

FLAX RESEARCH AIMS TO GROW OUR INDUSTRY

An overview of our flax research program and recent investments

Wayne Thompson | Executive Director



Spring is almost here and soon seeding will start in Saskatchewan. The Saskatchewan Flax Development Commission (SaskFlax) has had a busy winter working to move the flax industry forward. One of the primary ways we aim to move the industry forward is through research. Through this newsletter we hope to give you a better understanding of some of our recent and ongoing research investments.

In the fall the Board approved funding for two research projects. The first is "Optimal Fertilizer Management," which will be led by Chris Holzapel at the Indian Head Agricultural Research Foundation and carried out at several sites across Manitoba, Saskatchewan, and Alberta. This project is co-funded with the Saskatchewan Ministry of Agriculture's Agriculture Development Fund and the Western Grains Research Foundation (WGRF). The second project, "Integrated Weed Management," will be led by Dr. Chris Willenborg at the University of Saskatchewan and is co-funded with the Saskatchewan Wheat Development Commission and Saskatchewan Canola Development Commission.

Over the past three years, SaskFlax has supported research and demonstration plots looking at fungicides, seeding dates, seeding rates and fertilizer rates, with support from the Saskatchewan Ministry of Agriculture's Agricultural Demonstration of Practices and Technologies program. This research has been facilitated through the Indian Head Agricultural Research Foundation (IHARF), East Central Research Foundation and Northeast Agricultural Research Farm, and the reports for these demonstrations are on the SaskFlax website under the Research tab. You can also read about some of the work that has been performed at IHARF on Pg. 3 of this newsletter.

SaskFlax is also funding research projects aiming to develop new flax varieties, led by Dr. Helen Booker at the University of Saskatchewan Crop Development Centre and Dr. Khalid Rashid at Agriculture and Agri-Food Canada's Morden Research and Development Centre. Dr. Booker's program is highlighted on Pg. 5.

SaskFlax has also invested in feed trials for livestock, to help inform animal nutritionists on how to use flaxseed in health and feed

formulations. You can learn about some of this research on Pg. 7.

Flax also holds a great deal of potential for human diets and in light of this SaskFlax has invested in research being done by Dr. Grant Pierce at the St. Boniface Research Centre in Winnipeg, which is highlighted on Pg. 6. SaskFlax is also funding research in other areas of human nutrition, including potential health benefits for people who suffer from multiple sclerosis.

In addition to funding research, SaskFlax has been participating in a project led by the WGRF looking at overall agronomic research capacity in Western Canada. To carry out the agronomic research needed for flax and other crops in coming decades, we need a strong network of researchers and research sites, and our current capacity is not up to speed. Several organizations have partnered with the WGRF to help develop a solution.

It will also be important to nurture the future of flax research in Saskatchewan. To that end SaskFlax recently established a scholarship at the University of Saskatchewan's College of Agriculture and Bioresources, at an annual amount of \$20,000, for graduate level students carrying out flax-related studies.

Going forward, SaskFlax will continue to work with the Saskatchewan Ministry of Agriculture and several other producer organizations to review research proposals and explore new and exciting research opportunities.

We hope you find this newsletter informative and as always we are happy to hear your thoughts on flax research and the state of the industry in general. The SaskFlax contact information may be found on the last page of this newsletter.

THANKS FOR YOUR FEEDBACK!

An overview of the results from our flax agronomy and variety development survey last fall



In our last newsletter, we published a survey asking for your input into some of the issues that are important to you as a producer, such as variety development, flax agronomy and flax straw management. We had an incredible response, in terms of both numbers and quality of comments, and we thank you for taking the time to get back to us. Here is an overview of the feedback we received.

The first question asked you to rank what is important in a flax variety. You told us that the most important factor to you is yield, followed by good straw management options. The characteristics for determinant growth, lodging and oil content all came in with a similar ranking. Seed colour was ranked the lowest, but not the least important.

The second question in the survey asked what areas of flax agronomy research are currently the most important to you, in order to help better manage your flax crops. The number one response was fertilizer research. We are happy to report that the Saskatchewan Flax Development

Commission (SaskFlax) is currently working to provide answers and solutions on this subject, through continued and new research. After fertilizer, research into disease control, seeding dates and seeding rates all had a similar ranking. SaskFlax will

“SASKFLAX WILL EXPLORE OPTIONS AND RESEARCH FOR DEVELOPING A FLAX VARIETY THAT WOULD ALLOW YOU TO CONSISTENTLY LEAVE THE STRAW ON THE FIELD. THIS WILL REQUIRE A LONG-TERM RESEARCH STRATEGY, FOCUSED PRIMARILY ON VARIETY DEVELOPMENT.”

continue to review research proposals on these topics, and provide funding when it's appropriate. Flax storage research ranked the lowest in terms of importance to you. However, we know it's important to know how flax keeps under different storage circumstances such as moisture levels and bin size, so SaskFlax will explore opportunities for research in this area.

The third question asked you to rank your preferences for straw management and managing flax residue. The overwhelming

response to this question was that you would like to see straw that can be left on the field to breakdown and not interfere with seeding the following spring. Your second choice was baling of flax straw, and your last choice was burning straw.

To this end SaskFlax will explore options and research for developing a flax variety that would allow you to consistently leave the straw on the field. This will require a long-term research strategy, focused primarily on variety development.

If you have any comments or feedback about flax agronomy or variety development research needs, please get in touch with us anytime. Our main priority is to continue to fund research that will benefit flax producers.

FLAX RESEARCH GROWS ALONG WITH INTEREST IN CROP

A snapshot of completed and ongoing flax research in Saskatchewan

Danny Petty



Research in areas of the province such as the Indian Head aims to maximize returns for flax producers as interest in the crop resurges.

Producers in Saskatchewan are constantly looking for ways to stay competitive in the global marketplace. One way of doing this is by growing crops that aren't mainstream around the world, filling the voids left by major commodity crops.

Interest in growing flax has seen a resurgence in recent years, prompting funding providers to focus their efforts on this historically overlooked crop. Over the past three seasons, producer organizations such as the Saskatchewan Flax Development Commission (SaskFlax) have been conducting studies to maximize the returns for flax producers in the province. With funding through the Agricultural Demonstration of Practices and Technologies initiative, along with in-kind industry support, regional producer groups have been conducting field studies to evaluate various aspects of flax production across Saskatchewan.

Seeding dates and rates

During the 2013-2015 growing seasons, the effects of seeding dates and rates were studied at Indian Head, Melfort and Yorkton. It was found that increasing the

seeding rate beyond the recommended 300 plants/m² resulted in earlier and more uniform maturity, but had little effect on seed yield. In regards to seeding dates, there was very little yield impact on early May versus late May planting. However, flax seeded early was typically ready to harvest one to two weeks ahead of late seeded flax. Despite the potential for earlier harvest, producers who currently leave flax to be seeded last aren't likely sacrificing yield in doing so and delayed seeding could allow for improved control of Group 1 resistant wild oats.

Response to fungicide at varying row spacing

This is another area of flax production being studied. Pasmox, like many diseases, prefers wet conditions with dense crop canopies that can reduce the air movement between plants. It has been speculated that with wider row spacing, the crop canopy may stay drier than it would under narrower spacing, potentially reducing the impact of disease. Row spacings from 10 to 12

inches (") were tested with and without fungicide applications. Increasing the row spacing past 12" reduced flax yields, which does not mean that flax cannot be seeded beyond 12" spacing, but greater yield variability may be expected. No interactions between fungicide applications and row spacings were detected, however overall disease pressure in these specific trials was low. Going back further, trials in southeast Saskatchewan have shown significant yield increases with fungicide over half of the time and an average yield increase of 10% with annual fungicide applications.

Fertilizer applications

In 2016, a new three-year study will begin at eight locations across Western Canada. Funded by the Agriculture Development Fund, the Western Grains Research Foundation, and SaskFlax, the project will investigate the potential merits of more aggressive fertilizer regimes than most producers implement when growing the crop. Nitrogen fertilizer rates of up to 134 pounds an acre (lbs/ac) and phosphorus rates up to 54 lbs/ac will be evaluated across a wide range of environments. Flax is often considered relatively unresponsive to fertilizer, but with modern farming techniques and advances in variety breeding, more intensive nutrient management may be required to maximize production and increase yield stability with this crop.

These projects are just a small snapshot of the work that has and is being done in Saskatchewan. With the continued support and efforts of SaskFlax and other funding groups, flax production and marketing opportunities will continue to expand into the future.

For more information please visit the IHARF website at iharf.ca

Danny Petty is the Executive Manager of the Indian Head Agricultural Research Foundation. He can be reached at dpetty@iharf.ca

NORTHERN FLAX RESEARCH YIELDS BENEFICIAL RESULTS FOR PRODUCERS

Research shows yields in northern areas of the prairies can be boosted significantly if producers follow some basic rules



Jan Slaski's flax plots in the Northern Adapted Flax Agronomy Program.

Producers who grow flax in northern areas of the prairie grain belt can boost yields significantly if they follow some basic rules at seeding time and during the growing season, according to research supported by the Saskatchewan Flax Research Foundation (SaskFlax) and the Western Grains Research Foundation.

Flax producers should pay close attention to seeding date, seeding rates and fungicide applications if they hope to maximize flax yields, says Jan Slaski, an Alberta researcher who heads the Northern Adapted Flax Agronomy Program (NAFAP).

In controlled trials conducted over four years at Vegreville, AB, and Melfort, SK, flax crops seeded between May 15 and May 20 produced consistently higher yields than crops planted in early May or early June.

"Producers typically tend to put flax in the ground last," he said. "We tested the effects of seeding dates using four different dates and we found that neither a late seeding date nor a very early seeding date resulted in the highest yields."

Seeding rates are another important consideration, Slaski said. Plots seeded at a rate of 40 kilograms per hectare (kg/ha) produced greater yield than plots seeded at 80 kg/ha. Plots seeded at the heavier rate were more prone to lodging and disease. Slaski, a senior researcher with Alberta Innovates Technology Future in Vegreville, says that last year's plots showed that higher seeding rates did not translate into higher seed yields. "Conversely, lower seeding rates produced increased yields across all the tested varieties," he says.

Between 2011 and 2013, Slaski studied flax agronomy under the Northern Adapted Flax Variety Development Program (NAFVDP). He continued his research under NAFAP, a two-year program that began producing data in 2014. In addition to examining seeding dates and seeding rates, Slaski's research focused on the beneficial effects of fungicide treatments.

Data collected by Slaski and Cecil Vera, an Agriculture and Agri-Food Canada scientist based at Melfort, seemed to support the notion that certain fungicides can boost flax yields significantly, even if

"IT APPEARS THAT PRODUCERS, BY ADHERING TO PROPER SEEDING DATES AND APPLYING FUNGICIDES, CAN BOOST YIELDS BY 10 TO 20 PERCENT."

disease pressure in the crop appears to be minimal or non-existent.

Although it is still too early to make definitive conclusions, it is possible that some fungicides contain an active ingredient that serves as a growth promoter in flax, resulting in higher yields, Slaski said.

Research that assessed the impact of fungicide applications also yields some interesting results. Prior to Slaski's research, a number of flax producers had suggested that applying a fungicide such as Headline EC delivers a significant yield boost, even in fields where disease pressure is minimal.

Headline EC is registered to control PasmO in flax but anecdotal evidence suggested that the fungicide, or some active ingredient in it, may also act as a growth promoter in flax.

Preliminary research conducted by Slaski and Vera appears to support that theory.

"We found that in certain years, an application of Headline increased the yield of flax by as much as 30 percent," Slaski said. "That's a phenomenal yield increase."

Slaski said it is still too early to say definitively if Headline acts as a growth promoter or if it simply increases yield by limiting disease-related losses.

Overall, preliminary indications of the research suggest that proper agronomic management is the key to maximizing flax yields in the northern grainbelt.

"It appears that producers, by adhering to proper seeding dates and applying fungicides, can boost yields by 10 to 20 percent," Slaski said.

CDC'S FLAX BREEDING PROGRAM POISED FOR GROWTH

A look at how the program is supporting the resurging potential of the crop

Delaney Seiferling



The CDC flax program's Helen Booker and Ken Jackle stand next to FP2432, a yellow linseed line which has an ALA content of 64% -- the highest ever released by the CDC.

The Crop Development Centre's (CDC) flax breeding program is focused on one thing: improving flax varieties for producers in the prairies.

And for Dr. Helen Booker, the CDC's head flax breeder since 2009, this means looking for the most strategic ways to exploit the growth of this crop in Saskatchewan.

"There's a lot of potential for flax right now in the Canadian prairies," she says. "We had a setback with the Triffid incident in 2009 but now the acres are back up."

One of the ways her flax team, comprised of eight full-time staff members, is promoting the potential for flax in the prairies is by developing new varieties suited to Saskatchewan growing conditions and with increased yield potential.

In the past five years, they have released three new varieties, all with promising yield potential when compared to CDC Bethune, which is currently considered the industry standard. CDC Glas, registered in 2013, has a yield advantage of 103% of CDC Bethune, and CDC Neela, registered in 2014, has a yield advantage of 105% of CDC Bethune.

CDC Plava, registered in 2015, has a yield advantage of 106% of CDC Bethune with the added bonus of being specifically

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adapted for northern growing conditions, or the Black, Dark Brown and Grey soil zones, meaning it requires fewer days to flower and mature.

"Usually you can push yield by pushing maturity – increasing the length of the field season – but to get a good yield with an early maturing line is not an easy feat so the development of CDC Plava was a real coup for us," Dr. Booker says.

Adapting varieties for northern growing conditions will be important going forward, Dr. Booker says, as flax is one of the last

crops to mature and northern conditions hold great promise for growing high quality crops.

"Flax is a crop that really does well in the north," she says. "The yield potential is great and the seed quality and oil profile is very superior when grown in the north."

CDC Plava is also currently being tested in Brown soil zones as well, including Indian Head and Redvers. "We know it does well in brown soil zones because it was developed in Saskatoon but we'll see how it does in the longer growing season areas," Dr. Booker says.

The CDC flax program also recently released its first yellow linseed variety, the first to have a high linolenic acid content, making it ideal for human and animal markets. It has not yet come through the variety registration process but producers can watch for it under the name of CDC Melyn.

Another major focus of the CDC flax program is supporting variety development through improvements in breeding technology. This means adopting marker-assisted selection for seed colour and disease resistance, increasing its access to and use of genomic data in breeding and genomic selection, and improving selection efficiency in the breeding program.

Dr. Booker also hopes to see more producer adoption of new varieties going forward, as this will be important in maintaining and growing the flax breeding program.

"It takes awhile for new material to be adopted by producers but if they know about the increases in yield potential, they are more likely to try something new," she says. "This is critical to our program – it's exciting to develop new cultivars but unless it ends up in producers fields it doesn't have any impact."

To learn more about the CDC flax breeding program visit www.cdcflax.usask.ca

CAN FLAXSEED REPLACE HYPERTENSION MEDICATION?

One Canadian researcher is working to answer questions around flaxseed as medication for your heart

Delaney Seiferling



Alex Austria, a lab technician at the University of Manitoba's Institute of Cardiovascular Sciences, handles a flaxseed sample.

Consumers are just beginning to learn about the link between flaxseed consumption and heart health, says one Canadian researcher, but more questions need to be answered about this relationship before we will see a major increase in consumption.

Dr. Grant Pierce, Executive Director of Research at St. Boniface Hospital and a Professor of Physiology and Pharmacy at the University of Manitoba, is aiming to answer these questions with research partially funded by the Saskatchewan Flax Development Commissions (SaskFlax), the Western Grains Research Foundation, and the Flax Council of Canada.

A previous study by Dr. Pierce established that regular flaxseed consumption in humans can decrease

diastolic and systolic blood pressure more, or as effectively, as hypertensive medication – a major breakthrough for the flax industry. “The decreases we saw were the equivalent of dropping heart attacks and strokes by 50% and reducing cholesterol levels by 20%,” he says. “Those are pretty impressive figures.”

But now the follow-up question is, can people get rid of their blood pressure medication and just use flaxseed?

“The answer is, I don’t know,” he says.

In order to be in a better position to answer this question, Dr. Pierce is currently conducting clinical trials involving human subjects that suffer from mild hypertension. Half of the trial group receives food containing flaxseed and half received a placebo food. After six months, researchers will monitor which

“IN THE WINNIPEG AREA THE HEALTH BENEFITS OF FLAXSEED ARE WELL KNOWN, AND THERE ARE A LOT OF PEOPLE HERE WHO ARE ALREADY USING FLAXSEED SUPPLEMENTATION IN THEIR DIET. BUT IN OTHER PARTS OF THE COUNTRY PEOPLE AREN'T AS AWARE SO IT REQUIRES MORE EXPOSURE.”

patients require hypertensive medications and which do not.

“Our hypothesis is those patients on flaxseed will not go on drugs and those who are on placebo will have to go on drugs because their blood pressure will continue to rise,” says Dr. Pierce.

He is also currently seeking support for research examining dose dependency. In his previous trials, subjects were given 30 grams of flaxseed a day (the equivalent of three heaping tablespoons) but more work needs to be done to determine if that dosage can be lowered and still be effective.

All of this research will hopefully one day lead to a health claim for flaxseed in Canada, which would be a major coup for flax producers across the country. But in the shorter term the goal is simply to spread the message about the known health benefits of flaxseed to the general public, says Dr. Pierce, who regularly does public speaking across Canada on the subject.

“In the Winnipeg area the health benefits of flaxseed are well known, and there are a lot of people here who are already using flaxseed supplementation in their diet. But in other parts of the country people aren’t as aware so it requires more exposure,” he says.

For more information about Dr. Pierce and his work, visit www.sbr.ca/ics/faculty/dr-grant-pierce/

IMPROVING THE NUTRITIONAL VALUE OF MILK WITH FLAXSEED

Saskatchewan grad student's research showcases opportunity to increase flaxseed usage in livestock diets and improve human health

Janna Moats



Janna Moats recently completed her Master's of Science degree through the U of S, focusing her research on how feeding flaxseed products to dairy cows can impact the nutritional profile of the milk produced.

Flaxseed has long been recognized for its high levels of omega-3 fatty acids and the potential human health benefits that are associated with those nutrients. However, it is believed that consumers simply aren't getting enough omega-3 fatty acids in

between the U of S and O&T Farms, a feed company based in Regina, with additional funding from the Industrial Research Assistance Program. Through this novel flaxseed research, I was able to demonstrate that feeding flaxseed to

fed extruded forms of flaxseed, more than doubling the amount of total omega-3s.

In addition to the increased levels of omega-3s, there was also a three-fold increase in another group of healthful fatty acid known as conjugated linoleic acids. Based on the information acquired from this research, it is clear that there is potential for adding omega-3s and other healthy fatty acids to the already nutrient-dense profile of milk simply by feeding flaxseed to our cattle.

“THERE IS POTENTIAL FOR ADDING OMEGA-3S AND OTHER HEALTHY FATTY ACIDS TO THE ALREADY NUTRIENT-DENSE PROFILE OF MILK SIMPLY BY FEEDING FLAXSEED TO OUR CATTLE.”

their diet. Therefore, there is interest in developing novel ways of increasing the availability of these healthful fats in everyday foods such as dairy products.

This was an area of research I chose to focus on through my recently-completed Master's of Science degree at the University of Saskatchewan (U of S). My research examined how feeding flaxseed products to dairy cows can impact the nutritional profile of the milk produced. The trial was a collaborative effort

dairy cattle has benefits in terms of the levels of omega-3 and other healthful fats in the milk.

The feeding trial was conducted by feeding Holstein cows either a control diet, a diet supplemented with a whole flaxseed product, or a diet supplemented with one of two extruded flaxseed products. The results showed that animal performance was maintained between treatments while the fatty acids in the milk improved dramatically when cows were

The results of this research have already received international attention, winning awards at last year's joint meeting of the American Society of Animal Science and American Dairy Science Association. But more importantly, this research is further proof of the potential opportunity to increase flaxseed usage in livestock diets with the aim of developing functional foods for human consumption.

SASKATCHEWAN FIELD DAY LISTINGS

**WEDNESDAY,
JULY 13**

Scott Research Farm
Scott, SK

**THURSDAY,
JULY 14**

Wheatland Conservation
Area Research Farm
Swift Current, SK

**THURSDAY,
JULY 14**

Canada-Saskatchewan
Irrigation Diversification
Centre
Outlook, SK

TUESDAY, JULY 19

Indian Head
Research Farm
Indian Head, SK

**WEDNESDAY,
JULY 20**

Melfort Research Farm
Melfort, SK

**WEDNESDAY,
JULY 20**

South East
Research Farm
Redvers, SK

**THURSDAY,
JULY 21**

East Central Research
Foundation
Yorkton, SK

*For more information
on Field Days, visit
www.saskflax.com*



SaskFlax was established in 1996 and represents almost 6,000 registered flax producers in Saskatchewan. Directed by flax producers, SaskFlax operates via a mandatory but refundable producer levy on flaxseed and straw. These dollars are leveraged whenever possible to execute programs ultimately geared to increase net returns to its producers members and advance Saskatchewan's flax industry.

SASKATCHEWAN FLAX DEVELOPMENT COMMISSION

A5A -116 -103rd Street East,
Saskatoon, SK S7N 1Y7

Phone: 1.306.664.1901

Fax: 1.306.664.4404

Email: saskflax@saskflax.com

Web: www.saskflax.com



FLAX COUNCIL OF CANADA

FLAX COUNCIL OF CANADA

465 -167 Lombard Avenue,
Winnipeg, MB R3B 0T6

Phone: 1.204.982.2115

Fax: 1.204.982.2128

Email: flax@flaxcouncil.ca

Web: www.flaxcouncil.ca



MANITOBA FLAX GROWERS ASSOCIATION

465-167 Lombard Avenue,
Winnipeg, MB R3B 0T6

Phone: 1.204.982.3990

Fax: 1.204.982.2128

Email: mfga@mymts.net

Web: www.mfga.ca

Return Undeliverable Canadian Addresses to;
Saskatchewan Flax Spring Newsletter
Saskatchewan Flax Development Commission
A5A – 116 – 103rd St. E. Saskatoon, SK S7N 1Y7
Ph: 1.306.664.1901 Fax: 1.306.664.4404
E: saskflax@saskflax.com www.saskflax.com