid. The viscosity of a water extract from intact linseed was used as an indirect measurement of the mucilage content to screen the flax world collection held at PGRC. A multi-location test with 16 North American flax cultivars registered in Canada and a Canadian breeding line was conducted during 2001 and 2002 at Morden (Manitoba), Indian Head (Saskatchewan), Melfort (Saskatchewan) and Saskatoon (Saskatchewan). The test investigated the genotypic and environmental influences on mucilage content. This project was funded by the Saskatchewan Flax Development Commission.

A wide range of variation for the seed extract viscosity was found in the flax world collection. The mucilage indicator value ranged

Table 2: Mean values of mucilage indicator value (cS*ml/g) and statistical grouping for 16 flax lines grown at four locations and two years in Western Canada (sorted by mean).

Entry name	Mean	Group*
AC McDuff	90.6	I
AC Carnduff	96.2	I
CDC Arras	127.4	H
CDC Bethune	156.6	G
Flanders	164.7	G
Omega	188.8	F
AC Linora	190.9	F
Macbeth	196.2	EF
Hanley	197.0	EF
Lightning	205.6	ED
Linott	213.6	CD
Vimy	222.0	BC
Norlin	222.5	BC
84495	228.9	B
AC Watson	244.0	A
AC Emerson	246.1	A
Total	187.1	

* Mean values with the same letter are not significantly different (P = 5%, Duncan's multiple range test)



Axel Diederichsen

Teaming Up for Tomorrow!

continued from previous page

from 22 to 343 cS*ml/g (Table 1). The group displaying the highest seed extract viscosity included recently registered Canadian cultivars. There was no correlation between mucilage indicator value and plant height, which means that high or low mucilage indicator values were not associated with flax type (fibre flax vs. linseed flax). A slightly negative correlation existed between mucilage indicator value and 1000 seed weight suggesting that flax with heavier seeds produces less mucilage, but this correlation was weak. When comparing the mucilage indicator value of flax with different seed colours, the brown seeded flax (1407 accessions) showed in average slightly higher values than the yellow seeded flax (117 accessions). The multi-location test allowed a ranking of the 16 entries regarding mucilage content. The variation observed in these 16 entries ranged from 90.6 to 246.1 cS*ml/g (Table 2). The mucilage contents were higher in the warmer growing season of 2002 than in 2001. Several other environmental factors impacted the mucilage content as the influences of location, and interactions among year, location and entry were found to be significant.

The wide range for mucilage content found in established Canadian linseed cultivars showed that Canadian farmers are already in position to respond to different market-needs regarding mucilage content in the flax seed coat. Some linseed cultivars displayed low viscosity of the seed extract ('AC McDuff', 'AC Carnduff', 'CDC Arras') while other cultivars had high seed extract viscosity ('AC Emerson', 'AC Watson', 'Norlin'). A screening of the PGRC world collection identified genetic resources with even lower or higher values for seed extract viscosity. This germplasm may be useful in plant breeding if the mucilage content in the seed coat becomes of economic importance. It may be worthy to investigate the market opportunities for flax mucilage, since this by-product component has become very important in condiment mustard, which was initially not grown for its mucilage content.

There is a continual need to increase agricultural productivity and profitability within the province. To meet these goals, farmers collectively and collaboratively pool their resources to support research and development activities designed to further enhance their respective industry's growth. Flax is no exception!

The Commission, representing Saskatchewan's 18,000 flax producers is comprised of six registered producers elected from the membership. Two director positions are open annually. Directors are elected to three year terms and may serve for two consecutive terms.

Elections are held each fall (when required) and new directors' responsibilities are initiated at the close of the annual general meeting in January.

If you are a registered flax producer interested in becoming involved as a Director, complete this form and return it on or before November 3, 2003 to:
Saskatchewan Flax Development Commission
A5A - 116 - 103rd Street East
Saskatoon, Saskatchewan
S7N 1Y7
Fax: 306.664-4404

NOMINATION FORM FOR DIRECTOR

SASKATCHEWAN FLAX DEVELOPMENT COMMISSION

In accordance with the Saskatchewan Flax Development Plan Regulations, I, the undersigned, hereby submit my name as a candidate for election to a seat on the Board of Directors of the Saskatchewan Flax Development Commission. I have sold flax within the past two years and have paid the check-off required pursuant to Sub Sections 15 (1) and (2) of the Saskatchewan Flax Development Commission Regulations.

First Name

Last Name

Address

Town

Postal Code

Telephone

Facsimile

Signature

I nominate the above flax producer as a candidate for election as a Director of the Saskatchewan Flax Development Commission.

Registered Producer (signature)

Please Print Name

Telephone/Fax

Registered Producer (signature)

Please Print Name

Telephone/Fax

Registered Producer (signature)

Please Print Name

Telephone/Fax

Our Mission

*"To lead, promote, and enhance
the production, value-added processing
and utilization of Saskatchewan flax"*

Our Logo Tells A Story

The bright and lively crown of the sheaf of flax represents the coming together of many members into a solid organization.



The stalks of the flax plant positioned in a woven manner represent fiber-based products as well as the close interaction between members of the organization.

The boll of the plant, made up of three oil droplet shapes, represents oil-based products as well as the overlapping areas of production, research and marketing.

Saskatchewan Flax Grower is published tri-annually by the Saskatchewan Flax Development Commission, for registered flax producers, registered buyers and allied organizations.

Subscription rate for other individuals/organizations is \$50.00 per year. Contact office for more details 306.664.1901.

Help Us Be Accurate
Are you getting more than one copy? Address incomplete or name misspelled? Let us know. Call 306.664.1901, 306.664.4404 fax, or mail in the label for correction. Thank you.

2002/2003 Board of Directors

Gordon Cresswell
Chairman
Box 2260
Tisdale, Saskatchewan
S0E 1T0
306.873-5360
306.873.5830 Fax

Bob Linnell
Vice-Chairman
P.O. Box 1086
Station Main
Weyburn, Saskatchewan
S4H 2L3
306.842.5987
306.848.1267 Fax

Allen Kuhlmann
Box 126
Rouleau, Saskatchewan
S0G 4H0
306.776.2295
306.776-2368 Fax

David Sefton
Box 262
Broadview,
Saskatchewan
S0G 0K0
306.696.2975
306.696.2276 Fax

Edmond Aime
Box 221
Redvers, Saskatchewan
S0C 2H0
306.452.6410
306.452.6410 Fax

Barry Karol
Box 141
Kelliher, Saskatchewan
S0A 1V0
306.675.6013
306.675.5763 Fax

Advisors

Gordon Rowland
Crop Development Centre
University of
Saskatchewan
Room 4D36
51 Campus Drive
Saskatoon, Saskatchewan
S7N 5A8
306.966.4977
306.966.5015 Fax

Bill Greuel
Oilseeds and
Transgenic Crops
Saskatchewan
Agriculture and Food
3085 Albert Street
Regina, Saskatchewan
S4S 0B1
306.787.2756
306.787.0428 fax

Saskatchewan Flax Grower
Saskatchewan Flax
Development Commission
A5A 116 103rd Street
Saskatoon, Saskatchewan
S7N 1Y7
306.664.1901

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