PULSEPOINT

March 2015

Planning for Profitability

Pulses in your Crop Rotations

New Pulse Crop Varieties for 2015

Canadian publication Mail Agreement 40021625

SASKATCHEWAN pulse Growers

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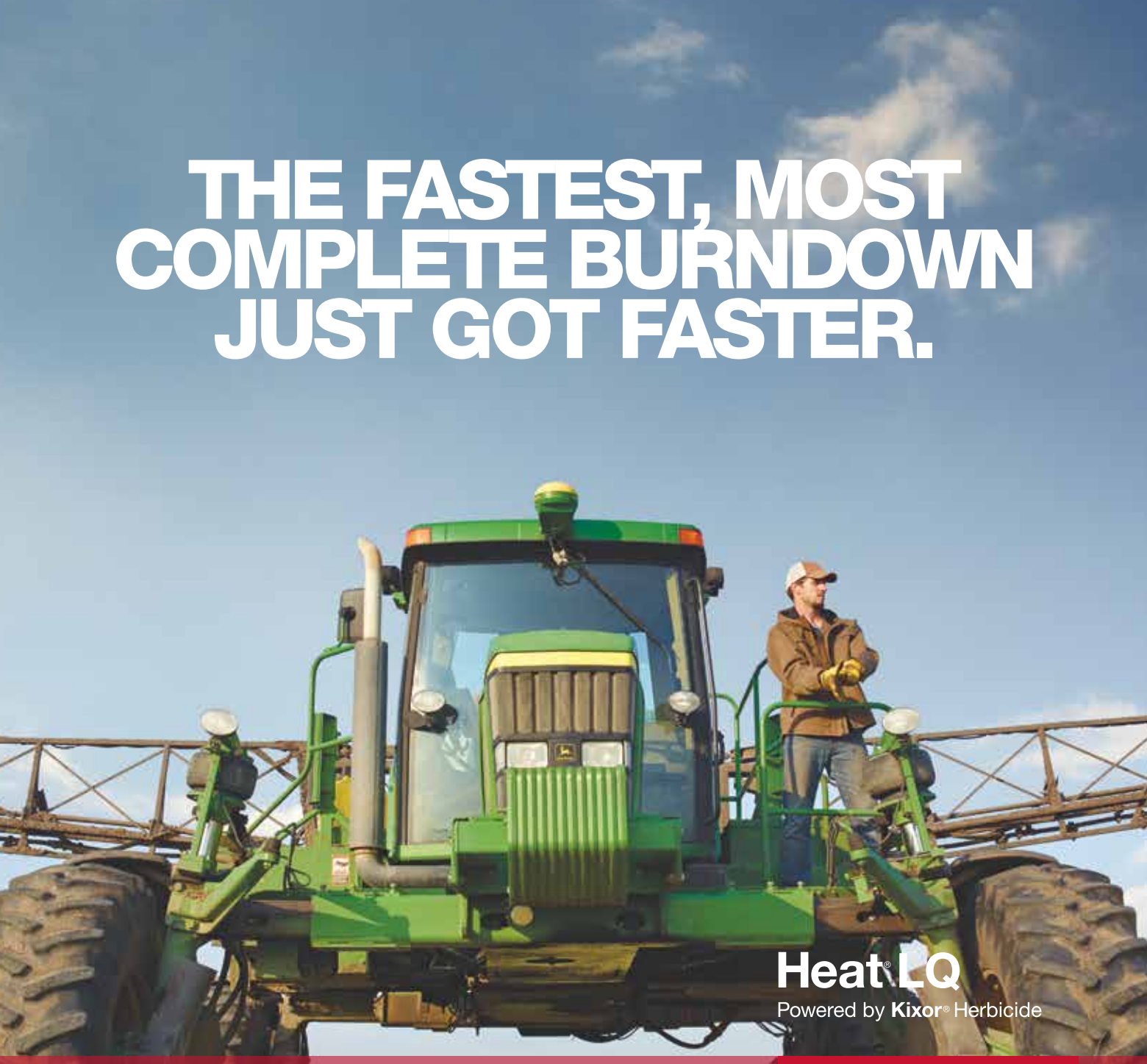

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Chair's Message

The future is bright for Saskatchewan pulses

Welcome to the March issue of PulsePoint magazine. I hope that the articles within this issue provide you with topical information that helps enhance your farming operations for the 2015 growing season.

Saskatchewan Pulse Growers (SPG) reviews its strategic plan on an ongoing basis. From time to time there are changes made to accommodate for new issues and opportunities that emerge, allowing us to move forward in new directions.

In looking back at SPG's Annual Report from the year 1999, it is clear to see the growth the organization has experienced over the last 15 years. At that time, 16,000 pulse growers in Saskatchewan were planting three million acres of pulses, and SPG was collecting $1.2 million in levy revenue. This levy was invested primarily into the area of research and development (R&D), with the emphasis on research of agronomy and varietal development. The mission of the organization in 1999 was to *Maximize Grower Profitability and Sustainability.*

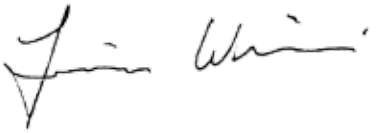
Fast-forward to the present day. The industry has grown tremendously due to the hard work and commitment of growers, researchers, and industry throughout the province. What began as an industry with a focus on one pulse market class - large green lentils, has evolved today into an industry with eight lentil, five pea, two chickpea, and several dry bean classes. New crops such as faba beans and soybeans are establishing their place in crop rotations.

Our organization, and our vision for the pulse industry, is to be *Nourishing the World through Profitable Pulse Production.* With six million tonnes of Canadian pulse production in 2014, and increased value for our product world-wide resulting in increased levy revenue for the organization, SPG is well positioned to diversify our investment into new areas that we believe will continue to increase growers' profitability. Such areas include expanding the utilization of pulse crops into ready-made food products and increasing consumer awareness about pulses and their nutritional and functional benefits.

The United Nations has declared 2016 as the International Year of Pulses. We believe that this is a tremendous opportunity to promote and leverage the nutritional and sustainable stories of the pulses that are being grown on Saskatchewan farms into increased market demand opportunities, and we are excited about the opportunities for investment into this work.

I wish you all a very successful planting season and when we check back in this June, that your crop development is progressing along nicely.

Tim Wiens
Chair



Executive Director's Message

Increasing yield of established crops

Spring is a time of renewal and many will be turning their attention to spring planting across the prairies. Global demand for pulses remains strong and relative prices for pulse crops are attractive. At this time, it is looking as though growers will choose to plant more acres of peas, lentils, and soybeans this spring. Throughout the winter, growers have been talking to us about faba beans and we are expecting more acres to go in the ground. Pulses have long played an important role in crop rotations and we are pleased to see many different pulse crops being attractive options for 2015.

With profitability being top of mind for growers during the 2015 growing season, Saskatchewan Pulse Growers (SPG) has been defining how we will help drive continued industry growth through revisions to our strategic plan. Through this process we established four key result areas that align with our mission of *Creating Profitable Growth Opportunities for the Saskatchewan Pulse Industry.*

Boosting the on-farm yield of existing pulse crops is one of the core focus areas of SPG. Through major investments in research and development, agronomy, and solidifying partnerships within industry, we strive to support growers in achieving the best yield results possible.

One of the ways we are boosting yield in established crops is by funding genome sequencing research in pulse crops. As pulse acreage continues to increase in Saskatchewan, there is a growing demand for varieties that can perform well in the weather conditions that the province experiences. SPG has invested in genome sequencing research that will allow breeders to employ tools to precisely select important plant traits. This speeds up the breeding process, allowing improved varieties to get in the hands of growers faster.

In 2014, SPG added in-house agronomy expertise. This will allow us to stay on top of key agronomic issues growers are facing across the province, provide input on research priorities, and provide growers with information on improved weed and disease management practices. To ensure you are receiving agronomy information from SPG including our Pulse Advisor Agronomy e-newsletter, sign-up for our email list at saskpulse.com.

These are a few of the ways SPG is trying to support increased on-farm profitability by reducing agronomic barriers to yield potential. I wish you good luck getting your crops in the ground, and I look forward to sharing the ways in which SPG will help the Saskatchewan pulse industry continue to grow.

Carl Potts
Executive Director
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Deadline for applications is Friday, May 8, 2015

SASKATCHEWAN pulse Growers

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Courtesy Tom Warkentin

Plant Population Key Driver of Maximum Pea Yields

An extensive, three-year agronomic study of pea inputs on their own and in combination suggests that skimping on seeding rates caps yield from the start

Lyndsey Smith

Is there a magic recipe of inputs for maximum pea yields? A recently-completed three-year, five-site study that varied five inputs alone and in different combinations provides some solid data to support a recipe, at least in part.

The pea input study, spearheaded by the Western Applied Research Corporation (WARC) at Scott, Saskatchewan, with funding provided by Saskatchewan Pulse Growers and Manitoba Pulse and Soybean Growers, totalled a formidable 22 treatments in five locations — Scott, Melfort, Swift Current, and Indian Head in Saskatchewan, and one Manitoba location at Minto — for a total of 12 site-years of data.

Sherrilyn Phelps, Agronomy and Seed Program Manager with Saskatchewan Pulse Growers, explains that the success of the canola and barley input studies headed up by Agriculture and Agri-Food Canada inspired the group to dig deeper into pea yield potential.

"The idea was to compare what individual inputs have the most impact on yield and then how the inputs act in combination. The low input treatment was called the 'empty package' and the treatment where all inputs were used in combination was called the 'full package'. We wanted to determine what the additive impact was of adding individual inputs, to see which inputs were the biggest drivers of yield," Phelps says. The individual inputs were tested by themselves, then in combinations of two, three, four, and then as all five which was considered the 'full package'.

The five inputs studied were:

- Seeding rate — 60 seeds/metre squared (m²) vs. 120 seeds/m² (roughly 1.8 bushels per acre (bu/ac) vs 3.8 bu/ac)
- Seed treatment — no seed treatment vs. Apron Maxx
- Inoculant — liquid vs. granular (at recommended rates of each)
- Starter fertilizer — none vs. 34 pounds (lbs) actual nitrogen (N)
- Foliar fungicide — none vs. a two-pass system (Headline EC and Priaxor DS)

When environment is limiting

What was immediately apparent from the results of the study, Phelps says, is that three sites — Melfort, Scott, and Minto — had much higher yields, whereas the Indian Head and Swift Current sites were lower yielding due to being limited by some factor other than the inputs the study looked at.

"There was an obvious split around the 45 bu/ac mark. Three sites above that became the high yielding locations, and the two below it low yielding sites, and we separated the data accordingly," Phelps says. "The environment — too much water, not enough, root rots, heat in July, whatever it was — was limiting in those areas."

Once settled out into high and low yield zones, Phelps says there were interesting findings within each grouping of sites.

High yielding site findings

"In the high yielding sites, there was one combination that was consistently the clear winner — the higher seeding rate, with the double fungicide application, and seeded with the granular inoculant," says Phelps.

Figure 1. Chart of Yield Response to Various Inputs and Combination of Inputs at the Yielding Site

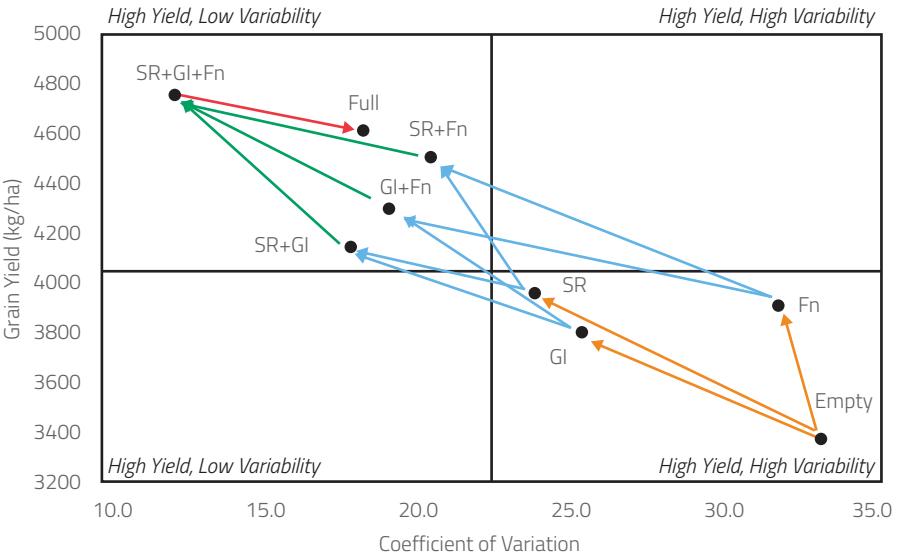

Figure 1. Chart of yield response to various inputs and combination of inputs at the high yielding sites. Only the individual inputs that showed significant responses and their corresponding combinations are shown. Coefficient of variation is a measure of the variability within that treatment. The more variable or inconsistent the yield response to that input, the higher the coefficient of variation, and the less predictable the response. Moving from the bottom right to the top left, you see that the addition of single inputs (SR, GI, Fn) increase yield and are less variable. Combining those individual inputs into combinations of two and then three, the yield continues to increase and the variability or risk continues to decline. The ultimate combination of all three inputs shows highest yield and lowest risk. In other words, it has the greatest yield potential and is more consistent at reaching higher yields than individual inputs. Comparing the three-way combination of inputs to the full input package that has all five inputs, or the empty package, you can see that the variability increases and the yield declines slightly. This suggests that the combination of five inputs or one of the five inputs is having a negative effect on yield and is causing more variability in response.

This pea input study was funded by Saskatchewan Pulse Growers and Manitoba Pulse and Soybean Growers.

With the individual inputs, the biggest yield advantage came from the first of these two inputs — the higher seeding rate and the foliar fungicide applications. When all individual inputs, as well as all the combinations of inputs were compared, granular inoculant also increased yields, Phelps says. "Not only were the input responses consistent, they were additive, too." In other words, the yield increase from the combination of adding input A plus input B equalled the total yield gain when the individual responses from treatment A were added to the individual treatment responses from treatment B.

Stu Brandt, manager of the North East Agricultural Research Foundation (NARF) at Melfort, says that the predictability observed in the data is great news for farmers, as it means not only can they be confident in what the numbers suggest, but also the consistency of the findings means that as they add inputs, the risks decrease.

"Under high yield conditions, the inputs work in an additive fashion — those that contributed to yield, could be combined to build that yield," Brandt says. "But in the low yielding sites, the

Table 1. Economic gain with inputs compared to empty package at high yielding site

Treatment Ranking	Gain $/ac
SR+GI+Fn	72
SR+GI	53
SR+Fn	50
GI+Fn	45
GI	37
SR	37
Full	31
Fn	10
Empty	0

SR = seeding rate
GI = granular inoculant
Fn = foliar fungicide
Full = full package
Empty = empty package

Table 2. Economic gain or loss with inputs compared to empty package at low yielding sites

Treatment Ranking	Gain $/ac
SR	44
SR+GI	5
GI	1
Empty	0
SR+GI+Fn	-8
GI+Fn	-24
Full	-25
Fn	-25
SR+Fn	-28

SR = seeding rate
GI = granular inoculant
Fn = foliar fungicide
Full = full package
Empty = empty package

responses were not additive, and in fact, the contribution to yield of each input was reduced."

Were there any inputs that did not appear to contribute to yield? Phelps says that, as the study was laid out, seeding happened in mid-to late May — hardly early — and that may have been why the seed treatment did not seem to offer any advantage. Peas, however, typically go in quite early, in cold or wet soil, making a seed treatment much more likely to protect plant populations, which, the data shows is a key driver of yield potential.

Running the numbers

Those that love numbers are likely waiting to hear about the economic breakdown of the different treatments — as achieving higher yields sometimes comes with a price tag too high to be economical.

That is not the case, though, according to Phelps, who says that the consistently higher yielding combinations also resulted in the highest net profit per acre. "In the high yielding sites, the combination of the higher seeding rate, two-pass fungicide, and granular inoculant resulted in a net gain of $72/acre versus the empty input package," she says. "Any of those two inputs in combination resulted in $45 to $53/acre above the empty input package. Not using all three basically costs you $20 an acre in potential income."

Low yield site lessons: Invest in seed

The input results at Indian Head and Swift Current are still very important, even if the possible yield potential never did reach the levels of the other three sites.

Whether plagued by root rots, too much moisture, or some other environmental factor (the analysis into that answer is still ongoing, but excess moisture was a factor at Indian Head), there was still a consistent advantage to investing in the higher seeding rate at the designated low yield sites.

In the high yielding sites, the combination of the higher seeding rate, two-pass fungicide, and granular inoculant resulted in a net gain of $72/acre versus the empty input package.

"At these two sites, the higher seeding rate was the only input that increased yield and margin consistently," Phelps says. "If you are going to invest in anything and you are not sure what your environment is going to be, or if you have a risky situation, do not skimp on seeding rates because you are shooting yourself in the foot right off the bat."

There was no observed advantage between the inoculant types, Phelps explains, but there was not a comparison to no inoculant. As for fungicides, that is a call to make in-season, Phelps says, as the payback on the application is likely only going to occur if the growing season favours disease development.

"There was still a profit advantage to inputs at the low yielding sites," Phelps says. "The higher seeding rate resulted in a gain of $44/acre versus the empty package, making it a clear driver of yield and profitability even when the environment is not ideal."

Lessons learned

Brandt says that the real value of this research is that when margins are tight, farmers can be confident in knowing where their input dollars are best spent, and which costs may be trimmed without significantly hurting yield. As well, when prices are good and you know you have high yield potential, you can have confidence, in input investments paying off.

bio

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Measuring What Matters

What the Weekly Performance Measurement Report means for growers

There has been a lot of attention paid to rail freight service over the last year. The discussion around where the problems lie, and their potential solutions has been ongoing. However, the conversation has just changed.

On January 26th the Ag Transport Coalition publicly released its first Weekly Performance Measurement Report. The report measures railway performance according to key indicators such as rail car demand, railway car supply, timeliness of railway car supply, and corridor performance. These data included in the report provides a level of visibility into the grain transportation system that farmers, shippers, and government had not previously had.

So what are these reports saying about grain movement? Essentially, they are quantifying what has been heard anecdotally for years, that shippers are not receiving the equipment they need, when they need it. This is particularly true for United States/Mexico, Vancouver transload, and Canadian domestic corridors, where railways have been supplying less than 30 per cent of the cars ordered by shippers each week. Overall, the reports are showing that through the current crop year, railways are only supplying 44 per cent of customer orders in the week for which cars were ordered.

Every rail car ordered is destined for a processing facility, a mill, a transloader, a container, or bulk vessel that needs product. For Canadian suppliers, lack of rail capacity and delays in car delivery result in increased costs associated with labour-load mismatches, contract penalties, container detention fees, vessel demurrage, and ultimately lost sales. For farmers, each weekly failure to supply cars results in a lost opportunity to deliver grain, cash flow challenges, wider basis levels, and ultimately lost earnings. For customers purchasing Canadian grain, every failure adds risk and uncertainty to their supply chain. Facilities do not sit idle waiting for Canadian product. Buyers source from other suppliers when Canada cannot deliver its goods on time.

For farmers, each weekly failure to supply cars results in a lost opportunity to deliver grain, cash flow challenges, wider basis levels, and ultimately lost earnings.

Transparency

Hearing that the rail freight system is moving 18 per cent more grain compared to the five-year average obscures the fact that 56 per cent of

weekly orders are not being met in the week for which cars were ordered. The reality is that customers measure Canada's performance each and every week – long term averages do not count for much when the processing line runs out of a key ingredient.

So now that we have this increased visibility into the grain transportation system, what do we do with it? The reports themselves do not provide solutions, but they do provide common, objective information from which everyone (government, railways, and the agriculture industry) can base discussions about legislative and commercial solutions. The information allows for a tight focus on the improvements that need to happen now so the numbers begin to move in the right direction.

What is a reasonable expectation in terms of action? In the short term, the Order in Council (OIC) minimum volume requirements will come up for renewal in spring 2015 and the Government has the opportunity to take immediate action to ensure that the next phase of the OIC addresses the timeliness and corridor performance issues highlighted in the reports. In addition, the weekly reports have ignited further calls for even greater transparency on rail freight performance, and a commitment from government and railways to provide enhanced railway information reporting for all shipping sectors.

Broadening the base of information stakeholders have access to will help ensure that federal policy measures, infrastructure investments, and commercial improvements can have the desired impact. A recommendation focused on information transparency is a key element of the submission a coalition of agriculture organizations have made to the Canada Transportation Act (CTA) Review process.

Having influence over the creation of new legislation and regulations requires that a wide range of stakeholders speak with one voice. Pulse Canada and its members joined forces with the Western Grain Elevator Association, the Inland Terminal Association, the Canadian Oilseed Processors Association, the Canadian Special Crops Association, the Canadian Federation of Agriculture, the Keystone Agriculture Producers, the Agriculture Producers Association of Saskatchewan, the Alberta Federation of Agriculture, and the British Columbia Agriculture Council to develop one comprehensive submission for the CTA Review. The submission calls government to introduce legislation that provides independent, detailed, comprehensive, and timely monitoring and reporting on railway service performance for all commodities. In total, the coalition has developed 10 recommendations to address issues in three key areas: railway capacity, railway performance, and the current shipper protection measures.

The weekly reports have become the catalyst for a renewed and focussed discussion on rail transportation. There is now quantifiable evidence that there is room for substantial improvement on performance. The solutions need to result in that measurable improvement in the short-, medium-, and long-term.

What is New for 2015

These new varieties give you options for spring this year

		Variety Name	Yield % CDC Maxim* Areas 1-2 (South)	Yield % CDC Maxim* Areas 3-4 (North)	Maturity	Days to flower	Resistance to Aschohyta	Resistance to Anthracnose	Height (cm)	Seed Weight g/1000	Year Released	Agronomic Traits	Market Traits
Small Red Lentil		CDC Dazil-CL	104	98	E-M	53	Good	Fair	33	35	2010	Clearfield variety	Seed most similar to dimensions of CDC Impact
		CDC Redcliff	107	103	E-M	51	Good	Fair	35	38	2010	High yielding, conventional	Seed type good for standard small red markets
		CDC Cherie	109	106	E-M	51	Good	Fair	32	39	2012	High yield, good lodging tolerance	Acceptable seed characters for standard small red
Small Red Lentil		CDC Scarlet	105	103	E-M	53	Good	Fair	35	36	2012	High yield, good lodging tolerance	Acceptable seed characters for standard small red
Extra Small Red Lentil		CDC Ruby	90	91	E	48	Good	Good	30	29	2010	Early maturity and shorter	Seed dimensions similar to CDC Robin
		CDC Rosie	92	90	E-M	52	Good	Good	33	30	2012	Good lodging tolerance	Plump seed
Large Green Lentils		CDC Impower CL	85	68	M-L	52	Good	Very Poor	41	64	2009	Clearfield variety, slightly later than CDC Improve	Clearfield variety, slightly later than CDC Improve
Medium Green Lentils		CDC Imigreen CL	78	71	M	50	Good	Very Poor	44	57	2009	Clearfield variety	Better green colour retention compared to all other lentil varieties
Small Green Lentils		CDC Imvincible CL	96	83	E	49	Good	Good	33	34	2009	Clearfield variety, otherwise similar to CDC Viceroy	All marketing characteristics very similar to CDC Viceroy
Extra Small Green Lentils		CDC Asterix	99	101	E	48	Good	Fair	30	26	2012	High yield, improved disease package	Extra small seed size attractive in some markets. Colour retention like CDC Viceroy

		Variety	Type	Yield % CDC Fatima	Maturity	Height (cm)	Seed Weight g/1000	Seed Coat Colour	Years Tested	Agronomic Traits	Market Comments
Faba Beans		CDC Snowdrop	Small seeded, zeo tannin	91	104	92	335	White	6	White flower with zero tannins. Improved lodging tolerance, small seeded	First small-seeded zero tannin type

*See Varieties of Grain Crops 2015 for Areas Map and other variety information. E-Early, M- Medium, L-Late

		Variety Name	Yield % Golden* 1,2, & 3 South	3 -4 North	Irrig-ation	Maturity	Lodging (1-9)	Resistance to Mycho. Blight (1-9)	Resistance to Seed Coat Breakage	Resis-tance to Dimpling	Seed Weight g/1000	Year Released	Agronomic Traits	Market Traits
Yellow Peas		CDC Saffron	106	114	100	M	4	4.5	Good	Fair	250	2011	High yield, good lodging resistance	Round shape, medium protein content, good cooking quality
		CDC Amarillo *Limited availability	110	126	115	M	3.5	4.5	Fair	Fair	230	2012	High yield, good lodging resistance, good Fusarium wilt resistance	Round shape, medium protein content, good cooking quality
Green Peas		CDC Raezer	91	104	104	M	3.5	5	Good	Good	220	2011	Good lodging resistance, good disease resistance package	Smooth, round seed shape with bleaching resistance similar to CDC Striker
		CDC Limerick *Limited availability	104	109	101	L	3.5	4	Very Good	Good	210	2012	Good performer, medium-tall, good lodging resistance, improved mychospherella resistance	Smooth, round seed shape with bleaching resistance equal/better to CDC Striker, high protein concentration
Other Peas		CDC Tetris – Blocky type green pea	99	113	98	L	4	4.5	Good	Good	210	2010	Good performer, medium-tall	'Espace-type' market class used in snack food markets in Asia. Blocky seed shape, and good green colour intensity
		CDC Pluto – Small seeded green pea	102	102	102	M	5.5	4.5	Good	Good	160	2010	Good yield, fair lodging resistance	A new market class due to small seed size. Smooth round seed shape and good green colour intensity
		CDC Horizon – Forage Pea	97	98	70	M	4.5	4.5	Good	Good	170	2010	High biomass (approx 8% greater than 40-10), acceptable grain yield (approx 97% of Cutlass in forage elite test)	Similar feed value to Trapper and 40-10, small seed size
		CDC Mosaic – Maple Pea	90	92	65	M	4	4.5	Good	Very Good	180	2010	Acceptable grain yield. First maple with good lodging resistance	Seed type similar to CDC Acer
		CDC Dakota – Dun Pea	117	124	111	M	3.5	4.5	Good	Very Good	205	2010	Good yield, good lodging resistance	Uniform, nice dun (greenish-tan) seed coat, blocky seed shape, non-dimpled surface. Ideal for split pea markets.

		Variety	Yield % Amit Areas* South 1	2	Maturity	Days to Flower	Resistance to Aschochyta	Height (cm)	Seed Weight g/1000	Seed Shape	Year Released	Agronomic Traits	Market Traits
Chickpeas		CDC Leader – Kabuli	110	107	M	55	4.5	42	392	Ram-head	2011	High yield and earlier maturity than CDC Frontier	9-10 mm size, ram-head seed shape, beige seed colour
		CDC Orion – Kabuli	108	107	L	51	5	45	439	Ram-head	2010	High yield and same maturity as CDC Frontier	10 mm size, ram-head shape, beige seed colour
		CDC Cory – Desi	112	105	M	57	4.2	48	270	Angular/ plump	2010	High yield and earlier maturity than check	Medium seed size, tan seed coat colour

E-Early, M- Medium, L-Late *See Varieties of Grain Crops 2015 for Areas Map and other variety information.

Pulses in your Rotations

What are the measurable and non-measurable benefits?

Noelle Chorney

Agriculture and Agri-Food Canada (AAFC) soil fertility specialist Dr. Cindy Grant remembers what her professor used to say about the benefits that a pea crop in rotation can offer a producer. "It is not easy to quantify," she says. "He called it 'pea magic.'"

Peas, lentils, and other legumes are best known for their ability to fix nitrogen. To achieve the optimal nitrogen fixation benefit, a pulse crop in rotation must be inoculated with a high quality, species specific strain of *Rhizobium*, in order to convert nitrogen from the air in the soil around the roots to a nitrogen source available to the plants.

Within a month of germination, the plant's roots will exhibit nodules, tiny bumps on the roots that contain *Rhizobia.* This is the sign that plants are fixing nitrogen.

While all legumes fix nitrogen, some are better at it than others. Of pulses, faba beans top the list of nitrogen fixers, deriving 90 per cent of their nitrogen from fixation. Peas and lentils follow close behind at 80 per cent, chickpeas at 70 per cent, and soybean and dry beans at 50 per cent.

When peas and other pulses are grown in rotation with other crops, producers can realize multiple benefits.

Measurable Benefits

When peas and other pulses are grown in rotation with other crops, producers can realize multiple benefits.

1. Use less fertilizer

In a pulse rotation year, fields will require fewer inputs. While pulses can fix their own nitrogen, they will use nitrogen in the soil or added fertilizer first. To maximize the nitrogen fixing capabilities of pulses, growers should avoid adding nitrogen if the soil levels are above 15-20 pounds per acre (lbs/ac).

2. Gain residual nitrogen for next year's crop

As roots from a harvested pea or lentil crop decay, they release nitrogen into the soil. Next year's crop will benefit from the nitrogen in the soil not only at seeding time, but also during the growing season.

Dr. Bob Blackshaw, a research scientist with AAFC in Lethbridge explains, "You have an extra 10-30 lbs/ac of nitrogen at seeding time, but there is probably that much again available later in the growing season, unlike a fertilizer application that is taken up immediately."

"For a cereal like wheat, that available nitrogen later in the season will not directly affect yield, but it can increase protein content and overall seed quality, because the nitrogen is available during the seed fill period."

The biggest benefit can be seen in the crop grown following peas or lentils. Some benefits may carry over to the second year, but to a lesser degree.

3. Better flax crops

A pulse rotation can set the foundation for mycorrhiza-dependent crops such as flax. Planting flax following a pulse crop can ensure better soil microbe populations, leading to improved yields.

With canola featuring prominently in growers' rotations, it is important to realize that canola is a mycorrhiza inhibitor. Research has shown that flax grown following canola has decreased yields. In a multi-year rotation, it may be advisable to select cereal-oilseed-pulse, so that the pulse can restock the soil's microbial populations after a canola year.

Non-measurable benefits: Improved soil diversity

Dr. Blackshaw identifies several long term advantages of soil improvement, backed by multi-year studies. "Soil microbes need nitrogen, and prefer it to be in a more stable form. Total soil microbial population and biodiversity improve when pulses are included in crop rotation."

Good soil microbes present in high numbers can inhibit disease-causing microbes. "It is hard to measure what that means economically to the grower, but we know it is an indicator of overall soil health," he says.

Related to soil health, soil scientists identify several other factors that point to soil health and long-term sustainability. Dr. Grant says, "Pulse rotation can create a disease break, improve soil workability, reduce penetration resistance or soil hardness, and increase moisture retention in drier

years. While you cannot easily attribute the benefits directly, we know that there are economic benefits to diversification."

Benefits of Pulses in Rotation:

1. Use less fertilizer
2. Gain residual nitrogen for next year's crop
3. Better flax crops
4. Improved soil diversity
5. Better yield = better nitrogen supply

"From a crop sustainability and soil health standpoint, it is advisable to work a pulse crop into a three-five year rotation. We are lucky to have several types to choose from in our climate," says Dr. Blackshaw.

Better Yield = Better Nitrogen Supply

The healthier your pulse crop, the more nitrogen it will put into the soil. Careful management of your pulse crop, through choosing ideal seeding dates, preparing the seedbed, proper inoculation (using the correct inoculant species for the pulse you are planting), and early weed control will all help to optimize your pulse crop.

Of course, a healthy pulse crop also means higher yields and economic gains. Dr. Grant says, "Research shows that benefits to the crop following a pulse rotation are directly related to the yield of the pulse crop."

Faba beans may be the most efficient nitrogen fixers, Dr. Grant points out, but their yield potential can be highly variable.

Put Your Peas to Work

When planning your crop rotations, consider not only the inputs required and the potential yield of a pea or lentil crop in the year you plant it, but also factor in the savings you gain from reduced inputs that year and the benefits to your other crops the years following.

bio

Noelle Chorney is a freelance science writer, interpretive planner, content manager, and owner of Tall Order Communications. She can be reached at tallorder@sasktel.net.

New Pulse Crop Options for your Farm

Are faba beans and soybeans suited to your area?

Amanda Ryan

PHOTO: ROBYNE BOWNESS

Faba bean field in Sylvan Lake, Alberta

Cropportunities. It seems to be the new buzz word in agriculture as research and technology are providing growers with the opportunity to diversify and look at new cropping options for their farm. While farming practices have changed substantially over the years, there has not been a significant change in the types of crops that are being grown. There are improved varieties being introduced each year, but the crops that growers have been planting have remained fairly consistent. That is until now – two fairly new crops are making headway in Saskatchewan, giving growers more options this spring. But will these crops succeed in your part of the province?

Those producers living in the Dark Brown and Black soil zones may want to consider faba beans as a pulse crop choice for 2015. The ideal growing conditions for faba beans are "cool, high moisture areas," says Robyne Bowness, Pulse Research Scientist with Alberta Agriculture and Rural Development.

Faba bean production has been expanding in Saskatchewan, and according to Statistics Canada, there was almost three times the production in 2014 as compared to the previous year. So how do growers know if adding faba beans to their rotation is a viable option for them?

"Faba beans are best suited to Dark Brown or Black soils with relatively high levels of organic matter and lots of available moisture, as the moisture requirement is quite high," explains Bowness. "They need a lot of water to emerge, grow, and set seed. They do not mind wet feet for a few days."

Garry Hnatowich, Research Scientist with the Irrigation Crop Diversification Centre in Outlook agrees.

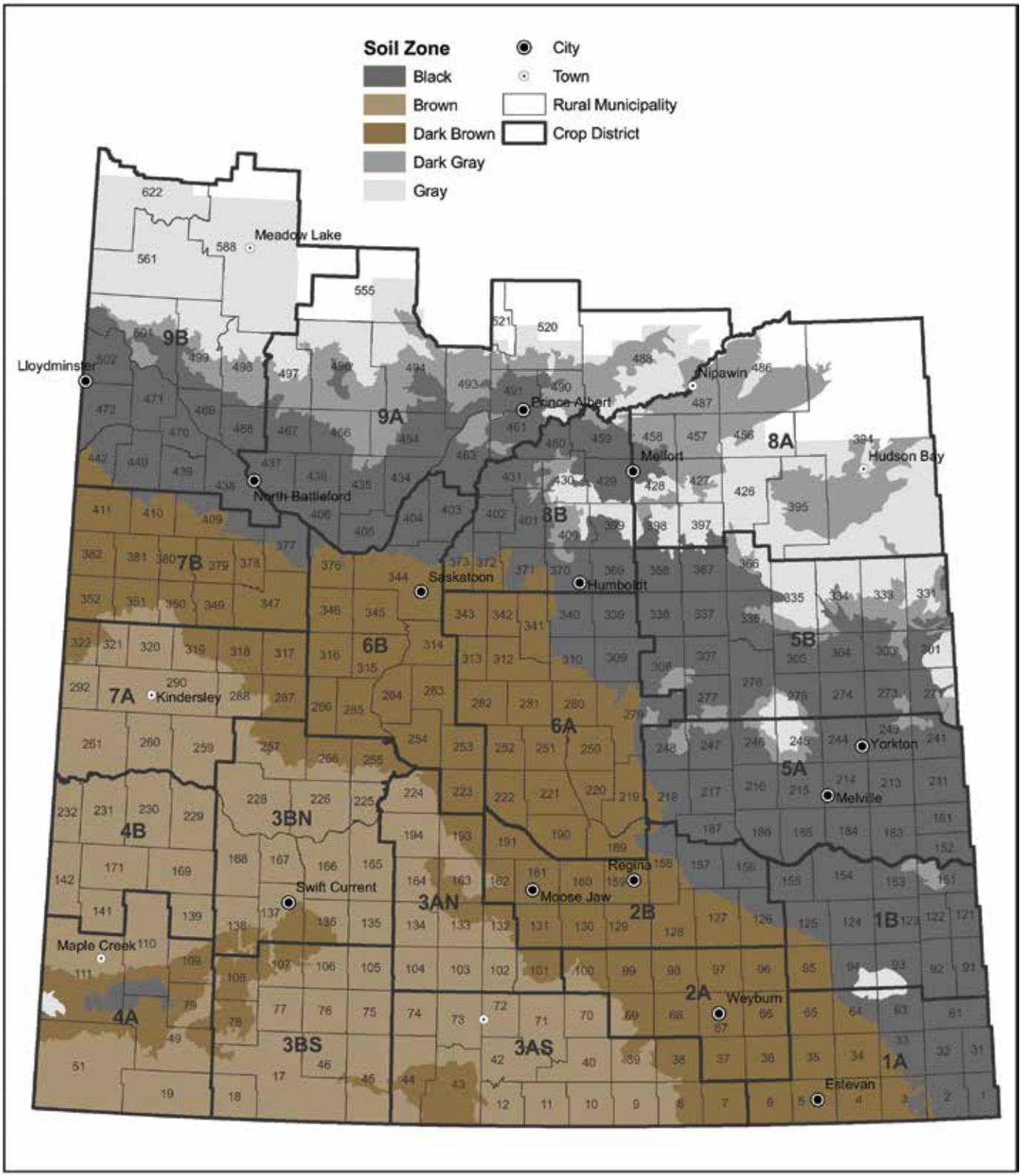
"Faba beans are similar to peas and require cool season production. They do best on medium textured soils that are well drained, but able to maintain soil moisture and are best adapted to the Black soil zone and the northern portions of the Dark Brown soil zones of Saskatchewan."

Bowness believes that faba bean production will increase again in 2015, specifically within the areas of the province that have a cooler climate and high moisture soil.

"Faba beans can handle the cool soil in early spring and should be seeded as soon as the field is passable to get good establishment, which is actually the recommended timing. Faba beans are also sensitive to heat during growth, and growers should plan accordingly to avoid flowering in July, when heat is at its highest," she says.

This also means that faba beans may not be best suited to areas of the

Soil Zones in Southern Saskatchewan



Saskatchewan Ministry of Agriculture

0 25 50 100 150 200
Kilometers

Projection: UTM Zone 13 Datum: NAD83

Data Source:
Soil Zones - Soil Landscapes of Canada (SLC) version 3.1

Prepared by: Geomatics Services Date: August 20, 2009

PHOTO: TOM WARKENTIN

province that experience a lot of heat throughout the summer, likely the areas within the Brown soil zone.

Hnatowich notes that the University of Saskatchewan's Crop Development Centre (CDC) has been active in their faba bean breeding program and is working on introducing better adapted varieties.

Saskatchewan Pulse Growers (SPG) has also been partnering with researchers and industry to explore another newer crop option for Saskatchewan growers – soybeans. Soybean production has been making a shift from east to west and may be a new cropportunity for Saskatchewan growers in the Black soil zone, but also has potential to grow in the Dark Brown and Brown soil zones.

"In Saskatchewan, they (soybeans) are best suited to the Black soil zone along the Manitoba border and the Dark Brown soil zone regions of southern and central Saskatchewan," says Hnatowich.

Dr. Tom Warkentin, Pulse Crop Breeder at the CDC explains that the ideal growing conditions for soybeans are, "Warm summers with adequate rainfall. Soybean grown in the Dark brown and Brown soil zones would work in wetter seasons, or if irrigation is available."

Soybeans have a fairly long growing season, compared to other pulse crops. SPG is currently funding research on the development of shorter season varieties, but until they are available, for soybeans to be a successful cropping option, there is an important mix of warm weather and moist soil conditions required.

"Soybeans do best on medium textured, well drained soils. Sandy soils are prone to moisture stress and heavy textured soils can be problematic for soybean emergence and seedbed conditions if wet," explains Hnatowich.

"Current soybean varieties require a long growing season (approximately 125 days) to reach maturity, so ideally, soybean should be grown in areas of the Prairies that have the longest frost-free period and most heat units," adds Warkentin.

Given the long growing season needed for soybeans, what is the new attraction for growing soybeans in Saskatchewan?

Warkentin believes soybeans are another alternative crop option for fixing nitrogen in the soil, plus the input costs are less than canola, and weed control is pretty straightforward. There are also a number of markets available for soybean, making it a potentially profitable option for growers across the province – just some of the reasons behind the growing interest and acres.

"Soybean has become established in the Red River Valley of southern Manitoba. For the rest of the Prairies, time will tell. At present, the varieties available are still a bit risky for much of the Prairies because of their season length requirement. If we get an early frost it will reduce soybean yields and perhaps enthusiasm for the crop. However, in the medium term I think that earlier season soybean varieties that will come to the market will reduce this risk," says Warkentin.

Hnatowich shares the same concern about the current varieties and says a complete agronomic package for soybean production for much of the Prairies is still to be developed.

"Prairie production is still primarily in the Manitoba regions where warm, long growing seasons prevail. The expansion of seeded acreage has occurred with the introduction of earlier season varieties that are typically grown in central Canada, and interest in Saskatchewan and Alberta has been due to Manitoba's success."

Growers that are trying to determine if faba beans and/or soybeans will work on their farms should evaluate whether their land sits within the ideal soil zones for that crop, has the right amount of available soil moisture, and adequate weather patterns for growth. So if the shoe fits, both are viable new pulse cropportunities to consider this spring.

bio

Amanda Ryan is an ag communicator and freelance writer. She can be reached at akayeolekson@hotmail.com.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Calculations Count

Formula removes some guesswork from calculating optimal seeding rate

Trudy Kelly Forsythe

It is seeding time and while it may be tempting to stick with the traditional kilograms-per-hectare (kg/ha) method of seeding, it is not the best way to optimize yields. That is because there are a lot of variables to consider, including variation in seed sizes.

Take yellow and green peas, for example. According to the Government of Saskatchewan's 2015 Varieties of Grain Crops guide, CDC Golden's thousand kernel weight (TKW) is 230 grams while CDC Pluto's is 160 grams. That smaller size impacts how many seeds growers need to plant to achieve their target density per square metre.

To help determine just how many seeds that is, growers can use the following formula: Seeding rate (kg/ha) = (target plant population/m² x TKW in grams) divided by anticipated percentage of plant survival (as a whole number).

Determining the percentage of survival rate is probably the trickiest part of the equation.

To determine TKW, Brent Flaten, an integrated pest management specialist with Saskatchewan Ministry of Agriculture, says growers can use the standard number for the different varieties as listed in the Saskatchewan Seed Growers Association Seed Guide, or they can weigh the seeds themselves. He recommends the latter.

"Count out 250 seeds, weigh them, and then times it by four to get the thousand kernel weight. It makes it more accurate as it allows for variations in seed size from year to year. Some years, growers might get smaller seeds; the next year, larger."

TKW also varies depending on what pulse growers are seeding. The small red lentil CDC Maxim, for example, is rated in the provincial seed guide as 40 grams for its TKW. The large green lentil CDC Greenland is 64 grams. Flaten says most farmers intuitively sow a heavier rate for larger seeds, but the formula makes it more precise.

To determine TKW, growers can use the following formula:

Seeding rate (kg/ha) = (target plant population/m2 x TKW in grams) divided by anticipated percentage of plant survival (as a whole number).

Determining the percentage of survival rate is probably the trickiest part of the equation. "It is really an educated guess," Flaten says. "We can give typical numbers, but there is variation depending on the germination for that particular seed lot, seed-borne disease issues, seedbed conditions that particular year. If the soil is cold it will be different than if the soil is warm, which promotes healthy, rapid seedling emergence."

If growers purchase certified seed, the germination rate for that seed lot will already be available. If the grower is using non-certified seed, laboratories can test the seeds for germination and seed borne diseases. Once growers have the anticipated germination rate, Flaten recommends picking a percentage survival rate slightly lower to take into account plants lost to disease or an inability to become established.

Flaten suggests to also consider the conditions the seeds are being planted into. "The emergence gap will be greater if they are seeding into non-ideal seeding conditions such as extremely dry, or cold ground."

Dale Risula, Provincial Specialist, Special Crops, with Saskatchewan's Ministry of Agriculture, says that in addition to testing for the germination rate, growers should test to see what diseases might be present on the seed.

"Have them treated with insecticide or fungicide to reduce or eliminate the seed-borne diseases that could be on the seed, and also to reduce the impact organisms in the soil might have on seedlings," he says.

bio

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Root Rot in Pea and Lentil

What to watch for this year

Root Rot in Pea and Lentil in Western Canada

Root rot of pea and lentil is a disease that affects the below ground portion of the developing plant, leading to poor performing pulse crops. The organisms that cause the disease are soil borne and can infect the plant at any stage. Unfortunately once root rot has set in, there is nothing that can be done. Understanding the disease, identifying the risks for root rot infection, and thorough planning for prevention are the only options.

Root Rot Symptoms

- Poor emergence, stunting, yellowing of leaf tissue, a reduced root system, decay, and brown discolouration of roots.
- Nodules are often reduced, pale in colour, or have not developed.
- Typically occur in patches and may expand if conditions are favourable for the pathogens over several growing seasons. Symptoms are often associated with areas of flooding or waterlogging.
- Difficult to identify root rot pathogen(s) once plants are heavily damaged or dead, due to the presence of other organisms that feed on decaying tissue.
- Pathogens associated with root rot often appear in the form of a complex, where more than one pathogen is present, making identification of the primary causal agent difficult.

Browning of below ground portion of pea plants due to root rot.
Source: Saskatchewan Ministry of Agriculture

Root Rot Pathogens

Various fungal and fungus-like organisms make up the complex that cause/contribute to root rot. Other conditions can also contribute to root rot, including abiotic factors such as flooding and soil oxygen depletion. Abiotic factors can result in root cell death and symptoms that are similar to root rot, as well as facilitate infection by root rot pathogens.

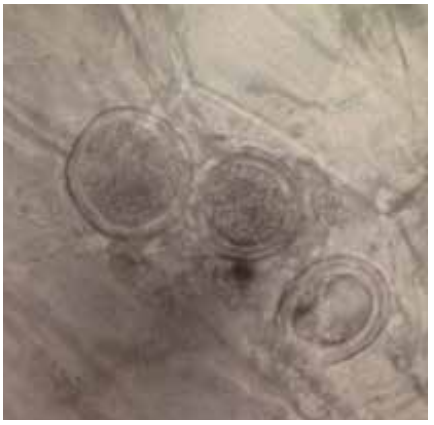
Fusarium Root Rot

Fusarium species isolated from pulses in Saskatchewan include *F. avenaceum, F. solani, F. redolens, F. oxysporum, F. graminearum, F. equiseti, F. culmorum, and F. poae.* These are non-specialized pathogens that can also infect cereals, causing root rot and head blight. A distinguishing feature of fusarium root rot is a red discolouration of the vascular tissue below the soil line.

Red discolouration from fusarium root rot.
Source: Alberta Agriculture and Rural Development

Fusarium infected pea roots.
Source: Agriculture and Agri-Food Canada

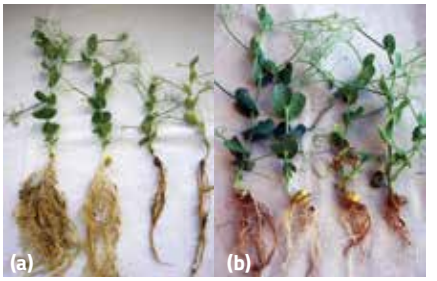
Aphanomyces and Pythium Root Rots
Pythium spp. and *Aphanomyces euteiches* are organisms that belong to a group of fungal-like root pathogens commonly referred to as "water moulds". As the name indicates, they are particularly adapted to wet, waterlogged soils. *Pythium spp.* can be controlled with certain seed treatments, however there is no effective seed treatment available against *A. euteiches.* Because of the lack of seed treatment and the longevity of its spores in the soil, *A. euteiches* is the most difficult and therefore most serious pathogen among the root rot pathogens.



Water moulds produce round oospores in crop roots.
Source: Crop Development Centre

A distinguishing feature of aphanomyces root rot is the development of caramel coloured roots (below). Later, roots darken and the cortex is sloughed off.

Caramel coloured roots are a key symptom of aphanomyces root rot.
Left: Diseased plants, Right: Healthy plants.
Source: Crop Development Centre



(a) *Seedlings grown in normally watered field soil – Left: Two plants without Aphanomyces euteiches, Right: Two plants with A. euteiches* **(b)** *Seedlings grown in field soil with A. euteiches - Left: Two plants left in normally watered soil, Right: Two plants in flooded soil. Even when watered normally (i.e., no wet feet), A. euteiches was able to cause disease in peas, but symptoms were more severe when the soil was flooded.*
Source: Crop Development Centre

Pea roots infected with Pythium will be rotten and may contain oospores.
Source: Saskatchewan Ministry of Agriculture

Other Forms of Root Rot
Rhizoctonia solani is also a root rot fungus that may be present in soil. *Botrytis* and *Sclerotinia* are other pathogens that may be present on seed and able to cause seedling diseases as well.

Risk Factors for Root Rot

Stress factors that delay germination and slow emergence and growth of plants contribute to an increased risk of root rot infection.

Key Facts:

- Plant roots and nitrogen fixing bacteria need oxygen. When the soil is saturated, roots function poorly, and *Rhizobia* activity is slow, resulting in yellow growth.

Stress Factors	Why?
Wet Conditions	Wet feet stresses plants and reduces rhizobial activity. Root rot fungi need water to germinate and infect roots
Cool Temperatures Early in the Season	Slow plant growth and slow nitrogen availability from organic matter
Shortened Rotations	Increase level of pathogens in soil
Heavy Textured Soils	More prone to waterlogging and compaction
Soil Compaction	Root growth impeded and less aeration
Nutrient Deficiency	Slows seedling growth and weakens plant

Pea seedlings grown in sterile soil. Left: normal watering, Right: waterlogged conditions.
Source: Crop Development Centre

- Cool conditions slow seedling metabolism and root growth. This also slows mineralization of nitrogen from organic matter.
- Under cloudy skies, plants turn pale green and yellow due to reduced photosynthetic activity.
- Seed with low vigour and stressed plants are more susceptible to seedling diseases.
- Seed treatments are ineffective past the seedling stage and foliar fungicides will not work on root diseases.

- Root rots are most severe under waterlogged conditions. However, crops can be diseased even under ideal moisture conditions, and crops can also suffer due to wet feet regardless of pathogen pressure.

Pea roots and nitrogen-fixing bacteria need oxygen to function properly.
Source: Saskatchewan Ministry of Agriculture

Heavy Disease Pressure
When a pathogen is able to build up in the soil due to conditions conducive for its development in consecutive seasons (such as waterlogging and tight rotations), it may continue to cause issues even when conditions return to what would be considered normal or ideal for crop production.

More than One Susceptible Crop
Depending on the pathogen, root rot can infect various crops in the rotation, or survive as a saprophyte (feeding on dead plant material) until the next susceptible crop is grown, and/or conditions are favourable for disease.

Root Rot Diagnosis
The purpose of diagnosing root rot is not to implement an immediate fix as there are no effective treatment options. However, proper diagnosis will aid in future crop management decisions and may reveal trends among varieties, crop rotations, management practices that affect the soil, or other inputs and stresses. This information also supports researchers in breeding efforts.

Send Samples to a Lab:
Diagnostic laboratories may be able to examine freshly infected roots for spores, plate samples for fungal identification, or confirm disease using DNA testing. The following labs offer analysis for root rot disease:

BDS Laboratories - Qu'Appelle, SK
306-699-2679
www.bdslabs.com

Discovery Seed Labs Ltd. - Saskatoon, SK
306-249-4484
www.seedtesting.com

20/20 Seed Labs Inc – Nisku and Lethbridge, AB; Winnipeg, MB
1-877-420-2099
www.2020seedlabs.ca

Individual labs may differ in testing methods and sample requirements. Please check with the lab prior to sending samples.

Information to Gather for Diagnosis and Discussions

Field History	Crop rotation, last year in pulses
Herbicide History	Herbicides used throughout the year and past history
Environment	Moisture situation leading up to the problem including previous year(s)
Soil Information	Texture, organic matter, pH, signs of compaction, flooding, or water runs
Seeding Information	Variety, seeding date, seeding depth, seed treatments, inoculant, and fertilizer amount and placement as applicable
Field Information and Maps	Legal land location, map of good and bad areas, notes on topography, and patterns in the field where symptoms are present and not present. Mark waterways, side hill seeps, heavier soil, etc
Patterns in Field	Note any patterns that may be visible. Patterns may relate to equipment such as misses, overlap areas, swath and chaff rows from harvest, and compacted areas. Note seeding and sprayer direction. Patterns may also relate to other factors such as field edges (see picture below)
Photos and Samples	Good photos are critical. Aerial photos are great for identifying patterns. Plant and soil samples from both good and bad areas for analysis

Root rot identified in left field in 2014. Field histories: Left field had peas in 2010, right field had canola in 2010 with no peas for past eight years. Fields farmed together as half-section 2011 to present.

Pattern in pea field. Top right of picture is old fence line and that area never had peas on it before.

Better peas along field edge where grass helps reduce excess water.

Aerial shows entire pea field in Alberta affected by root rot. Slightly better area identified in top right. Source: Alberta Pulse Growers

Prevention of Root Rot

Following best management practices can help get crops off to a good start, ensuring they are better able to handle stress and tolerate disease pressure. The two most critical factors are environment (moisture) and presence of pathogen (rotation). Field choice is key but other factors may play a role.

In the case of *Aphanomyces*, it is important not to grow a susceptible host for a minimum of six years, maybe longer. *Aphanomyces* can infect peas, lentils, alfalfa, dry beans, some varieties of red clover, some varieties of faba bean, and possibly some of the native weedy legume species. Faba bean and chickpea varieties with partial resistance can be used to maintain pulse crops in rotation. Soybeans are another option for a nitrogen (N) fixing crop that is more resistant to *Aphanomyces.*

Peas and lentils fix their own N but until the nodules form, the crop relies on soil N. Starter N is not usually recommended with peas and lentils, as extra N can delay nodulation and maturity. However, under conditions where soils are low in N (less than 15 lb/acre in the top 12 inches) at the start of the season, application of 10 to 20 lbs of N may be beneficial. As a rule of thumb, if soil tests indicate more than 20 lbs/acre of nitrate nitrogen, then no additional N is needed. If below 15 lb/acre, then consider starter N.

Phosphorous (P) is important for good root development and to support the nitrogen fixation process. Good P levels are important for early growth, especially under cool conditions associated with early seeding. Maximum safe rates of seed placed P are 20-25 lbs/acre for lentils and 15-20 lbs/acre for peas based on narrow opener (15 per cent seedbed utilization), and good moisture conditions. If higher P rates are required, banding is the best strategy.

Choices	Options for Reducing Risk of Root Rots
Field Choice	▪ Lighter textured soils (sandier) with good drainage ▪ Out of peas/lentils for at least three years (four year rotation) and maybe up to six years if *Aphanomyces* positively identified ▪ Manage or avoid compacted fields or areas
Soil Testing and Fertility	▪ Apply nutrients as needed ▪ Starter nitrogen if soils <15 lbs/acre available nitrogen in top 12 inches ▪ Phosphorous if seeding early into cool soils ▪ Other nutrients only if deficient ▪ Know the safe rates of nutrients that can be safely seed placed
Seed Testing	▪ Plant good quality seed ▪ Apply seed treatments as warranted for seed borne disease or if planting early into cool soils (see next table)
Seeding Decisions	▪ Use appropriate inoculant and good application methods ▪ Choose more resistant crops - faba bean, chickpea, and soybean (only for *Aphanomyces* root rot) ▪ Minimize seed damage and watch airspeed of seeder ▪ Seed into warm moist soil – the quicker the emergence the more vigorous the seedlings
After Seeding	▪ Monitor crop for signs of stress ▪ Follow herbicide labels - increased injury can occur when plants are stressed

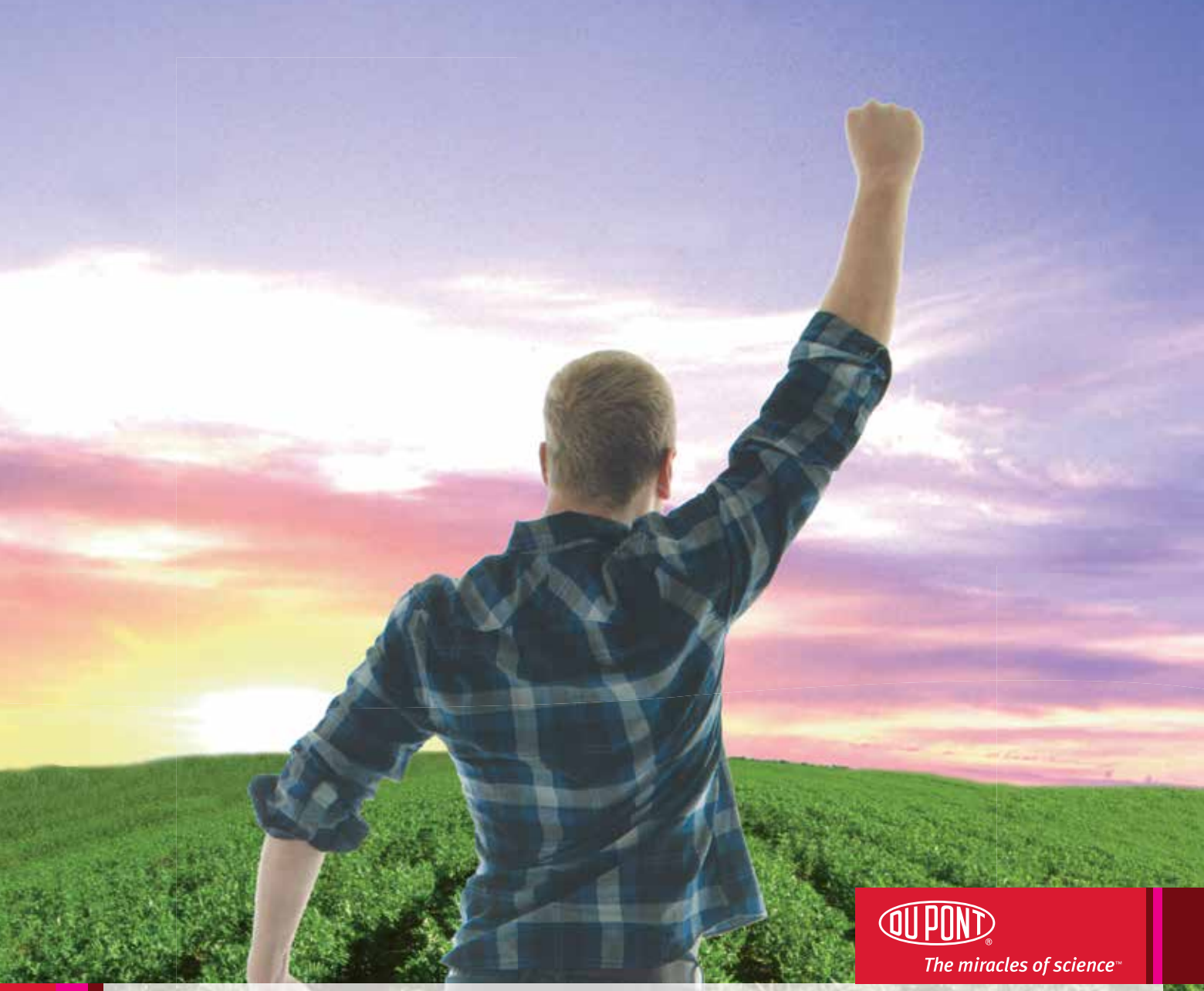
Seed Treatments

Root rot pathogens can be controlled to a certain degree using seed treatments. However, fungicidal effects will only last two to three weeks against early season disease pressure.

Pathogen (Disease)	Seed Treatments
Pythium spp. (Seed rot and damping off) Use seed treatment if history of disease; seeding under cool/moist conditions	Allegiance FL® (metalaxyl S) Belmont 2.7 FS® (metalaxyl S)
Botrytis, Sclerotinia, and Fusarium (Seed rot and seedling blight) Use seed treatment if pathogen detected over 10 per cent on seed	Agrox FL® (captan) Apron Advance® (fludioxonil C metalaxyl-M S and thiabendazole) Apron Maxx RTA/RFC® (fludioxonil C, metalaxyl-M S) Cruiser Maxx Pulses® (thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Evergol Energy® (penflufen, prothioconazole and metalaxyl) Thiram (thiram)[2] Trilex AL® (trifloxystrobinC and metalaxylS) Vibrance Maxx RTA/RFC® (fludioxonil, metalaxyl-M and sedaxane) Vitaflo® products (carbathiin and thiram)[3] Crown® (carbathiin S, thiabendazole S,C)[1]
Rhizoctonia Solani	Cruiser Maxx Pulses® (thiamethoxam insecticide, fludioxonil C and metalaxyl-M S fungicides) Evergol Energy® (penflufen, metalaxyl, and prothioconazole) Vitaflo products® (carbathiin and thiram)[3]
Aphanomyces Euteiches	None registered

[1] *Crown is registered for lentil but not registered for pea*
[2] *Thiram is registered for pea but not registered for lentil*
[3] *Includes Vitaflo 280, Vitaflo Fungicide, and Vitaflo SP*
Refer to product labels and the most recent Guide to Crop Protection for more information on seed treatments.

Making informed decisions before root rot symptoms appear is the best option. Once the seed is in the ground it is important to monitor plant health by checking above and below ground portions of the plant throughout the season.



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Fertilizing Pulses

Getting it Just Right

Noelle Chorney

PHOTOS: JEFF SCHOENAU

As nitrogen fixers, it is commonly assumed and recommended that pulses do not require fertilizer. While peas can respond negatively to too much of a good thing, in some cases, properly applied fertilizer can make a difference.

Nitrogen

Agronomist Scott Anderson and soil scientist Jeff Schoenau agree that large amounts of nitrogen fertilizer for pulse crops are not required. Field peas, in fact, are sensitive to seed row fertilizer over 15-20 pounds per acre (lbs/ac). "Any more than that," says Anderson, "and you see a reduction in yield."

Knowing what levels your soils are at prior to seeding can assure that there is enough nitrogen to ensure good health of the developing seedling. The general rule of thumb for nitrogen application with peas and lentils suggests soils below 15 lbs/ac of available nitrogen may benefit from 10 lbs/acre of nitrogen at seeding time, while soils with greater than 15 lbs/acre do not require addition nitrogen.

Lentils, while less sensitive than peas, will not fix nitrogen in the soil if fertilizer nitrogen is available. "The crop will do fine," says Dr. Schoenau. "It will just use the nitrogen in the fertilizer instead of fixing the nitrogen in the soil."

Phosphate

Phosphate fertility in pulses can often use some improvement in both pea and lentil crops. "Peas and lentils are pretty good scavengers of nutrients," says Schoenau. "But it is important to note that a 40 bushel per acre (bu/ac) pea crop will take up 30 lbs/ac of phosphate. Product application rates often do not meet the usage rate."

In other words, the amount of phosphorous removed in the plant is more than is applied at seeding time, which often means there is often a negative phosphorus balance.

If you consider the long-term sustainability of soils, and the fact that other high performance crops like canola use phosphate at a rate of 70-80 lbs/ac, it is likely that phosphate levels could use a boost. "In the end, you have to put back in what you take out," explains Schoenau.

Potassium and Sulfur

Potassium and sulfur deficiencies are not an issue in most areas of Saskatchewan. However one area where potassium levels may need to be tested is along the edge of the boreal forest. "In grey wooded soils,

potassium deficiencies might be an issue," says Anderson.

Careful Application

It is important to separate fertilizer band and seed placement when fertilizing pulse crops—peas in particular are very sensitive. In a recent soybean study, an increase from 20 lbs/ac to 32 lbs/ac of seed placed phosphorus pentoxide (P_2O_5) caused reductions in emergence. Therefore side band or mid-row band applications are recommended.

"A 10-34-0 ammonium polyphosphate solution (APP) or 11-52-0 mono-ammonium phosphate (MAP) are probably your best bets," says Anderson. "You will get a bit of extra starter nitrogen—but not too much—and the phosphate levels that will give your soil a boost."

Micro-nutrients

Research previously undertaken on the use of zinc in fertilizing lentils showed varying results. The research showed that foliar-applications fared better than soil-applied zinc sulfate, but the results were less yield related, and more related to bio-fortification, says Schoenau. "Foliar application reduces phytate [anti-nutritional] concentrations, which creates better nutritional profiles in lentils, but offered minimal impact on yields."

When working with soybeans, areas that have experienced flooding may cause soybeans to be more prone to iron deficiencies. Iron chelate applications have not shown to have any impact on iron levels in soybean plants in these cases, and it is recommended to choose soybean cultivars that are less sensitive to deficiencies if your soils are presenting with insufficient iron levels.

Test and Trial

If you are not sure of your soil nutrient levels, testing will give you the definitive answers. And if you are not sure whether micronutrients or small changes in fertilizer might work on your fields, Scott Anderson suggests a field trial. "I am a big advocate of field trials. Trial any application and measure the response. Soils are dynamic—what works for others may not work for you."

bio

Noelle Chorney is a freelance science writer, interpretive planner, content manager, and owner of Tall Order Communications. She can be reached at tallorder@sasktel.net.

CropSphere 2015

Highlights from CropSphere 2015

The second annual CropSphere conference took place January 12-14, 2015 at TCU Place in Saskatoon. Bringing together growers, researchers, and industry, the conference showcased the best in production, marketing, and agronomy information.

SPG's AGM was held as part of CropSphere, on January 12, 2015. Over 150 people attended the AGM.

The Chair of the Audit and Finance Committee for SPG in 2013/14, Tim Wiens, presented the audited financial statements at the SPG AGM. For a copy of the financials, see SPG's Annual Report on saskpulse.com.

SPG honoured the late Guy Lafond with the Pulse Legacy Award at CropSphere. Guy's wife Enid Oddleifson accepted the award.

The Honourable Gerry Ritz attended CropSphere to announce $3.3 million in funding for pulse research projects related to increased utilization of pulse crops.

Keynote Dr. Joe Schwarcz spoke to CropSphere attendees about the importance of science in a society full of misinformation related to the production of food.

SPG and BASF named Ed Seidle of Medstead the Pulse Promoter of the Year, presenting him with the award at CropSphere. Shown here: Chris Vander Kant (BASF), Ed Seidle, Carl Potts (SPG)

Regional Meetings 2015

Highlights from the 2015 Regional Pulse Meetings

Saskatchewan Pulse Growers and the Saskatchewan Ministry of Agriculture held their annual Regional Pulse Meetings from February 2-5, 2015, visiting the communities of North Battleford, Rosetown, Swift Current, and Regina. Topics covered local pulse research, new pulse varieties, faba bean markets, soybean production, root rot and disease in pulses, and pulse market outlooks.

Sponsors of the event were given the opportunity to interact with grower attendees during various networking breaks.

CDC breeders and SPG Directors spent time chatting with growers during coffee breaks.

SPG Executive Director Carl Potts gave growers an update on the organization's revised strategic plan at each of the meetings.

Dr. Yantai Gan shared results from on-going research being conducted at the Swift Current AAFC research centre.

Chris Holzapfel spoke to growers about the findings on the SPG funded pea input study. For more on this project, turn to page 6.

On Point

Lori Chapman Joins SPG Staff

SPG welcomed Lori Chapman to the team in December, in the position of Administrative Assistant. Lori has extensive experience in administrative roles including positions such as Executive Coordinator, Administrative Officer, and Accountant with Saskatchewan Research Council and Vecima Networks.

Pulse Promoter Award

At CropSphere 2015 Ed Seidle was presented with the Pulse Promoter of the Year by SPG and BASF. He has over 60 years of successful pedigreed seed production and 25 years of crop and soil studies. He is the senior partner of a multi-farm family pedigreed seed production enterprise in Medstead, Saskatchewan with his two sons and nephew.

Pulse Legacy Award

SPG honoured the late Dr. Guy Lafond at their Annual General Meeting in Saskatoon in January, awarding him the Pulse Legacy Award. Dr. Lafond was recognized for his significant impact on soil conservation and improvements to prairie agricultural practices. He was an Agriculture and Agri-Food Canada researcher and soil conservationist that, over his lifetime, made significant advancements related to zero-till development and agronomy research that has altered the way pulses are grown in the province.

SPG Board of Directors Profile John Bennett, Director

For the last 36 years, John and his wife Shirley have farmed an average sized farm south of Biggar. They have a diverse rotation with 25 per cent pulses - both peas and lentils. John began early no-till farming in 1988 and introduced peas into his rotations soon after. He has cooperated with several researchers from the University of Saskatchewan over the years with on-farm field research, focusing on environmental issues, soil quality, chickpea inoculants, and germplasm trials.

John acts as the Industry Co-Chair of the Provincial Offset Trading working group. He previously served on the SPG Board from 2005-2010. During that time he served as Chair of the Finance and Audit Committee, Chair of the Research and Development Committee, and as Board Vice-Chair. As a past Director and former Chair with Saskatchewan Soil Conservation Association, John has travelled extensively provincially, nationally, and internationally promoting sustainable no-till agriculture. He also served eight years on the Board of Saskatchewan Research Council.

In 1993 the Saskatchewan Soil Conservation Society honoured John with the Saskatchewan Soil Conservation Farm Family of the Year Award for promoting zero-till production practices. He was named Canadian No-Till Farmer of the Year in 2000 by the Manitoba-North Dakota Zero-Tillage Association. John was also named one of the 12 most influential farmers in Canada by Country Guide in 2010. He has an Honorary Life membership in the Saskatchewan Institute of Agrologists.

SR&ED Tax Credit

For the 2014 tax year, 44 per cent of the Saskatchewan pulse levy qualifies for the federal Scientific Research and Experimental Development (SR&ED) tax credit. For more information on the SR&ED tax credit, visit saskpulse.com.

Upcoming Events

Faba Bean Clinic

March 11, 2015, Melfort

BASF and Saskatchewan Pulse Growers will be hosting a clinic on faba beans. Explore ways to better grow and sell your faba beans.

For details and to register for this event, visit: www.saskpulse.com.

Root Rots in Pulses: Webinar

March 19, 2015, 12 – 1 PM

Join the Saskatchewan Ministry of Agriculture, Saskatchewan Pulse Growers, and the University of Saskatchewan for an update on root rots in pulses. Dr. Sabine Banniza with the Crop Development Centre at the University of Saskatchewan will discuss current disease issues in pulse production and ways to mitigate risk in the field.

To register for this event, visit: www.saskpulse.com.

CICLIS 2015 World Pulses Convention

April 12-15, 2015, Las Vegas

Join some of the world's most influential and knowledgeable industry analysts, researchers, and pulse promoters in Las Vegas, April 12-15, 2015 for the CICILS 2015 World Pulses Convention.

For information on the program, and to register, visit: www.cicilsiptic.org.

Canadian Special Crops Association

June 21 - 23, 2015, Calgary

The 2015 Pulse and Special Crops Convention will be held in Calgary, June 21-23. Network with industry leaders, make new business connections, and learn more about pulse and special crops markets around the world. Early bird registration opens March 3, 2015.

For more information, please visit the Canadian Special Crops Association website at www.specialcrops.mb.ca.

Lentils.™

Midnight Coconut Lentil Fudge

SERVINGS 12 | PREP TIME 10 minutes | TOTAL TIME 15 minutes

WHAT YOU NEED

⅓ cup	(75 mL) toasted sunflower seeds
½ cup	(125 mL) toasted coconut flakes
1 cup	(250 mL) cooked or canned green lentils, rinsed and drained
3 Tbsp	(45 mL) cocoa powder
¼ cup	(60 mL) honey
3 Tbsp	(45 mL) coconut oil

MAKE IT

1. **PLACE** the seeds, coconut, lentils, cocoa powder, and honey into the bowl of a food processor and pulse until smooth. You may need to scrape down the sides a few times. Scoop out into a bowl.
2. **MELT** the coconut oil on low heat on the stove and stir into the lentil mixture. Transfer the mixture into a small parchment lined pan and chill for 3 hours.
3. **ONCE** chilled, cut into 12 pieces.

Nutritional Information **SERVING SIZE** 1 piece

Calories 130, Total Fat 8 g, Saturated Fat 5 g, Cholesterol 0 mg, Carbohydrates 11 g, Fibre 2 g, Sugars 6 g, Protein 3 g, Sodium 0 mg, Potassium 86 mg, Folate 39 mcg

Pulse Grower Profile

Scott Sefton, Broadview, Saskatchewan

How long have you been a soybean grower for?

This is our sixth year growing soybeans. I farm with my father north of Broadview, in the Qu'appelle Valley, where conditions are good to grow soybeans. We got the idea to grow soybeans from Kevin Elmy, a grower and seed retailer from Saltcoats, Saskatchewan. He is a big advocate for the crop and has had success growing them, so we decided to try 140 acres our first time. That first year our soybean crop did not perform that well, only 15 bushels per acre (bu/ac). We were told it was a bad year and to keep trying. The second year we doubled our acres and at harvest they went 40 bu/ac.

What has been your experience with growing soybeans so far?

After that first year, we have had good experiences growing soybeans - it is an easy crop to grow. Soybeans do not really need any fertilizer. We double inoculate the seed, seed 10 pounds per acre (lbs/ac) which is on the heavy side, and then let things go. I may spray them once or twice depending on the weeds that emerge.

The earliest we have had soybeans in the ground is mid- to late May. The latest has been the first week in June. This past year was wet and our soybean crop did get hailed on, but somehow the frost missed the seeds. We were able to average 20 bu/ac this year.

Harvesting soybeans is tough. As far as equipment, you really do need to have a flex header.

> *We have had good experiences growing soybeans - it is an easy crop to grow.*

Are there things that you think are limiting soybean acres grown in Saskatchewan?

One of the barriers we encountered when we first started growing soybeans was the marketability of the crop. There were not many places in Saskatchewan that were buying soybeans six years ago, so they were troublesome to get rid of. When we first started growing them we had to truck them to Weyburn, which is over two hours away, to find an elevator that would take them. Now more of the local elevators are taking soybeans and they are becoming easier to sell.

What is your long-term vision for soybeans, or for pulses?

The more pulses you can get into your rotation in Saskatchewan, the better it is for the soil, and the better it is for producers' pocket books. The more you can diversify your crops, the less reliant you are on one or two crops. You will also get crops that will yield better and hopefully pay you better. Pulses really are a better alternative for producers.

Where could research dollars be best placed to help producers with major production challenges?

It would be nice to see more being invested into the agronomy of how to grow a good soybean crop in Saskatchewan. It is harder to do what we need to with a shorter growing season and cooler temperatures. Variety-wise there are a lot of big companies investing money into soybean varieties that can tolerate the growing season and temperatures in Saskatchewan. That variety investment just needs to be backed up with information and education.

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HERBICIDES

Increase your yields by using Authority and removing weeds early

Kochia and cleavers were put to rest by a group 14 mode of action with extended residual weed control. Lamb's quarters, redroot pigweed, wild buckwheat and others met the same fate. Authority is registered in peas, flax, soybeans, chickpeas and sunflowers.

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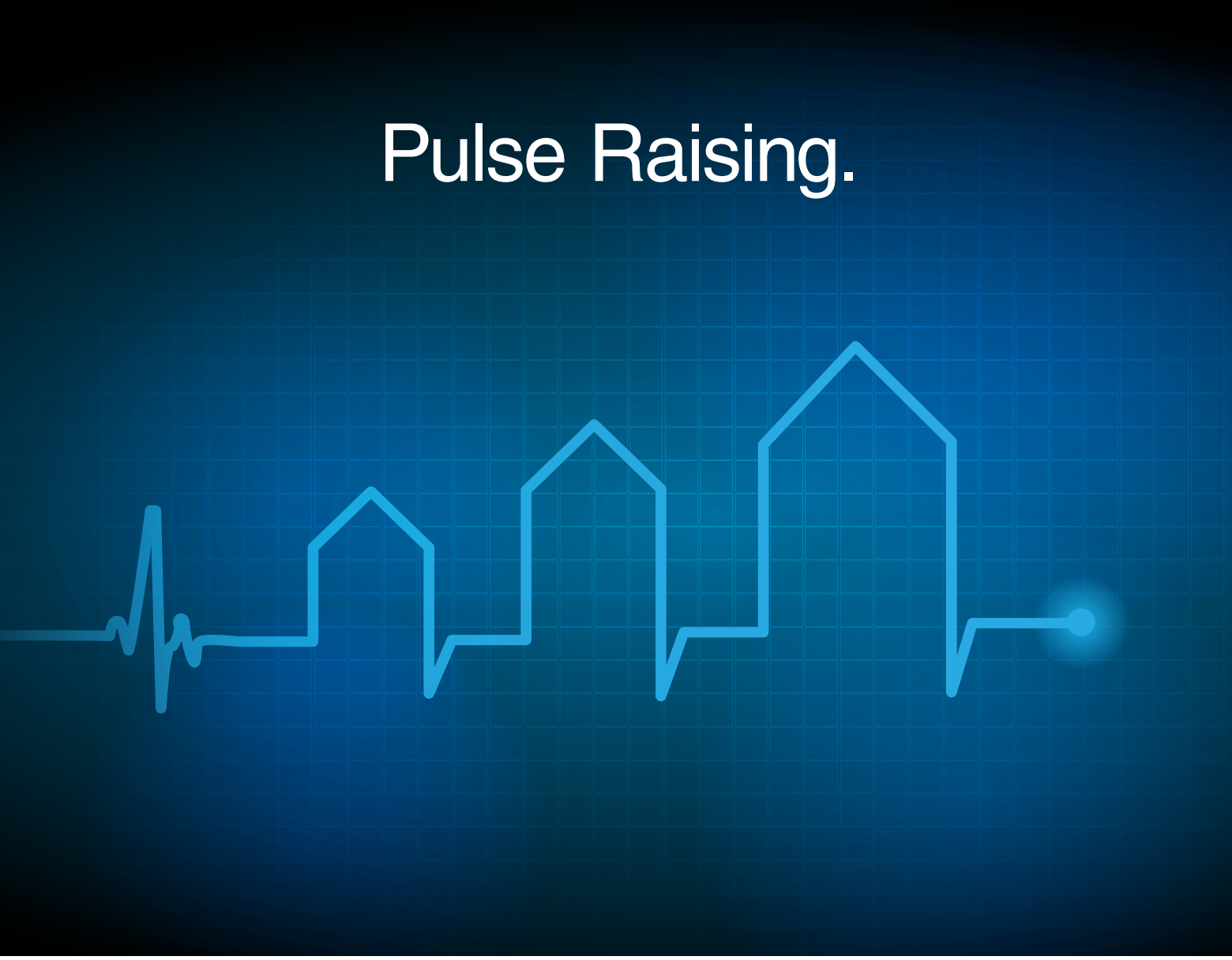
FMC

Pulse Raising.



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TagTeam®

*115 independent large-plot trials in Canada between 1997 and 2012 showed an average yield increase of 8%. Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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