MANAGING GROUP 2-RESISTANT WEEDS IN PULSES ACROSS WESTERN CANADA

Cleavers, mustard, kochia and sow thistle are among the weeds getting harder to control, but there are methods, starting with good agronomy

BY LISA GUENTHER

Group 2 resistance is something that is really a big problem across Western Canada," says Dr. Chris Willenborg, a researcher at the University of Saskatchewan’s plant sciences department.

Willenborg has worked on several research projects that inform weed resistance in pulses. The bad news is that resistance is spreading. And the more farmers rely solely on Group 2s as in-crop herbicides, the more Group 2 resistance will challenge us in the future, Willenborg says.

But farmers still have tools left to manage resistant weeds in pulses. Read on to find out how to best use them.

SPOT RESISTANT WEEDS

There’s no shortage of problem weeds in pulses. Cleavers are “top of mind” for growers in the black soil zone, Willenborg says. And Group 2-resistant wild mustards and kochia are also problems, he says.

“Both of those tend to be problematic in the brown and dark brown soil zones. And a lot of that issue has not been helped with Clearfield varieties, in particular where we’re not necessarily managing the technology,” says Willenborg. Over 90 per cent of the kochia population sampled is resistant in Western Canada, says Willenborg, so farmers should treat all kochia as resistant.

But with other weeds, resistance is more localized.

Willenborg says farmers shouldn’t give up on Group 2s with sow thistle, as resistance is patchy. Resistant cleavers are also spotty, but the problem is growing. Resistant wild mustard is a problem in south-western Saskatchewan. Farmers will know if they’ve got resistant wild mustard in lentils if it “sort of looks like an intercrop with mustard. A lot of those fields, we can assume, have Group 2-resistant wild mustard.”

If a herbicide fails, farmers should look first at the application, says Willenborg. For example, cleavers have a narrow application window, so the weeds may have been out of stage at spray time.

Willenborg recommends scouting a couple of weeks after spraying to examine the weeds. If they haven’t been controlled or are coming back, the

CONTINUED ON PAGE 4
o matter how you feel about our newly elected federal government, I think all Grainews readers can agree on one thing: federal government employees in Ottawa can never really understand Prairie farms.

Before my husband and I moved to southeast Saskatchewan, I had a provincial government job in Regina. I can tell you — life as a Regina bureaucrat is nothing like life on the farm.

I’d grown up on a grain farm, I’d worked for the provincial ag department, and I thought I knew everything I needed to know about agriculture and farm living. This won’t shock you: I was wrong. Prairie farm life is unique.

And I’m talking about the contrast between Regina and southeast Saskatchewan. How impossible would it be for someone living and working in downtown Ottawa to understand everyday life on a Prairie farm?

I won’t pretend to know what it’s like to live in our federal capital. But since spending a few days there in December, I’ve been thinking about things that are wildly different between here and there. It’s not that surprising that, no matter who’s in charge, the ideas coming from Ottawa don’t always fit our needs. Here are four of the most obvious differences.

1. FRENCH IS PARTOUT

As far as I know, partout is French for “everywhere.”

But I know no little French, I had to rely on Google for that translation.

Here in Saskatchewan, my inability to speak French doesn’t impact my life. I can go weeks without hearing anyone utter a French word. On a Tuesday in Weyburn, I’m more likely to hear English or Spanish than French. My son is in third grade, and his class has never been offered any sort of French instruction. We only hear French in my house when someone tries to read out loud from a cereal box.

Visiting Ottawa is like travelling to another country. Signs are bilingual. People in restaurants flip between English and French faster than farmers switch between miles and kilometres. Retail clerks greet me in French, as if everyone is born speaking it.

I was in Ottawa for a meeting with people from all over the country — French and English parts of Canada. Two interpreters spent the day speaking into microphones in a glassed-in room, translating everything so unilingual dopes like me could follow along. I had to wear a large hair-smushing headset while all of the metropolitan Ottawa residents easily switched from “yes” to “oui,” with un-mussed hair.

If I lived in Ottawa, immersed in French, I would have a better chance at picking up the language. Heck, by the end of the meeting, I almost thought I could understand what the French speakers were saying. But for anyone living in a unilingual community, being surrounded by two official languages all day is easy to forget that not everyone understands.

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2. THE HISTORY

Most of our Prairie history survives only in stories. There may have once been a tipi ring, a pioneer’s sod shack and a wagon train rut in the space that I call my front lawn, but that’s long gone.

Meanwhile, there are 25 National Historic sites right in Ottawa. The oldest of these is a home built in 1829. (The oldest standing building in Saskatchewan was built in 1860, the Holy Trinity Anglican Church in Stanley Muton.)

Even if you never darkened the door of an actual historic site, you couldn’t work in downtown Ottawa without looking up at our Parliament Buildings (the oldest part, the West Block, was completed in 1865).

Being surrounded constantly by the stone walls of so many historical buildings would give you a very different sense of what everyday Canadians think of as “normal.”

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4. A LOT OF CIVIL SERVANTS

The 2011 census found 135,865 federal civil servants in the Ottawa-Gatineau metropolitan area. This was out of a total population of just under 1.3 mil- lion. So, if you were in a Tim Hortons with 10 people in Ottawa, odds are at least one would be taking a coffee break from a federal government job. This statistic doesn’t include civil servants working for the province of Ontario, or people mixed up with health care or education.

In all of Saskatchewan in 2011, there were 10,260 federal civil servants.

With so many federal employees in one place, Ottawa also has a relatively high median family income ($71,500). If you lived in Ottawa, it would be easy to forget that not everyone has a full-time well-paid steady job with high-end benefits and a generous retirement package. It’s not like that in southeast Saskatchewan, especially during an oil bust.

For me, Ottawa is a foreign country. It doesn’t matter if our federal politicians come from Calgary, Quebec or Iqaluit. The lives of people living in Ottawa are so different from ours in the rural West that our federal government may never understand our needs. The best we can hope is that they take the time to understand our differences.
Business risk management makes good sense

Business Risk Management isn’t limited to income safety net programs like crop insurance. Managing business risk also includes managing the safety risks that threaten the financial health of farm productions. There are four areas of health and safety business risks that farmers own: include prosecution, economic loss, commodity loss and human resource loss.

A very real business risk for a farm owner/operator is potential prosecution should a work-related injury or illness occur on the farm operation. There are three levels of legal action that a farmer could face: regulatory, civil and criminal.

Regulatory: In most provinces, occupational health and safety laws assume that the farm owner/operator is responsible for an incident, unless the farmer can prove preventive measures and actions were taken.

Civil: If someone is injured on your farm and they believe you to be negligent in providing a safe work environment or have failed in your responsibilities in taking reasonable care to protect the workers on your farm.

Criminal: An amendment made in 2004 to the Criminal Code of Canada set new legal duties for your farm.

In taking reasonable care to protect the workers on your farm.

The real possibility of economic loss is also a major risk to the viability of the farming operation. The Canadian Agricultural Injury Reporting (CAIR) conducted an analysis of the average costs of a farm incident to the farm’s bottom line. If a farm experienced a workplace fatality, on average, it costs a farm approximately $275,000. An injury resulting in a permanent disability? $143,000.

Commodity loss is a bit more difficult to measure. However, if a farmer or a farm worker were to become injured or killed on the farm, the impact to the commodities could be severe. Crops that need planting, fields that need to be combined, grain that has to be moved all need someone to do the work. Livestock needs tending, cattle need to be fed, hogs need to be shipped, and so on. If a depended person is suddenly unable to fulfill the farm’s needs these commodities suffer. Depending on the kindness of neighbours and family members only goes so far.

The loss of human resources is a major factor in business risk. A sudden loss of a worker, as a result of a workplace injury or illness, has a significant impact on the worker, the farming operation and the social well-being of the people working or living on the farm.

We don’t yet know what to expect this winter, or how heavy the snowfall will be. A good snow covering could help replenish your soil’s moisture stock, leading to fairly good seeding conditions come the spring.

Due to the wet fall we’ve had in many parts, winter annual weeds may have already had anywhere from a one-month to three-month head start on growth. That’s why it’s important to get out there and scout your fields before your spring glyphosate burn.

We also had a pretty healthy canola acreage this past year, which could translate to a lot of volunteer canola in the spring. If last year’s canola yields were surprisingly good, you can bet there still be a healthy volunteer canola crop coming up as weeds.

Most farmers already work very hard at making sure their farm is a safe place to work. Hazard and risk assessments are done, conversations about safety issues are had, and an overall commitment to safety is understood. Or… is it?

You may know the hazards, risks and dangers. You may have felt like you’ve communicated with your workers or family members about specific hazards, you may feel like your farm is as safe as it can get. But sometimes, if we are not purposeful about making sure that we’ve communicated and made a specific point to making sure that hazards, risks and dangers are discussed, talked about and planned for, others may not understand.

By implementing a written safety plan, taking the time to do tail-gate safety meetings and making sure that you’ve done your due diligence, you can protect yourself and your farm from the business risks associated with farm injuries. If you are interested in knowing more about developing a farm safety plan, please visit casa-acsa.ca or call 877-452-2272.

By Carson Demmans and Jason

This agronomy tip was brought to you by: Rob Klewchuk, western technical lead, with Syngenta Canada.

You might be from the Prairies if…

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You went to a school where gun safety was one of the classes that was offered.

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herbicide may have failed. In that case, the best thing to do is send a sample to the crop lab, Willenborg says. If farmers can find an effective product that's still on label, they can spray again.

“Let’s think of where you can get into a bit of trouble. With some of the crops in a group, in a lot of the products are out of scope or the crop’s too large to have it applied.”

START WITH GOOD AGRONOMY AT SEEDING

Willenborg quips that there are 29 modes of action, not 28. “And the 29th is good agronomy. Good agronomy goes a long way to managing resistance.”

Highest seeding rates are part of that good agronomy package. To manage resistance, pea growers using shorter rotations have rates higher than the general recommendation. “We really think that you need to be in that 90 to 100 plants per metre square if you’re targeting a competitive stand.”

When it comes to row spacing, Western Canada is sliding backward, says Willenborg. But he acknowledges that there are practical reasons for wider spacings.

“The fewer openers, the fewer weeds we have on our drills, the less horseradish required, the bigger our drills can make them, the more land (we can cover).”

Many row spacing studies are done in the absence of weeds, says Willenborg, and that concerns him. “We can grow things on 30-inch rows. We can grow things on 50-inch rows. But when you factor weeds — and in particular resistant weeds — into that equation, you’re going to get results that are very different. You’ll have much wider, open rows. And we know that narrowing the row spacing actually results in better weed management.”

The bottom line is that wider rows put more selection pressure on herbicides. That means farmers need excellent weed control. “Otherwise, you’re giving the opportunity to the weeds to have a large space of light.”

ROTATING VERSUS MIXING HERBICIDES

Rotating modes of action is critical, says Willenborg. Producers using a two-pass system should rotate within one crop group this year, he adds. “That second product, that in-crop, really needs to be another mode of action, or at the very least, a herbicide mixture.”

Using herbicide mixtures that contain different modes of action is key. Such mixtures are actually more effective than chemical rotation alone at reducing resistance. That’s because it’s impossible to run two weeds into trouble with two different herbicide modes of action.

“With two different modes of action in your spray tank, you’re actually enhancing the competitiveness of the mixture,” Willenborg says. “You’re really getting a ‘cloud’ of activity that’s going to be much more competitive.”

PLAN YOUR ROTATION

Group 2 resistance in peas is a critical issue to most farmers, Willenborg says. He advocates setting up rotations to control resistant weeds prior to the pulse crop coming into rotation.

One strategy is to grow herbicide-resistant canola to control Group 2-resistant weeds. Willenborg suggests skipping a cereal crop between the canola and pulse to alleviate disease issues. Both oats and barley are good options because they’re very competitive. “If you want to play a major role in limiting weeds, you need to have Group 2-resistant weeds, but only one of those mixtures has good efficacy,” he adds.

Cereals also allow farmers to use herbicides from other groups — such as Group 45, 66 and 276 — to control some of the Group 2-resistant weeds. “That’s where farmers have got a lot of options to control a cereal into that rotation prior to (the pulse).”

Perennials and cover crops are going to have to play a major role in dealing with herbicide resistance, Willenborg says. The argument against cover crops has always been their moisture use, says Willenborg, but some farmers have seen excess moisture in the last few years. “Perennials can provide tillage raddle, annual ryegrass and blends.

“Adding perennial crops to the rotation, I think, critical because they suppress seed production,” says Willenborg. That’s good news for farmers dealing with resistant weeds, with the exception of wild mustard. Willenborg says researchers have documented wild mustard seed survival for 15 to 20 years.

Willenborg suggests alfalfa because it’s easy to fit into an annual cropping system — and perennial crops also can be grown in wider open rows. And we know that narrowing the row spacing actually results in better weed management.”

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PICK COMPETITIVE VARIETIES

Willenborg and his colleagues are pushing for seed guides to list weed competitiveness so growers can pick competitive pea varieties.

But Willenborg and his colleagues have researched weed competitiveness in peas, and one of the reasons that smaller ones, they did find a few more competitive varieties.

“Varieties like CDC Patrick, CDC Dakota, and Centennial all tend to have a greater competitive ability than some of the varieties like Warden, Camay or Stutzus,” says Willenborg.

Pea growers wed to weakly competitive varieties can mix in a highly competitive variety to boost performance, Willenborg says. But varieties in the middle won’t see much benefit unless farmers are growing with a 70/30 mixture, he says.

One caveat with vertical mixtures is to think about the end use when selecting varieties. Willenborg says. For example, don’t mix yellow and green peas.

Willenborg’s pea variety research is due to be published in Weed Science in the new year.

LAYER YOUR HERBICIDES

Giving up on herbicides is a knee-jerk response to resistance. Instead, farmers should try to start with clean fields, says Willenborg, and layering herbicides is one way to do that.

“It’s estimated that only 20 per cent of fields see a pre-emergence or pre-plant herbicide. Yet these are key to managing resistance because they help to keep the weed population low for the in-crop application.”

Willenborg says they’ve found applying a residual herbicide pick ban can kill the weeds if clean, then they can apply an in-crop herbicide. Willenborg says one farmer doesn’t apply a residual because they don’t see many weeds that early. But residuals are more effective on weeds before emergence, and they can play a major role in limiting weeds, he adds.

Residuals are also a useful tool for farmers dealing with cleavers in the black soil zone. Typically, farmers will hit Group 2-resistant weeds with a Group 4. But once organic matter tops six per cent, Group 14 products tend to use their efficacy.

In such conditions, the Group 14s might come close to suppression, but never control, says Willenborg.

But growers in the black soil zone can start by applying a pre-emergent such as Edge. Authority or Heat, Willenborg says. By coming back in with something like Viper, they could get 90 to 95 per cent control, he adds.

“We don’t obviously strongly advocate fighting resistance with more herbicides. But if you’re able to come in with a residual herbicide that’s a different mode of action than your in-crop, and both of those have grassy start, your resistant weeds, I think you’re going to end up with really good weed control.”

STOP SEED PRODUCTION AS A LAST RESORT

If all else fails, farmers can focus on stopping seed production.

Growers have typically resorted to moving that patch, that easier to do in cereals than pea, should not be a patch, although that’s easier to do in

Canadian farmers can look to Australian growers for methods. For example, if the weeds pop above the crop canopy, farmers can hit them with a cutter bar, in a process called topping. Willenborg says the University of Saskatchewan recently bought a comb cutter through the USDA. It works like a sickle bar, cutting the heads of anything taller than the crop canopy. It doesn’t damage the crop and prevents seed production. Willenborg adds.

Weed picking is also a possibility. Farmers will need a tank mounted to the tractor and a long picker that’s saturated with a systemic herbicide, such as glyphosate. The sticker touches the weed above the canopy, brushing herbicide on the plants. The systemic herbicide moves through the plant. Willenborg cautions that weed picking wouldn’t work with a contact product.

Despite the problem weeds pulse producers face, Willenborg is still relatively optimistic. “I’m not prepared to give up on Group 2 technology. But you have to be aware of whether you have those weeds in your field.”

Information on sending samples to Sask’s Crop Protection lab is online at agriculture.gov.sk.ca/Crops/Protection_Lab. A guide also lists herbicide resistance- using Crops/guide/services/.

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Cover Stories

PULSE PRODUCTION

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Researching root rot control in peas

Evaluating the benefits of seed treatments, soil amendments and soil tests

BY LISA GUENTHER

T here's still a lot to learn when it comes to managing root rot, especially aphanomyces. Yet, are seed treatments most effective? Do soil amendments help? And how can soil testing help farmers pick the best pea fields?

Researchers in the province are underway to answer these very questions.

Dr. Syama Chatterton, an Agriculture and Agri-Food Canada (AAFC) researcher based in Lethbridge, is collaborating on two projects that promise to shine light on management practices around aphanomyces and fusarium root rot.

Researchers on the first project are studying how seed treatments and soil amendments affect disease and yield in fields infested with aphanomyces and fusarium root rot. They're also screening pea varieties to see how they fare when exposed to aphanomyces.

Chatterton's collaborators include Dr. Mike Harding and Dr. Robyne Bowness with Alberta Agriculture and Forestry, plus Dr. Bruce Gossen, with AAFC in Saskatchewan. Together, they're running trials at seven Alberta sites and one near Saskatchewan. All the sites, except the one at Lethbridge, are in farmers' fields. The sites have high aphanomyces levels, distributed uniformly over the field. Only the Lethbridge research centre site has fusarium root rot.

Confidentiality agreements prevent Chatterton from specifying all the seed treatments being studied. But Intego Solo, registered for aphanomyces, is one of them.

"Basically we're look at seed treatments that had active ingredients against the whole root rot complex. So that's fusarium, pythium, rhizoctonia and aphanomyces," said Chatterton.

Researchers are also looking at soil amendments reported to work against aphanomyces. That includes lime, along with Phostrol (a phosphorus acid used as a fungicide) and the herbicide Edge (a Group 3 herbicide with active ingredient ethalfluralin).

Pea varieties being screened include about 20 commonly grown cultivars that are already registered. Chatterton said because aphanomyces is new to Alberta and Saskatchewan, these cultivars hadn't been screened before.

To measure the early effects of treatments, particularly seed treatments, Chatterton and her colleagues rate disease severity a few weeks after seeding. A second rating at flowering or early podding evaluates the treatments when the disease is most severe. They also take NDVI measurements throughout the growing season to measure the treatments' effects on shoot health. Finally, they assess yield in thousand seed weight.

EARLY SEASON RESULTS ENCOURAGING

Chatterton said the early season results from the seed treatments and soil amendments were encouraging. Visually, the roots from some treatments looked much healthier than others. But by the growing season's end, root rot severity was the same across all treatments, she said. Some treatments saw improved yields, but those improvements weren't statistically significant, Chatterton said.

Chatterton cautioned that it's only the first year of a three-year study, and so it's too early to make recommendations.

"Because 2015 was such an unusual year as well, these unusual environmental conditions can sometimes affect what the results are," she added. For example, they had a site near Drumheller that was so dry, they weren't able to take the trial to yield. She hopes to share results after the second year of the trial.

Chatterton said she'd like to continue the study beyond three years to see whether different management practices work better as the inoculum levels drop. The current trials are funded by the Alberta Crop Industry Development Fund, the Alberta Pulse Growers, and Agriculture and Agri-Food Canada.

Soil testing helps farmers with aphanomyces

Chatterton and Dr. Sabine Rannizza from the University of Saskatchewan are also developing a soil test for producers struggling with aphanomyces.

Chatterton said the soil testing project is piggybacking on the other management trials. The study looks at not only how much inoculum is in the field, but also "at what level of inoculum will each of these management strategies be effective," she said.

The project will address practical questions, such as how many samples farmers would have to collect to gauge aphanomyces risk in a given field. Chatterton said they've started collecting from areas known to be infested with aphanomyces, plus low-lying areas prone to water saturation. They then move out sequentially from those areas to see how far out producers would have to go.

2015 marked the first year of the three-year project, funded by the Saskatchewan Pulse Growers. Chatterton hopes to share results by the end of the third year.

"And again, we're looking at three different soil zones because early results are suggesting there might be differences in inoculum potential in different soil zones."
FARM SAFETY

Bin safety starts with grain quality

Train yourself and your farm employees to avoid tragic grain bin accidents

BY MELANIE EPP

Every year we heat tragic stories of deaths associated with grain bin entrapments. Despite continued efforts, the accidents keep happening. While it’s always good practice to remind farm staff of grain bin safety protocols, injuries and deaths could be dramatically reduced simply by eliminating their number one cause: storing out-of-condition grain.

“Virtually all entrapment events occur due to out-of-condition grain,” says Gary Woodruff, conditioning applications manager at GSI in Assumption, Illinois. “You don’t need to go into a bin if the grain is in good condition.”

What exactly is meant by good condition? According to Woodruff, it’s important to store your grain at the right moisture level, but that level will depend on what your plans are for it. For instance, grain that will be shipped in the spring should be stored at 15 per cent moisture, which grain that will be shipped next fall should be stored at 14 per cent. Grain that will be stored for longer than one year should be stored at 14 per cent moisture. “Reduce each by one per cent if grain is not excellent,” says Woodruff.

Woodruff also recommends taking out multiple cores of grain, enough to create a nine-foot diameter cone at the top of every 10 to 15 feet of depth as the bin is filled. Run aeration fans for five to 10 days after the bin is full, he says. This will help equalize kernel-to-kernel moisture. Aeration can be used to lower grain temperature, and taking it down to 10 C will help combat insect activity and mould.

“Use the right amount of aeration at,” warns Woodruff. “Too much is as bad as or worse than too little. Aeration in a large bin will not hold high-moisture corn or reverse or stop a grain condition problem that is already in place. Only moving grain will help at this point, so follow the rules to prevent issues.”

Finally, Woodruff says it’s important to follow local university recommendations for aeration during storage, as conditions will vary depending on local weather and climate conditions.

Westeel general manager Bruce Allen agrees that out-of-condition grain is the No. 1 leading cause of grain bin deaths and accidents. And corn, he says, is particularly prone to problems. “The best way to prevent accidents is to detect and deal with the problem early, before it escalates into something major,” he says. “This is why early-detection practices, such as temperature monitoring, are utilized. Once detected, the problem can be appropriately dealt with using aeration, drying, etc.”

A ZERO-ENTRY GOAL

Allen says that in 2010, the Occupational Safety and Health Administration in the U.S. issued a letter to all commercial grain installations advising that there had been too many associated deaths in the industry. They were warned that appropriate measures must be taken to minimize the deaths and accidents associated with grain bin storage. The letter, says Allen, sparked a lot of activity.

“Today, you go to any industry conference or trade show and everyone is talking about and offering safety solutions, such as training and equipment,” he says.

While training and equipment will make entering the bin safer, the goal should be zero entry, he says. When entry is required, training is a must. Use proper procedures and appropriate safety equipment, and always have a person outside monitoring. Good practices, he says, involve working with personnel who:

• Are aware of the dangers and the steps that can be taken to mitigate the hazards.

Most grain bin entrapment accidents occur due to out-of-condition stored grain.

• Understand and practice lockout procedures, tie-off procedures, external monitoring procedures and communication procedures.

• Use harness and fall protection and arrest equipment that is properly secured. When asked if personnel should attempt a rescue should an accident occur both men were clear: No.

“First responders are trained in a variety of hazards and methods to deal with dangerous environments,” says Allen. “If a problem is minor, there may be a safe way for a producer to remove the threat or deal with a problem. However, again, lack of training could turn a minor problem into a major problem if proper procedures are not followed.”

Woodruff agrees. “Call 911 and let emergency personnel handle the rescue to prevent making the situation worse or getting someone else entrapped,” he says.

Melanie Epp is a freelance farm writer.

What’s your Next Move?

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Phosphorus can drain off the soil during snowmelt. Periodic tillage may reduce the losses. Zero tillage can increase P loss.

Features

Zero tillage can increase P loss

Phosphorus can drain off the soil during snowmelt. Periodic tillage may reduce the losses. Zero tillage can increase P loss.

By Julienne Isaacs

The latest soil-management recommendation will come as a surprise: In some cases, producers should consider periodic tillage to reduce the risk of phosphorus (P) loss from conservation tillage systems.

According to Don Flaten, a professor in the University of Manitoba’s Department of Soil Science, zero tillage actually increases P loading from soils to surface water — P that drains off the land each spring during snowmelt.

Flaten says much of the research contributing to best management practice (BMP) recommendations for conservation tillage has historically been done under non-Prefert conditions, examining rainfall runoff rather than spring snowmelt runoff. In the Prairies, 80 per cent of our runoff occurs during snowmelt.

“Because the process of snowmelt runoff is so different from rainfall runoff, the fundamental controls on those two runoff systems are completely different, especially when it comes to nutrient loss,” he says. “When summer rainfall is occurring, it’s more evenly distributed and soil is thawed, so there’s infiltration, and the vegetation is growing and alive.”

Flaten says soils are actually very efficient at retaining vegetative P during the growing season. When P washes out of vegetation during summer rainfall events, very little of that P will make its way into surface water, he says.

By contrast, snowmelt runoff occurs overtop frozen soils that do not allow infiltration. Vegetation is dead or dormant, and does not intercept water or nutrients. Instead, they “bleed” into runoff water.

One runoff simulation experiment done under laboratory conditions in Pennsylvania examined runout P in a soil tray containing manured soil and a cover crop, says Flaten. Under room temperature conditions, the cover-cropped soil “did a great job” of intercepting P and reducing erosion. But when the soil and cover crop were frozen, P losses were 10 times greater than when there was no cover crop. The experiment “completely flipped a BMP into a bad management practice from a P loss perspective,” says Flaten, despite the many other benefits of cover cropping.

SURPRISING FINDINGS

Flaten and colleagues at the University of Manitoba, Agriculture and Agri-Food Canada, Environment Canada and the Province of Manitoba, as well as local farmers, have been conducting research at the South Tobacco Creek Model Watershed for many years. He says they’ve learned much that has come as a surprise to the research and extension community.

“When we look at biophysical measurements, we’ve found that zero tillage, although it has lots of benefits and reduces sediment and nitrogen loading, increases P loading,” he says. “Periodic tillage, or intermittent tillage in the fall, can reduce the amount of P loss from those conservation tillage systems.”

The researchers have made other surprising findings: perennial alfalfa forage fields lose, on average, approximately 2.5 times more P than cultivated annual fields. They are also examining the effects of baling grazing on nutrient loss.

“A variety of practices have been evaluated, and we frequently come up with findings that don’t match conventional thinking. But all of these differences have to be considered in light of the very different process we have in the Prairies,” says Flaten.

This isn’t to say producers should throw out the BMPs with the runoff water. Flaten says there are many other benefits to BMPs that should be retained.

“We certainly want to minimize the buildup of soil test P in our soils, and we want to practice conservation tillage in a way that protects us from erosion,” he says. “But one of the most important things to remember is that a lot of our BMPs have a wide range of benefits. There may be detrimental factors associated with those BMPs, but we don’t want to throw away the benefits because we’re focused on P loss.”

The answer is not eliminating conservation tillage, but fine-tuning BMPs to minimize trade-offs. Examples of other BMPs that are important include managing inputs and timing with respect to P fertilizer management, applying P after snowmelt and injecting nutrients whenever possible.

Producers can also minimize green vegetation material that’s susceptible to large losses during the snowmelt event. “For example, in our alfalfa trial, if we had harvested some of that alfalfa in October it wouldn’t be hanging around waiting to get into trouble during spring snowmelt losses,” Flaten says.

Other potential solutions include storing water upstream in wetlands or reservoirs that can be recycled and reused on agricultural land. “As we start seeing more long-season crops like soybeans that do better with a good supply of late season moisture, maybe there’s an opportunity to put that stored drainage water back on top of nearby land and increase yields,” he says.

“But to put all of our faith in one water-management practice, let’s say re-establishing wetlands with no economic return—it’s unlikely farmers will move very far in that direction. We’re trying to come up with market-driven solutions for water management.”

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The answer is not eliminat-
The case of the struggling canola

BY JACLYN PHILLIPS

ack in July, I got a call from Ed, who grows mostly wheat and canola on his 5,000-acre spread at Melita, Man. He’d recently driven by one of his fields planted with an InVigor hybrid canola and was alarmed to see the crop wasn’t doing well. Half of the plants had slightly browned and crisped up, and Ed asked if I could come out to have a look for myself.

When I arrived at Ed’s farm, I could see that plants on one-half of the 320-acre field had turned yellow-brown and were stunted and struggling to bolt. The canola in the unaffected half of the field was doing just fine, and there appeared to be a clear delineation between it and affected crop. I also noted there were strips within the affected half of the field where the plant symptoms were showing up more intensely as well.

I wondered if Mother Nature could be to blame. It had been a fairly wet summer up to that point, with some farmers having to deal with flooded fields in the area. I also considered whether the problem could be due to some kind of nitrogen deficiency, and I had Ed fill me in on his fertility program. I also inquired into the planting history of the canola field.

Ed asked me if I thought the problem might have something to do with his herbicide application, as the ailing plants first showed symptoms about a week to 10 days after the half section had been sprayed. He had been worried about falling behind on his herbicide applications on the farm and was in a hurry to get the canola done. This particular field was the first of the canola to be sprayed.

That prompted me to take a look at the area of Ed’s yard where the spraying equipment and products were stored. I noticed there were both Liberty and glyphosate barreled there, and I wondered if he might have rushed the sprayer cleanout process. But Ed informed me that he hadn’t even been able to do a pre-seed burn-off that year because of the poor planting conditions.

By this time, I had a good hunch what might be causing the burn-off that year because of the poor planting conditions. Dan’s field preparation included the use of additional nutrients that were precisely placed with seed. An in-crop application of glyphosate was also utilized to control the perennial forage volunteers, boosting the canola crop’s ability to compete. These measures were followed by some timely rainfall, and a bit of time spent in the field with a gopher helping Dan manage the rodent issue.

Fortunately for Dan, there was a happy ending to this story. The problems with the crop were caught in the nick of time and the grower, after working the soil to break down lumps and smooth out gopher holes, was able to successfully reseed the field with a glyphosate-tolerant canola variety.

I also noticed there were strips within the affected half of the field where the plant symptoms were showing up more intensely.
Manage root rot before seeding
Saskatchewan plant disease specialist recommends good agronomy to reduce root rot

BY LISA GUE Th ter

Lentil and pea growers struggling with root rot need to manage the disease before the seed is in the ground, according to Saskatchewan Agriculture’s plant disease specialist, Lisa Dokken-Bouchard.

Fusarium, pythium, and rhizoctonia are root pathogens long familiar to farmers. But aphomy- 
ces is a relatively new problem, only detected in Saskatchewan in 2012.

“It probably was widespread and prevalent before,” said Faye Dokken-Bouchard told farmers at Canadian Western Agribition’s Grain Expo. But with fewer fields and less monitoring, the pathogen didn’t cause dis- ease symptoms in the field until Saskatchewan had years of excess moisture, she added.

And the disease isn’t going anywhere. Aphomyces spores can survive for a long time in the soil. Excess moisture in the future will put infested fields at risk again, Dokken-Bouchard told farmers.

IDENTIFYING THE ROT

Stunting, yellowing plants are above-ground symptoms of root rot. Poor root growth, poor nodulation, and rotting roots are also signs of pathogens.

“But it’s also important to note that excess moisture can often cause these types of symp- toms on its own. And then if you add a combination of wet feet along with diseases, then you’re going to have an even bigger issue,” said Dokken-Bouchard.

Management OPTIONS

Akered whether tillage could help manage disease, Dokken-Bouchard said it depends on the crop and the pathogen. Some research has shown tillage helps because it breaks down residue faster, or buries the spores.

“But then on the other hand, it might bring some inoculum back up to the surface and make it more accessible,” said Dokken-Bouchard. And losing the benefits of reduced tillage might not justify any potential reduction in inocu- lum, she added.

“So it’s not really yes or no. It’s kind of maybe.” Dokken-Bouchard recommended farmers test seed for disease and germination. Depending on the dis- ease level and type, farmers may not want to use the seed at all. Seed treatments are available for root rot pathogens such as aphomyces, rhizoctonia, fusarium and pythium.

“But you have to keep in mind that with all of these diseases, they might be in the crop residue or in the soil as well. So even if you have low levels of disease on your seed, you could still have disease issues,” said Dokken-Bouchard.

Crop rotation is “critically important” to managing disease, said Dokken-Bouchard. Fields with aphomyces should see a six-year break from peas, lentils, and other hosts. Other susceptible crops include alfalfa, dry beans, and some red clover varieties. Chickpeas and fababean s are generally less suscep- tible to aphomyces.

Field selection is also an important way to manage aphomyces. Dokken-Bouchard advised farmers to consider previous issues, moisture levels, differences in soil, and compaction. Waterlogged soil and compaction favour the dis- ease. Heavily textured soil is more likely to suffer from waterlogging and compaction.

Asked whether farmers can soil test for root rot pathogens, Dokken-Bouchard said labs such as Discovery Seed Labs do those tests. But interpreting those levels is tricky right now, she said.

“Good agronomy, including weed control and fertility, also help bolster the crop against root rot. Alberta Pulse Growers suggests considering starter N in soils that have less than 15 pounds per acre in the top 12 inches.

Phosphorus is a good idea if seed- ing into cool soils early in the sea- son. Assuming adequate moisture and narrow openings, maximum safe rates of seed-applied P for lentils are 25 lbs./ac., and 20 lbs./ac. for peas, states the Alberta Pulse Growers’ factsheet.

Such practices help the crop get off to a good start “so that it’s not going to be stressed out and more susceptible to all kinds of disease issues,” Dokken-Bouchard said.

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FACT #5: Good agronomy, including weed control and fertility, also help bolster the crop against root rot.

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U of S prof points out that the option was allowing other carriers on CP and CN lines

**Features**

**GRAIN TRANSPORTATION**

**Rail revenue control a compromise**

U of S prof points out that the option was allowing other carriers on CP and CN lines

**BY LISA GUENTHER**

When it comes to understanding the present state of Canada’s grain transportation, it’s worth knowing a little history.

Back in the late 1990s, Justice Willard Estey chaired a grain handling and transportation system review, and recommended more rail competition, including open running rights. Canadian Pacific proposed the Maximum Revenue Entitlement (MRE), otherwise known as the revenue cap, instead.

“That fact tends to get lost in all this debate,” Dr. James Nolan says. Nolan is a professor with the University of Saskatchewan who researches transportation policy. He tapped out an email in response to an earlier Grainews article on myths and facts of the MRE.

The MRE is not perfect, but has worked reasonably well for both sides, says Nolan.

There are two primary ways to improve things in a concentrated industry, or a natural monopoly, like rail, he says. One is to encourage competition through new institutions such as open access. Open access would allow other carriers to run on CN and CP’s lines.

The other way to improve the transportation system is to regulate rates, Nolan writes. Under this system, CN and CP’s rates would have to be close to the rates of a similar, competitive company. But these rates would be below full cost recovery, and so the government would need to subsidize the revenue difference for the railways.

“In fact, this is essentially the old regulated system we used before the MRE — and while shippers were happy with it, railways were not,” Nolan writes.

MRE sits between these options. “Neither shipper nor carrier are fully satisfied by definition as it is a middle ground policy,” says Nolan. Under MRE, rates are below monopoly levels, but above competitive levels, he adds. It’s designed so that railways recover all their yearly operating costs, and more, he writes.

Overhead and capital costs might or might not be fully covered under MRE each year. But Nolan thinks the railways are doing well under the cap, given their recent expansions and CP’s attempt to buy U.S. railway Norfolk Southern.

“I guess in their minds they could do better.”

Nolan think railways mess with levels of service to try to game the system. Under MRE, the less they move, the more they charge for what they do move, he explains.

“But CTA enforcement has kept this sort of strategizing mostly in check, so far,” he adds.

Regulatory policies such as the MRE are rarely used elsewhere, Nolan says. He sees the MRE as an economic experiment that has worked “reasonably well” for both shippers and the railways.

**HOW TO MAKE IT BETTER**

All that being said, Nolan isn’t necessarily the MRE’s biggest fan.

Although the policy is working better than he thought it would when it was first implemented, he sees it as “a second-best solution to a fully deregulated market.”

Caution that “deregulated market” doesn’t mean rail roads should be free from all regulations like other industries. That’s because the cost structure of rail is like rail, a monopoly by nature,” Nolan says.

The larger the railway, the lower the cost per unit, he explains. These economics are what transformed rail from an industry with

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**Open access in the United Kingdom**

Not every rail industry operates the way Canada’s railways do. In the United Kingdom, rail freight has been open access for several years. There are several registered freight carriers that compete with each other for business.

A white paper authored by Tony Lodge of the Centre for Policy Studies notes that over a 10-year period, rail freight companies have cut unit costs by 35 per cent. The U.K’s passenger operations, most of which are not open access, increased costs by 10 per cent.

The U.K.’s rail freight was privatized in the 1990s. Since then, the industry has catered to growing container traffic as its traditional market, such as locally mined coal, have shrank. Lodge writes that if freight companies had been granted exclusive “franchises,” they wouldn’t have had the flexibility or incentive to adapt to the market changes.

Freight traffic has grown by 50 per cent, in tonnes, since rail freight was privatized. And they’ve cut it in half, he adds.

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many railways competing to a monopoly-like structure, he says.

Nolan would like to see two things to improve the system. The first is a full costing review. The last costing review was in 1992 and much has changed since then, he notes.

“I believe what that will reveal is that even under MRE, the railways are making a lot of overhead versus their actual costs of moving grain,” Nolan says. “This would take the wind out of the sails of those who side with removing the MRE.”

He also believes the gap might be so large that farmers would want changes to the MRE in their favour, “which is exactly what the railways don’t want,” he adds.

Next on Nolan’s wish list is to try full reciprocal switching or open-access systems, but perhaps only with grain. This is basically what CP offered “as a quid pro quo to get their takeover bid to work with U.S. regulators,” Nolan says. In its proposed merger with Norfolk Southern, CP said it would allow other carriers to use its tracks if its own service was inadequate or rates not competitive.

Nolan says such a policy would create “marginal competition” in the rail industry, especially for captive shippers. And rates would still have a market cap, he adds.

“What (CP CEO) Hunter Harrison is telling us by even suggesting this is that he thinks even with possible fringe competition, there would not be ubiquitous access by other competing railways, which is something I have always also believed,” he says.

“It is my understanding that back in the late 1990s when this issue cropped up, CP had at least one VP who believed they could make money under access by charging competitors to use CP track in those instances when a shipper called for it,” says Nolan.

But the industry quickly shot down that idea. Nolan thinks it was a gut reaction to what the industry perceived as more regulation.

“I wonder if Hunter Harrison has had his guys revisit open access and found that it could work under reasonable assumptions. My own research agrees with this conclusion.”

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Lisa Guenther is field editor for Grainews based at Livelong, Sask. Contact her at Lisa.Guenther@fbcpublishing.com or on Twitter @LtoG.
Jim Radtke may not be a gene whisperer, but his California-based plant genetics company, Cibus, has developed technology that allows it to communicate with and influence plant genes to produce desired traits.

Whether it be something like herbicide resistance, or drought tolerance in field crops, or producing a different-colored petal in a flower, as examples, the process known as gene editing doesn’t introduce anything foreign into a plant gene, says Radtke, a Cibus vice-president.

“It is not GMO”, he says. Rather the patented technology relies on the plant’s own natural process to accomplish a “change” which hopefully is the desired new trait. Working with very essence of DNA, Radtke says one base change, changing one nucleotide, is often sufficient to produce the desired new trait. “In the very simplest of terms it is like placing a template in the gene which tells the plant what to do,” says Radtke.

“This process could take place naturally in nature over time, so our gene editing technology becomes an alternative to GMO plant breeding programs.”

Cibus has already used the technology to develop a herbicide-resistant canola they hope to introduce to Canada in 2016, and Cibus is looking to work with any seed or chemical company interested in developing crop varieties with specific traits.

NATURAL “REPAIR” JOB

Without getting too heavy on the science side, Cibus scientists use molecules — gene repair molecules — to create a “structure” in a plant gene. To the cell, this structure might be viewed as a typographical error in the way in which the gene is spelled. To correct the spelling, these “errors” also known as “mismatches” are repaired by natural enzymes using the plant’s own DNA. A single change in the genetic code is enough to repair genes and in some cases create new valuable plant characteristics, or trait.

“It is a natural process and we want to take advantage of that,” says Radtke. “We actually add a piece of DNA to the cell, which creates the mismatch or that mispelling. When that happens the enzymes say we have to repair something here, and they move to repair it. And at least 50 per cent of the time they repair it the way we had hoped. The DNA we enter into the cell only acts a template, it shows the plant DNA how we want to change it, but it doesn’t enter into the change itself.”

In further explaining the difference between gene editing and genetically modified breeding programs, Radtke pointed to BT corn as an example. He was involved in the original BT breeding programs back in the day. With BT corn, the Bacillus thuringiensis gene is a soil-borne bacterium that was inserted into the corn plant to control pests. While it is effective technology, it would not occur naturally, so it is a genetically modified process.

On the other hand, Radtke points to weeds that come under pressure from herbicides and they naturally change to develop resistance to that herbicide. “A weed comes under that selection pressure from a herbicide, so then they mutate and change so they develop a resistance to that herbicide,” says Radtke. “In a very general sense that is what gene editing does. We introduce material into the gene, which...
causes the plant to respond and change, and hopefully the change produces a desired trait.

**SU CANOLA VARIETY**

Cibus has already used the gene editing technology to develop SU canola, the first non-GMO canola resistant to sulfonylurea chemistry. The SU canola partnered with a product called Draft herbicide has been registered in the U.S. Cibus hopes to introduce the product to Canadian growers in 2016. It becomes another option for growers on several fronts, says Radtke. SU canola is a non-GMO herbicide-tolerant variety, which in itself might create some marketing opportunities. It is tolerant to different chemistry, which makes it option for farmers looking to extend herbicide rotations and reduce risk of weeds developing herbicide resistance.

Cibus is looking to work in the Canadian and global market in various ways. Radtke says the company will be looking to develop specific plant traits it can market itself, but it is also interested in working with seed and crop protection companies as a partner. "We can work with another company and say you show us the gene you want changed to produce a specific trait and then we can apply our technology to develop this trait and then we can share in the royalties."

Radtke says gene editing can be used for a wide range of genetic changes in plants. It is not just a process for developing herbicide resistance. It can be used to enhance or suppress any specific characteristic in a plant.

He sees an opportunity for SU-tolerant canola and soybean varieties in Western Canada. Cibus is also working on flax, potatoes and corn to develop weed and crop pest control changes in plant genetics. He says there may be opportunity to develop canola varieties with sclerotinia resistance. Some changes, such as improved drought tolerance in a particular crop, is more involved, involves several genes, that means it is more complicated, but not impossible, says Radtke.

“Our message to Canadian canola growers and farmers in general is that there is alternative and new technology available in plant breeding,” says Radtke. “It is precise and trustworthy, comes with no baggage, and provides opportunities in geographical areas and markets where non-GMO crops are in demand.”

Lee Hart is a field editor for Grainews in Calgary. Contact him at 403-592-1964 or by email at lee@fbcpublishing.com.
Farmers ahead of carbon curve

BY JULIENNE ISAACS

Carbon sequestration is a term with plenty of traction these days. Technically speaking, it refers to long-term storage of carbon dioxide or other forms of carbon to help mitigate the fallout from climate change — a subject that increasingly figures on Canada’s agendas.

In agriculture, carbon sequestration finds a home in discussions about soil management and soil health.

According to John Bennett, former director and past president of the Saskatchewan Soil Conservation Association (SSCA), Canadian farmers have had a major, positive impact on reducing Canada’s greenhouse gas (GHG) emissions in recent years through soil management practices like zero-tillage. “Farmers’ actions have likely made the largest possible contribution to Canada’s GHG inventory, but to date have not had much recognition of that contribution,” he says.

Bennett says farmers are ahead of the curve in adopting practices like zero till, and through a relentless push for input efficiencies and fuel use reductions, they have reduced emissions from production systems.

This year, the SSCA published a position paper discussing the results of the Prairie Soil Carbon Balance (PSCB) project, which measured changes in soil organic carbon in 137 Saskatchewan field sites under direct seeding management over a period of 14 years.

“The PSCB project proved conclusively that significant amounts of CO2 — averaging 0.38 tonne CO2 per acre per year — is sequestered under direct-seeded cropping systems,” the authors write.

The paper argues that past carbon tax or trading schemes have failed to deliver appropriate value back to the farm gate for offsets from carbon stored in agricultural soils. “If emitters of GHGs are penalized through the imposition of a carbon tax or emission reduction limits, it is reasonable to follow changes in soil carbon to apportion carbon gains, says Janzen.

In Alberta, farmers have the option of selling carbon offsets from no till and continuous cropping to previouslysummerfallowed land, according to Lorraine Lynch, a spokesperson for Alberta Agriculture and Forestry. “At current carbon prices of $15 per tonne of carbon dioxide equivalent, the value to farmers is $0.54 to $0.80 per acre in the brown and dark brown soil zones and $1 to $1.60 per acre in the black and gray soil zones,” she says.

“Other opportunities for carbon credits to improve management of nitrogen fertilizers and livestock are also available.”

SOIL MEMORY

Henry Janzen, a research scientist at Agriculture and Agri-Food Canada’s Lethbridge Research Station, has been studying long-term carbon storage in soil for close to 30 years.

“Here at Lethbridge we have experiments dating back to 1911, from which we’ve been able to follow changes in soil carbon over time,” he says.

“A lot of our work over the last number of years has been focused on the question of how management affects carbon storage in soils.”

Much of Janzen’s work is focused on studying “carbon flows” — the flow of carbon atoms from the atmosphere into plants.

“In farming, we harvest some of that material typically in grain and export it from the system often to feed ourselves, and consume it, burning it back to CO2 and extracting the solar energy from it,” he explains.

“Farming is about trapping CO2, investing it with solar energy and using that to fuel ourselves and animals.”

But much of this biomass carbon trapped by photosynthesis goes back into the soil, in straw, residues and manure, for example, replenishing soil organic matter. Microbes then help that organic matter decay back to CO2. “The amount of carbon stored in the soil is a function of two things: how much is going in and how much is being lost as CO2 from the decay,” says Janzen.

He likens soil carbon to a bank balance: you either have to reduce the rate at which carbon is lost, or increase the amount going into the soil to stay in the black.

By this measure, zero till is one excellent means of maintaining soil carbon. Planting grasses and other forage on land that has been intensively cultivated may also lead to carbon gains, says Janzen.

But Janzen emphasizes that there is no set of one-size-fits-all best management practices for enhancing carbon sequestration. He says every farmer should look at the land and ask, “What works best here?”

That question should be anchored in the assumption that our decisions will impact future generations, that we leave a legacy. “We come and go but the soil stays and the soil remembers us. The practices that we impose on the land have lingering effects for better or for worse,” he says.

Julienne Isaacs is a Winnipeg-based freelance writer and editor. Contact her at julienne.isaacs@gmail.com.
Health care benefits for your farm

Health plans can protect your family and help you attract farm employees

BY DILIA NARIZZUZZI

Most farmer operators assume that health care benefits are only for people with off-farm jobs. Farmers usually pay for their own massage therapy and trips for the dentist. Farm employees aren’t always offered the same benefits they could get from non-farm employers. But, there are health care plan options for farmers. Buying an extended health care plan is actually relatively easy. Farmers can be part of a group health plan with as few as three people.

Jolene Moen, her husband Brant and her mother-in-law Sheryl are grain farmers from Stewart Valley, Sask. On 5,000 acres, the Moens farm pulses, durum, and oilseeds. As of right now, says Jolene Moen, they have one employee and a few casual employees during the busy times. The Moens thought about how health insurance when they incorporated their farm. “Knowing that we have health insurance when they incorporate in. “It’s not one plan, take it or leave it. Plans can really be tailored to the farm’s needs.”

Another plus, says Elan, is that purchasers can “design the plan according to what’s important to them.” Budget, choice of benefits, and consideration of disability and critical illness all factor in. “It’s not one plan, take it or leave it. Plans can really be tailored to the farm’s needs.”

Kidd says farmers are increasingly interested in these plans “partly to compete with other industries that are offering benefits. They can either attract or retain good employees.” Further, Kidd emphasizes, small groups are quite often the norm. She does a lot of work with groups of 10 or fewer employees. If there are three or more people, no medical questions are asked.

If you considered group health insurance in the past but didn’t take the plunge, Kidd notes that some features are relatively new. For instance, critical illness benefits weren’t typically offered even 10 years ago. “Critical illness provides a lump sum benefit in the event you’re diagnosed with one of the covered critical conditions — heart, stroke, cancer, MS, blindness, deafness and others.” Kidd has seen many critical illness claims in the last few years. Many newer plans have additional features, like “owner access to legal, human resources, and accounting services,” if a second opinion is needed on a legal issue, or if you need a human resources expert’s opinion on a “challenging issue with an employee.”

For more information about the Chambers of Commerce Group Insurance Plan, see its website dedicated to farmers at www.farmersbenefits.ca.

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Dilia Narduzzi is a freelance writer in Dundas, Ont.
‘Canola and snow’ is not profitable

New research says mixing cultivars does not mitigate the effects of continuous canola

BY DILIA NARDUZZI

R

Econsider those plans to seed back-to-back to canola this spring, recom-
mend Agriculture and Agri-Food Canada (AAFC) scientists. And they have new data to back that up.

Dr. Neil Harker and other study researchers recently published the results of their five-year experiment with the effects of continuous canola crops in The Canadian Journal of Plant Science. The main findings are in the title: “Canola cultivar mixtures and rotations do not mitigate the negative impacts of continuous canola.”

Researchers know that farmers face financial pressure to tighten their canola rotations. Harker and his colleagues wanted to see if, by changing some variables, they could get better agronomic results with continuous canola.

“Because canola rotations are getting tighter on the Prairies — a lot of specialists would recommend growing canola one out of every three years or one in every four — we looked at the extreme case of growing continuous canola to see if we could mitigate some of the risk in doing so by mixing different cultivar types within years and across years,” says Harker.

The researchers mixed canola varieties within or across years hoping to get enough variation and ability to resist disease “to help mitigate the problem of using the same thing over and over.” Part of the problem with this approach, though, says Harker, is that canola seed companies in Canada don’t share as much of their seed information with the public as they do in some other countries. Specific information about seed genetics is seen as “proprietary information,” so mixing varieties for the study was “a bit of a guessing game.” In Australia, for example, where this information is available, there’s at least the option to try different sources of seeds — ones with different kinds of disease resistances — to see if particular combinations or choices work better than others.

The study results were pretty clear: “If we don’t know any of these disease-resistance backgrounds — and even if you did know them — crop rotation is still better than growing continuous canola. All of the data showed that really well.” Out of all of the different rotations researchers looked at, including all sorts of continuous canola rotations (with different varieties), longer crop rotations were the best results for canola were the pea-wheat-canola rotation, and the wheat-wheat-canola rotation. “Even one year of wheat and two years of canola didn’t give you anything different than continuous canola.” Canola yield was highest when crops were rotated every three years.

ROTATIONS ARE IMPORTANT

Why are canola crop rotations so important? Plant pathologist Dr. Kelly Turkington, one of the co-authors of the study, says that rotation, “in its simplest form, lets enough time elapse so you have decomposition of any infested crop residues in the fields. Or, if the pathogen survives on its own, that interval between host crops allows for those structures to lose their viability.”

So, if you have blackleg, for example, rotation allows the canola residue harbouring the blackleg pathogen to decompose in the field, hopefully reducing the blackleg survival enough before canola is planted again three years down the road. This way, the fungus doesn’t build up in crop residues, and the pathogen has less potential to adapt to the resistance sources used in the varieties being grown.

The problem with growing canola continuously every year of the effects of continuous canola is that it is just not sustainable,“ says Turkington. Taking out that host plant in that triangle, the canola, is the best bet so far in getting the blackleg pathogen to die off before the next time the crop is planted.

Both Harker and Turkington say that while there is some potential for tighter canola rotations, if you don’t have enough information about varieties (so they could plant varieties from different seed backgrounds with different disease-resistant properties), longer crop rotations are still the best bet. “Continuous canola is just not sustainable,” in the long-term, because there are many other issues beyond disease resistance to take account of, things like weeds and insects, says Harker.

Sometimes farmers see canola’s profit potential and are willing to lose little yield to gain more income. But, rotation is still better for long-term sustainability on the farm, says Harker, if you’re willing to take that bit of a financial hit in the short term.

Dr. Dilia Narduzzi is a freelance writer in Dundas, Ont.

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Driving the big rigs yourself

Not every farmer is licensed to drive a semi, but they could be. Here's how it works

BY SUSANNA HEINRICH

For me, getting a 1A license (known as a 1Q in Manitoba or Alberta) was a necessity. I was on the farm, raising kids, helping where I could. The farm was expanding, the workforce was fluid and slowly meandering to “greener pastures.” Our employees were retiring or coming on board without a 1A license. Point blank — at harvest time the farm needed to move more grain in the same time with fewer people. This meant a move to larger trucks and training those remaining to drive them. That’s how I got so lucky.

If you’re a farmer thinking about getting licensed to drive a semi, and something is holding you back, think again. Remember, it is not rocket science — it is, in fact, not science at all. So, how difficult is it?

The ROAD to the ROAD

The procedure is consistent across the Prairies, although there may be some minor differences and some differing name classifications.

In Saskatchewan, the endorsement is an “A” for air brakes. In Manitoba, its “S” (slack adjuster endorsement) or an “A” endorsement. In Alberta the air brake endorsement is called a class “Q.” But not to worry whether it’s an A, S or Q, it means the same and is valid across Canada.

So to start at the beginning: first the decision is made, for whatever reason, to obtain your 1A. That’s simple enough. If you are over 18, hold a valid license in any of the 5, 4, 3, or 2 classifications, and are not a “novice” driver you can begin the process.

Before you can take your driver’s test, you must apply for your 1A learner’s permit. This involves a few steps. You will need a medical exam. Your doctor will check all basic functions as well as ask you about any seizure, fainting or substance-abuse disorders.

Once the medical has been accepted by the licensing agency, you can set up an appointment to write the test for your 1A learner’s permit. This is a series of seven “mini” exams — all multiple choice. Questions are specific to each class of vehicle, air brakes and road signs. The cost is minimal ($10) and you may repeat it on subsequent days if needed.

That completed and passed, you would now have a class 1A learners permit which means you can drive the big rigs — as long as a driver with a valid 1A and at least three years experience is sitting beside you. Once that hurdle has been cleared, you can choose to enrol in a drivers training program or practice on your own. If you practice on your own, be sure to use the knowledge of your teacher, but also the “professional drivers handbook” for information specific about circle checks (pre-trip inspections), air brake adjustments, coupling and uncoupling. This way, you learn to do “by the book” as this is what the examiner will specifically look for during the practical test.

GETTING Schooled

If you choose to enrol in a professional driving school, look for one accredited by the driving authority (i.e. SGI in Saskatchewan). The content of all the training schools is quite similar, and there were usually at least three options, ranging from one, two- or three-week programs. You may also choose to pay by the hour for “refresher” courses, but generally a minimum one-week course is recommended.

In the classroom you will be given a chance to discuss all the requirements for the practical test as well as the things such as how to complete logbooks, coupling and uncoupling, dollying down/up the trailers, changing the tires as well as plenty of in-truck driving experience and critiquing.

The fees vary from province to province and school to school. I checked several in each of the prairie provinces and found the cost to range from approximately $2,000 to $2,700 for a one-week course (20 hours of hands-on driving, plus classroom time and observation while in the track), and up to $5,000 to $6,000 for a three-week (40 hours driving) program.

ME, IN THE CAB

I chose the two-week option. Although I was quite comfortable driving large farm equipment and tandem axle trucks, I had little to no experience with the long trailers on the semi. (As I had to travel and stay at a far-away city, it was also a chance for my husband to bond with our children and appreciate me even more).

When you do go for your actual road test — and this can be done either by an instructor at your school (if accredited and if initiated by the school) or at the government licensing body.

If you have chosen to not attend a training course, you are responsible to arrange for your own (legal) truck and trailer for the road test. If you are enrolled with an instructional school, they will usually allow you to use their equipment for this purpose — it’s part of your tuition.

The cost for this portion (which, again, if you have gone through a school is likely included in your fee) is $35. You will be asked to show your knowledge of air brake adjustment, a pre-trip (circle check) inspection; and actually handling the vehicle on the road.

My road test was done late November in a snowstorm. Not ideal driving conditions, but an excellent opportunity to demonstrate my newfound capabilities.

As I said, it isn’t rocket science — if you can drive a manual transmission, you can drive a semi. Like anything, it takes practice, patience and time to refine the skills to be comfortable in most situations. It’s like so many things in life — easy to learn, a challenge to master.
Liquid manure is liquid gold
It’s expensive to transport, but farmers near hog operations like the benefits

BY JULIENNE ISAACS

Liquid manure — particularly liquid hog manure, which is more readily available than solid or semi-solid manures — has always been viewed as a valuable nutrient source for field crop production. But it’s expensive to transport, so access is localized near hog operations.

“I talk to a lot of growers growing oilseeds and cereals, and they would take liquid hog manure any day if they had access to it,” says Mari Tenuta, Canada research chair in applied soil ecology and professor at the University of Manitoba. “If you viewed it as a nutrient product, by applying the science and understanding the potential, it’s a very good source of P and can also provide some N,“ he says.

Once the liquid is separated into N and P “streams” using a commercial centrifuge, explains Tenuta, the researchers take the P from the liquid manure and concentrate it. “This increases its value and gives it potential to be shipped farther,” he says.

“Once our approaches was to compost the material, produce a fertilizer that’s beneficial for soil and has other benefits.”

The University of Manitoba, along with the Manitoba Livestock Manure Management Initiative (MLMMI) and Manitoba pork industry representatives, has investigated several technologies for mechanical manure separation.

“I think it’s important to recognize that most soils in the province are deficient in nitrogen and phosphorus — we need both nutrients,” says John Carney, executive director of MLMMI.

“Manitoba is in a P deficit but there are a few areas that have a surplus because of livestock density. We have a P distribution problem. MLMMI is looking at various alternatives for relocating that phosphorus from a surplus region to a deficit region.”

Carney says Manitoba producers are showing more and more interest in optimizing manures. “They are motivated to try to get the most value from the nutrients in liquid manure. They want to get the nutrients into their crops and are motivated to do that both environmentally and economically,” he says.

APPLICATION OPTIONS

Most producers hire professional applicators to get the job done, due to the high cost of customizing application equipment and the difficulty of transporting manure.

According to Don Flaten, a soil science professor at the University of Manitoba, custom applicators must meet a rigorous set of standards. They must be licensed, and they must justify the cost of highly specialized and sophisticated equipment.

A large-scale intensive focus on manure management has improved the accuracy and efficiency of liquid manure application, says Flaten. “For larger livestock operations, it’s more effective to rent the services of manure management planners and custom applicators.”

Industry has sprung up around manure management; custom applicators sometimes work with nutrient management consulting companies. Scott Dick is part-owner of one such company, the Landmark-based Agra-Gold Consulting.

“We write nutrient management plans for submission to Manitoba Conservation, we work with producers in coming up with agronomic solutions using manure as a nutrient source, and we coordinate and schedule application for producers,” explains Dick.

Any livestock facility in the province with more than 300 animal units must file a manure management plan with Manitoba Conservation each year by July 10.

Agra-Gold’s consultants file plans indicating the amount of manure to be spread in the coming year, then does a series of soil tests and collects yield goals on a field-by-field basis. The company submits this information to Manitoba Conservation.

“Once the application is done, we create an application map using GPS data, and the manure applicator takes samples that we send to the lab to get an accurate number on the amount of nutrients in that manure,” Dick explains. “Post-addition, we take the data and create a map, take the samples and soil tests and put together an agronomic report and economic summary of what happened on each field. We’ll then visit the producers and give them reports.”

With precision and specialized equipment farmers are getting much more out of liquid manure.

“If you viewed it as a nutrient source rather than a waste product, by applying the science and following through with analysis and implementation, every step increases the value of that product,” he says.

Photo: Renowned food chain is a Winnipeg-based breakfast retailer and online. Contact her at julienne.isaacs@gmail.com.

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Canadian soybean acreage is likely to continue increasing

**By Lilian Schaefer**

Canola faces fierce competition from other oilseeds like soy or sunflowers, according to research completed by agri benchmark.

The global non-profit network of agricultural experts completed three in-depth case studies of the oil-seed/canola versus other oilseed crops in Canada, Hungary and Ukraine.

Results were presented during the International Rapeseed Conference in Saskatoon in July 2015; key among them were:

- Canola has clearly established themselves as the number two oilseed in Manitoba’s Red River Valley, with an average return of $200 per hectare — 45 per cent higher than canola.
- The recent downward trend in commodity prices also favours soybeans, say study authors, as they have 30 per cent lower liquidity requirements than canola.
- Soybeans tend to be preferred when liquidity or production risk is an issue.
- Soybeans are more responsive to management and higher input levels, making it more successful on high-performing farms.
- Soy mix influences canola choice. In western Canada, canola and soybeans go well together, while corn pairs well with soybeans or sunflowers.

The study showed that soybeans have clearly established themselves as the number two oilseed behind canola in Manitoba’s Red River Valley, with an average return of more than $200 per hectare — 45 per cent higher than canola.

The recent downward trend in commodity prices also favours soybeans, say study authors, as they have 30 per cent lower liquidity requirements than canola.

Shorter-season soy varieties and the changing climate are reducing production risks to growers, who can also get better use of labour and machinery from that crop because of how the soybeans’ later seedling and harvest times extend the cropping season.

Canadian soybean acreage has increased from 3.58 million acres in 2009 to 5.4 million in 2015. In Western Canada, Manitoba acreage has increased from 415,000 acres in 2009 to 1.33 million in 2015. Saskatchewan recorded 300,000 acres in 2015. In the Maritimes, acreage has risen from 35,000 to 82,000 and in Quebec from 598,000 to 778,000 acres during the same period, while Ontario’s seeded area has remained relatively stable.

And there promises to be more growth in the future for soybeans as new varieties, such as high oleic, come on the market that will open up new uses in both food and industrial applications.

**High Oleic Soybeans**

At the Canadian Conference on Fats and Oils held in Quebec City this past October, Susan Knowlton, senior research manager with DuPont Pioneer, said high oleic soybeans were developed to meet the trans-fat solution for the food industry, but that additional applications have also emerged.

“When you compare high oleic soy to other high oleic oils, it has quite a bit more stability than other oils,” Knowlton said. “No matter what test we do, high oleic soy is a really, really stable oil and comes out on top in manufacturing and food service.”

A new vegetable oil-based multi-tip purpose lubricant called Smart Earth Ecolube is now being made from Ontario-grown high oleic soybean oil, and manufacturer Smart Earth Corporation has additional products soy-based products soon to hit the market, including a grease and a bar and chain oil.

A study on Canadian vegetable oil consumption commissioned by Soy 20/20 shows that in 2013, a total of just over one million (1,080,885) metric tonnes of vegetable oils were consumed in food in Canada.

Of that total, approximately 20 per cent was soybean oil. The remaining 50 per cent was comprised of canola (42 per cent) and high oleic low linoleic canola (HOLL — at eight per cent), and imported oils and blends from 11 other plants such as palm, olive, coconut and corn.

“Soybean is the Canadian darling,” report author Josipa Paska, managing director of Fats and Oils Competitive Intelligence, stated in a presentation at the same conference.

“It’s the second-largest oilseed crop in Canada, and although Ontario is the largest producer, acreage is expanding in Manitoba and Saskatchewan, and oil processing capacity is expanding in Quebec.”

Lilian Schaefer is a professional farm and food writer based in Guelph, Ontario. Follow her blog at foodandfarmingcanada.com.

**The recent downward trend in commodity prices also favours soybeans, say agri benchmark, a global network of agricultural experts.**
You asked for it, you’ve got it
Lisa Guenther is starting out the new year by giving *Grainews* readers what they want

**LiSA GUENTHER**

I’ve decided to start out the New Year by writing at least one *Grainews* column that is focused on what readers want, rather than whatever is rattling around inside my head. Based on subscriber feedback and our own marketing material, it seems our readers want advice on everything from dealing with gossip to making easy money. And recipes.

So here is everything you ever wanted in a *Grainews* column

**YEAR OF THE PULSES A NO RECIPES TO MATCH**

This year, pulses have stepped into the spotlight, as the United Nations Food and Agriculture Organization declared 2016 the International Year of Pulses. Pulse Canada is holding over 20 events across the country this year to educate people about the benefits of eating pulses. For more on the International Year of Pulses, visit www.pulses.org/iyp-2016.

Personally, I’m a huge fan of chickpeas. I throw them into a tomato-based stew that I make in the slow-cooker. I turn them into hummus. But I really like to roast them. After rinsing them, I coat them with canola oil. Then I add some curry and minced garlic, as the taste. You can use other spices if you don’t like curry. I bake them at 400 F for 10 minutes, stir them, then bake them for another 10 minutes. If you want them crispier, you can keep baking them. There are many, many more recipes at www.pulses.org/recipes.

So thank you farmers for growing all those pulses. I hope you find something in this issue to help you bump your yield or deal with the production problems you see on your farm.

Now on to other things that we are supposed to cover in *Grainews*.

**THE SECRETS OF “LAZY” MILLIONAIRES**

I thought about calling up a certain tow-headed American politician for this one, but I figured he’d tell me to start by inheriting a bunch of money from my father. That didn’t seem helpful.

I’m guessing this probably has something to do with smart investing, rather than avoiding work. But if I ever find a money tree, I’ll let you know — for only 10 weekly payments of $19.99…

**HOW TO DEAL WITH Gossip AT THE COFFEE SHOP**

Fire back on Facebook. Just kidding.

Usually it’s best to ignore it. But if, for example, your neighbour is rude enough to say something malicious to you, I think you’re perfectly justified in giving him the hairy eyeball the next time you see him at the Co-op. If you can arch one eyebrow, that will work even better.

**HOW TO CREATE YOUR DREAM SHOP**

Talk to Scott Garvey. (*Grainews* machinery editor.)

**WHAT TO DO WHEN IT DOESN’T RAIN OR WOOn’T QUIT RAINING**

That would be a good time to learn all about Charles Hatfield, rainmaker. Or “rain enhancer.”

In 1915, San Diego commissioned him to break a dry spell and fill the city’s reservoir. Hatfield got to work, building a tower and mixing chemicals. Soon, it began to rain. The reservoir brimmed with water. One dam failed, and the flood devastated people living downstream. San Diego itself flooded.

People threatened to lynch Hatfield, and the only way the city would agree to accept responsibility for the flood damage. Lawsuits were already in the works, so Hatfield decided to pass on payment.

I learned about Hatfield through a podcast called Snap Judgement. It was near the end of Episode #525, if you’re interested. There’s also tonnes of information about him online.

I don’t know of any modern-day rainmakers, or rain stoppers, for that matter. So I have very little practical advice.

But if your father has noticed that all the neighbours have had more favourable weather, don’t joke about his place being cursed.

**HOW TO GET A NEW TRACTOR WITHOUT GETTING DIVORCED**

Talk to your spouse before you buy.

**18 TIMES A YEAR YOU’LL DISCOVER…**

- New crop varieties – which ones are worth it, which ones are a waste of time.
- Fertilizer – no B.S. advice on it. B.S.
- Hi-tech combines, smart phones, smart trucks and dumb technology mistakes to avoid.
- Ways to get your kids to help cut that are so weird, they just might work.
- The dynamics hiding inside the new technology use agreements.
- How to deal with gossip at the coffee shop (details…details…)

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**CRaZY MoDS TO YOUR TRUcKS, SNOWMOBILE, TRACTOR AND MORE**

Where to even start with this one? The first thing that popped into my head was “Apocalypse Skidoo,” these funny cartoons drawn by a young local. I wonder if he would be insulted that I found “Apocalypse Skidoo” funny. Maybe it’s supposed to be rad. Or crazy-rad.

The second thing about this category is that it’s missing ice-fishing shacks. We should be featuring crazy mods to old campers and whatever else you use for ice fishing. Some people are really into ice fishing, and upgrading their shacks. And many of them are of the former persuasion.

I think there’s a lot more to be done in this whole area.

Lisa Guenther is a field editor with *Grainews* based at Livingstone, Sask. Contact her at Lisa.Guenther@fbcpublishing.com or on Twitter @LtoG.
Your winter marketing plan
Watch the futures spread and the cost of carry to decide when to sell your grain

BRAN MITTAL

This winter, you should have time to take stock of your grain inventory, update your cost of production numbers and do some math to determine your true break-even costs.

Do you have a marketing plan? Are you using it or reviewing it and making changes accordingly? Do you know your quantity and quality of your grains?

I’m going to assume you answered yes to the last three questions! Now, it’s a matter of figuring out how and where to market your grain. Is the market offering prices that will make you a profit? If so, should you be selling now or holding on? You have to try to figure out what the world and domestic markets are telling you by the price signals they are showing you.

World grain markets are always in flux because every month of the year there is a crop being seeded or harvested somewhere in the world. This keeps supply and demand numbers fluid and constantly changing, which then is reflected in the price that buyers are willing to pay to secure supply.

What pricing signs should you be looking for?

Futures spreads, grade and protein spreads and basis levels are the primary ones to watch and follow.

Futures spreads are the market’s indication

WATCH THE SIGNS

Futures spreads: what are they and how do they work?

Futures spreads are the market’s indication of perceived world supply and demand for grains, and how and where buyers can buy grain, for what price.

Buyers (millers, brewers, crushers and feeders) need year-round supplies to keep their operations running smoothly. Most of them cannot store a years worth of grain or buy a years worth of grain 12 months in advance.

In normally functioning futures markets there is a spread, or price difference, between the various futures months. The further out months are usually at a higher value than the nearby month. This is because buyers would prefer you to store the grain so they can buy it as they need it. They realize you won’t do that unless there you have a price incentive. This is called the “cost of carry.”

In the cost of carry there is also a cost of interest that the buyers are willing to pay. This is based on what the buyer would have to pay to borrow money now to buy the grain for future use.

What does this tell you? In this example it could suggest that buyers are comfortable with the current supply availability in the market and are paying full carry to incent you not to sell your grain now but to carry it forward.

With the July only at 55 per cent of full cost of carry to May, it could suggest that there will be new supply coming onto the market from somewhere in the world between May and July and buyers expect that they will be able to buy it at a lower price then.

If the July were at full carry to May or above full carry, that could possibly indicate that buyers are concerned about the supply of the next crop to be harvested and they’re trying to get you to carry your grain forward. This would help them in July, should the new harvest be less than anticipated and they need your grain.

Sometimes nearby futures trade at a premium to the future months. This indicates that there is an immediate need from the buyers for the grain, and they are willing to pay a premium to get their hands on it now.

This immediate need can be for a number of reasons. The buyer may have just made a big sale for nearby delivery. There could be concerns that demand is greater than the current supply. A big harvest could be expected to come off in the next month or two — in the short term, buyers are willing to pay a little extra for old crop stocks to keep them running until the next big harvest comes off — there can always be weather delays and they don’t want to be caught without supplies to keep operations running. The forward months don’t have any cost of carry included — buyers know the full crop can’t all come to market at the same time and are willing to wait and buy as they need it.

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Acidic soils can restrict plant growth. Learn how to recognize and manage these soils on your farm.

**Diagnosing and managing acid soils**

Soils with a pH ranging between 6.0 and 8.0 are suitable for most crops on the Prairies. Soils with a pH range between 6.5 to 7.5 are considered to be near neutral. Soil pH between 6.0 to 5.6, 5.5 to 5.1 and < 5.0 are considered to be moderately acidic, strongly acidic and very strongly acidic, respectively. When soil pH declines below 6.0, the physical, chemical, and biological properties of soils are gradually affected and yield of crops will decline. Crops can vary considerably in their tolerance to the various components of soil acidity. The damage caused by soil acidity to crops is often complex.

**EFFECTS OF SOIL ACIDITY**

Soil acidity can have negative direct and indirect effects on crop growth and yield. Acidic soils usually contain soluble forms of aluminum (Al) and manganese (Mn). As soils become more acidic, the soil pH decreases, and this increases the concentration of hydrogen (H+) ions in soil. As soils become more acidic, this causes aluminum and manganese to become more soluble in soil, they will gradually increase to levels toxic to plants.

Aluminum toxicity will restrict root growth and tie up phosphorus (P), reducing crop uptake of P. The indirect effect of restricted root growth is a reduced uptake of water and nutrients which further restricts plant growth.

Manganese toxicity will result in visual symptoms, including black necrotic spots or streaks on leaves of cereal crops. Manganese toxicity can cause chlorosis on leaf margins and cupping of leaves of canola and legume crops. Toxicity of aluminum and manganese can restrict yields of most crops when grown on strongly acid soils (pH < 5.5). Recent research has shown that higher concentrations of H+ ions can be directly toxic to plants.

The other major negative effect of soil acidity is on the survival and growth of soil microorganisms. Of particular concern is the survival of rhizobia bacteria, which live in association with legume roots to fix nitrogen. The rhizobia bacteria that live in association with alfalfa, sweet clover and pulse crops such as pea are especially sensitive to acidity.

In acidic soils, microbial activity is reduced. This affects nutrient cycling, such as the mineralization of soil organic matter. This can reduce the mineralization and release of nitrogen, phosphorus, sulphur and other nutrients from organic matter.

**LOCATION OF ACIDIC SOILS**

The majority of acid soils occur in the gray and dark gray soil zones of Alberta, Saskatchewan, and Manitoba. These soils are formed under boreal forest vegetation. The effect of climate and vegetation caused the formation of soils that tend to be slightly to strongly acidic. Acidic soils can also occur in localized areas in fields throughout the Prairies, and tend to occur in lower relief areas of fields where water tends to accumulate and the soils tend to be more leached, reducing the soil pH.

Farming practices are contributing to the decline of soil pH. Nitrogen (N) and sulphur (S) fertilizers acidify the soil and over many years of application cause the slow decline. For example, anhydrous ammonia (NH₃), urea [CO(NH₂)₂] and other ammonium (NH₄⁺) fertilizers react in the soil in a process called nitrification to form nitrate (NO₃⁻), and in the process release H⁺ ions. So, as we continue to use significant amounts of N and S fertilizers, the pH of our agricultural soils will gradually decline and become more acidic.

**DIAGNOSING SOIL ACIDITY**

Poor yields of more sensitive crops may indicate acidic soil problems. Soil sampling and analysis are the first steps to correctly diagnose and confirm a soil acidity problem. Visual crop symptoms alone are not enough to diagnose a problem.

Fields of concern must be carefully sampled. Uniquely different areas of a field should be sampled separately. Fields should be divided into areas based on soil type, topography and differences in crop growth. Each area must be sampled separately. Often, soil pH will vary with topography, so on land with more rolling topography, the lower, mid and upper slope areas should be sampled separately. Often different areas of a field may be more acidic and require higher rates of lime than other areas, and some areas may not require any lime at all.

Soil samples that are moderately or strongly acidic should then have a “lime requirement test” to determine the amount of lime required to raise the soil pH to 6.0 or 6.5. Lime rates depend on the amount of pH change that is needed and must take into account the soil buffering capacity. Buffering capacity is the amount of lime required to change pH a given amount. Sandy soils have low buffering capacity and require less lime to modify soil pH versus soils with higher clay content, which have a higher buffering capacity. Once the rates of lime are determined, then the cost to purchase, transport and apply the lime can be estimated to assess the economics of liming.

**HOW DOES LIME CHANGE SOIL pH?**

The most common product used to modify acid soils is lime, which is calcium carbonate (CaCO₃). Other calcium-based products such as calcium hydroxide (Ca(OH)₂) and calcium oxide (CaO) can also be used as liming materials. When calcium carbonate is added to an acidic soil it produces...
a gas (carbon dioxide) and leaves Ca++ in the soil. The Ca++ will exchange with exchangeable acidity on the soil exchange complex. The reaction continues with calcium carbonate until all the acidity is neutralized or all the calcium carbonate is used up. The reaction process occurs over many months to several years.

Other calcium-based products such as calcium chloride or calcium sulfate (gypsum) are neutral salts and cannot be used as liming materials and are ineffective in modifying acid soils.

**LIME APPLICATION**

From the “lime requirement test,” the lab provides the rates required as “pure lime.” But sources of agricultural lime are not pure. They may only be 70 or 80 per cent calcium carbonate, which must be taken into consideration when determining the rate of product to apply. This is called the calcium carbonate equivalent (CCE).

The lime must also be very finely ground. The finer the liming material, the greater its surface area, resulting in faster reactivity with the soil. Fineness of the liming material must also be considered in calculating the actual application rate of the liming product.

Ideally, apply lime immediately after harvest to allow time for the lime to react for greatest benefit on soil pH before the next growing season. Lime should be spread very evenly over the soil surface and thoroughly incorporated into the soil. Water is required for the reaction process between the lime and soil. Lime will react more rapidly in a very moist soil versus a drier soil. It often takes a year or more before a response can be measured even under very good soil moisture conditions.

The reaction time will depend on the type of lime used, the fineness or coarseness of the lime material, and moisture conditions. Remember that liming materials differ widely in their neutralizing power due to variations in the percentage of calcium and magnesium content. Liming materials with a higher CCE will tend to neutralize soil acidity faster than those with a lower CCE.

**LONG TERM BENEFITS OF LIMING**

The major benefit of liming is increased crop production. This also results in more root and plant fibre returned to the soil, which in turn will benefit soil organic matter levels in the long term. The toxicity issues of aluminum and manganese are minimized or eliminated. Production of legume crops such as alfalfa, sweet clover and pea can be greatly improved due to more favourable soil conditions for the nitrogen fixing rhizobia bacteria. Forage quality can also significantly improved.

The application of lime to acid soils will improve the biological, chemical, and physical properties of the soils. Liming will increase soil pH causing a more favourable environment for soil microbiological activity. This improves soil nutrients cycling and turnover of plant available nutrients from soil organic matter. Ultimately, lime can contribute to improved soil health. Reduced soil acidity will increase the availability of plant nutrients, particularly phosphorus. In strongly acidic soils, phosphorus is retained in less available forms than on slightly acid and neutral soils. Therefore, a major benefit of liming acid soils is the increased utilization of residual phosphorus by crops. The application of lime can also improve the physical properties of some soils. Notably, soil structure may be improved and soil crustiness is reduced. This leads to improved emergence of small seeded crops such as canola.**

**THE FIRST STEPS?**

If you think you have reduced crop yields due to acid soils, the place to start is to have problem soils tested to determine soil pH. If a problem is identified, you may want to undertake more intensive soil testing and have lime requirement soil tests completed. Then, undertake the process to find lime sources, to determine the cost of lime, the transportation costs and application costs, to decide if application is economically feasible. If the economics look questionable, consider lime application in some test strips first to assess potential benefits.

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At age 80, Mary wants to pass her wealth on to her family and a favourite charity.

Mary's problem is to ensure that her four children, two of whom are farmers, are treated equally. There are also seven grandchildren who will have post-secondary educational expenses. She would like to donate some land to a conservation foundation and some money to her church.

The farm has a turbulent history. Low grain prices for much of the 1960s, rising operating costs in the 1970s, then high interest rates in the 1980s made the farm a subsistence operation for decades. For the last half-dozen years, the farm has broken even, but Mary now realizes she has to sell it. She has already sold the machinery and inventory. What's left is eight quarter sections of land at $1,600 per acre $512,000 and five quarter sections of land at $1,500 per acre $1,200,000.

Mary wants to move to an assisted living apartment in a nearby town. To do that, she will need about $45,000 a year in after-tax income.

Farm Financial Planner asked Rod Tyler, head of the Tyler Group in Regina, to work with Mary to devise a plan for transitioning the farm to cash for her children and then to pass it on to her own future. She already has financial assets worth $838,000 from Bob's life insurance and decades of modest living and saving.

At present, five quarters of land are rented to two sons who farm it. The rent supports Mary's cost of living. Two other quarters are rented to a third party. Total rental income averages $50 per acre per year, though she rents at a 20 per cent discount to her farming sons.

THE PLAN
Mary would like to sell the five quarters to her farming sons at a discounted price, enabling them to finance at today's low interest rates. She expects to sell the other two quarters for their assessed value, which is on the open market, obtaining enough to provide equal sums of about $225,000 to each child, pay some capital gains tax due after application of the $800,000 capital gains exemption for qualified farm property and then donate the single quarter with the grain pit to a charity for use as a wildlife refuge. The charity would provide a tax receipt for the value. Mary might wind up paying the Alternative Minimum Tax for one year. The AMT paid would be a carryforward for future taxes due, so its net cost could be zero. In the year of the sale, she would probably have income far in excess of the Old Age Security clawback point at which all OAS is lost. But it would be for only one year.

Assuming that Mary sells her farmland, donates the quarter to a charity and then the proceeds to her four children, sells her home for $200,000 but retains her financial assets, she will have total assets for investment of $1,038,000.

A three per cent return would produce annual pre-tax income of $31,140. On top of that base income, she would have Old Age Security benefits of $6,840 in 2013 dollars, and CPP benefits of $4,500 a year. Her total income would be $42,480. After 15 per cent average income tax, she would have income of $3,000 a month.

Mary can raise her investment income by using an annuity pay-out method. It is a calculation of return of capital, some of which is not taxed. It is not the result of buying an annuity from an insurance company. Using an annuity that would exhaust all capital in 20 years to her age 100, she could have $67,740. OAS and CPP would push annual income to $79,080. Allowing for a return of capital adjustment in her tax preparation, she could squawk by the clawback, which starts at $72,809 in 2016, and retain all of her income.

That would be in excess of her needs in a range of $40,000 to $50,000 a year, the higher sum reflecting perhaps costs of travel to see her grandchildren, gifts to them, a winter holiday and other pleasures. The excess income could be banked or just given to her family or to good causes, the latter with tax advantages.

There are other simple moves Mary can make to generate income and reduce tax. First, and most obvious, is to open a Tax-Free Savings Account. Under 2015 rules that do not reflect new moves by the federal government, to reduce TFSA contribution space, Mary could shelter $41,000 and reduce tax for the year by $1,250 a year. She could also top up the Top up the Financial Education Savings Plans of her grandchil-

Mary's substantial financial assets should be moved to professional management, Tyler suggests. Fee-only planners will handle the chore for about one to 1.5 per cent of assets under management. That would save her as much as 1.5 per cent of average fees charged by equity mutual funds. If she wishes to use mutual funds, corporate class units that can be swapped within the class umbrella without tax would reduce tax bills. There are guaranteed income funds with tax advantages, but the high inter-

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Above all, Mary should move the $590,000 she holds in cash and GICs to more profitable uses. A portfolio of stocks with a history of raising dividends would be a good approach. A modest allocation, about 10 per cent, to investment grade corporate bonds, or to good causes, the latter with tax advantages. The excess income could be banked or just given to her family or to good causes, the latter with tax advantages.

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Columns

KELLY’S AGEEXPERT TIPS AND HINTS

Back up your data with AgExpert

Learn how to back up and restore your data files and use other file-saving features

CREATING PROPER BACKUPS OF YOUR DATA FILE IS AN IMPORTANT PART OF USING THE SOFTWARE. HERE ARE THE STEPS WHEN USING AN ACCOUNTING SOFTWARE LIKE AGEXPERT:

1. Choose File > Backup
2. Choose file information when you want to back up the data file, usually the file should be restored to the C:\Documents\Analytics\Data folder.
3. Click “Restore.” You should see a green checkmark.
4. Click “Ok” then close the restore window.
5. To get back to work, File > Open > in the Documents/Analytics/Data folder you should see the name of the data file you restored. Highlight it and click open.

SAVE A SNAPSHOT
Just before attempting to enter a difficult or uncommon transaction, you can use the Snapshot feature. Choosing File > Save Snapshot instantly creates a picture of the current data file you’re working in. If you have problems entering a transaction, you can return the data file to the way it was when you started, by choosing File > Revert to Snapshot.

Warning: If you revert to the snapshot, any changes made since the snapshot was created will be lost. Make sure that’s what you really want to do!

USING “SAVE AS” TO CREATE A PRACTICE FILE
File > Save As will save a working copy of your open data file under a new file name. Often use this feature to create a “Practice File” from the AgExpert sample data file that comes with the software.

1. Choose File > Open Sample Data File
2. Choose File > Save As
3. Set File Name: Type “my practice data file”

HOW TO CREATE A BACKUP
1. Choose File > Backup
2. Last Backup: gives you information on when the last back up was created, and its location
3. Current Backup: Choose where you want to store the backup copy. Click on the folder icon to choose location.
   - Backup to Hard drive: Select the appropriate location. The file directory usually looks similar to this: C:\Documents\Analytics\Backup.
   - Backup to removable hardware such as a USB flash drive: insert the USB flash drive into your computer, then click on the folder icon to choose the appropriate drive.
4. Click “Back Up.” If you get a message saying that the backup file already exists and will be overwritten, click “Yes.” The current backup will then overwrite the old one.
5. Once the backup is completed successfully a window should appear: Click “Ok.”
6. If you would like to back up to a CD/DVD, use the AgExpert software to burn the backup file onto a disc by clicking on this button and following the instructions accordingly.

HOW TO RESTORE A BACKUP FILE
1. Choose File > Restore
2. Choose the location where you keep your backup files. Click on the folder icon to browse for the location on your hard drive, USB Flash Drive, disc or other.
3. Choose the data file you would like to restore. Click on the file name to highlight it. At the bottom of the screen you’ll see information about your file:

NEW Valtera™, a pre-emergence pre-emergence burndown with residual activity, cleans up early season broadleaf weeds and keeps on going for cleaner fields throughout the season. Weed control that burns down but doesn’t burn out.

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Grow a better tomorrow.
Diary of a tough year for canola

BY LES HENRY

As I was preparing to write this, the Dec. 1 issue of Grainews arrived with Lee Hart's front page article: “Holy Canola! A 74 bushel average yield." No 74 bushels here. My story is the land is rolling dark brown, loam texture, glacial till with some stones and many sloughs. It has been continuous cropped wheat/peas/wheat/canola for 17 years.

SEPTEMBER 16, 2014

Harvested a 48 bu./ac. wheat crop, CWRS No. 2 with 14.8 per cent protein and a bit of fusarium. The combine rolls at 2.5 m.p.h. The first real rain of the season: 0.5 litres/acre of glyphosate left some late weeds. The coldest being -5.7 C on May 18. Where was global warming when we needed it?

NOVEMBER 17, 2014

FLOATED ON 100 LBS./ACRE 21-0-0-24

APRIL 23, 2015

Snow all gone, weather warming up and looking like we might have an early spring for a change.

APRIL 25, 2015

A foot or more of wet heavy snow, leaving 2.5” water in rain gauges when it melted and many sloughs with water.

MAY 2 TO 4, 2015

Weather had warmed up nicely, leaves were on the poplar trees, must be time to seed. Seeded 4.2 lbs./acre 45129 RR canola with museum piece CIH 7200 drill with atom jet openers. Phosphate with seed was 20 lbs./acre P2O5 as 11-52-0. Apart from wet sloughs, seeding conditions were excellent — moisture was right at surface and soil fully recharged with water. Started out seeding about 1 inch deep but with moisture right there decided to pull it up and just tickle it in.

Big mistake! The moisture was right there but the weather turned cold right after seeding. The cold delayed germination and soil dried up so shallow seeding was a disaster. Never again.

Saskatoon weather station recorded frost on 11 nights in May, the coldest being -5.7 C on May 18. Where was global warming when we needed it?

With the cold weather, growth was slow to none and germination poor.

MAY, 2015

Rain, almost 0. It was not the lack of rain but the cold that gave the crop such a struggle. It made me sick to look at the poor stand and poorer growth.

We considered reseeding but many gave me advice not to — good advice. The crop was struggling. Some cotyledons were frozen off and the green growing point was limp. Did not spray Roundup at usual time top to avoid further stress on hugely stressed plants.

JUNE 4, 2015

Finally sprayed 0.5 litres/acre of glyphosate and control was very good. With first spraying being so late a second was not done, so there were some weeds in what is usually a very clean crop. Only one spray was not that I was too cheap, it just did not work out with turtle-like early growth.

JUNE 8, 2015

The best of it didn’t look great. I have no pictures of the worst. That was just a lot of bare ground. Who wants a picture of bare ground? June rain: total 1.5 inches. The biggest rain event was 0.3 of an inch.

JULY 13, 2015

By mid-July, the plants had big cabbage leaves and no disease. When the weather finally warmed up the canola took off like a rabbit. It’s hard to imagine the resilience of that crop.

Parts of the field never really grew. It seemed to go straight from brown to yellow!

JULY 28, 2015

The first real rain of the season: 3.6” nice slow rain. It all soaked in and the water table rose. But, it was too late for the 2015 crop. It survived on the ample soil moisture and, in places, the high water table.

JULY 30, 2015

By the end of July the crop was well podded and could hold up the spade.

AUGUST 17, 2015

Swathed. Many plants had branched to provide several “main” type stems. We considered reseeding but didn’t. We had no pictures of the worst. That was just a lot of bare ground. Who wants a picture of bare ground? August was just a lot of bare ground.

AUGUST 30, 2015

The combine rolls at 2.5 m.p.h. to put most of it in hopper. The final elevator yield was 40 bu./acre gross, 37 net. There was dockage — the one shot of glyphosate left some late weeds.

THE OUTCOME

2015 was a real lesson in reality and a reminder of the rules in farming. Rule 1 Mother Nature is in charge. Rule 2 If in doubt, see Rule 1.

†

More peas please

China is becoming a major importer of Canadian peas, thanks in large part to vermicelli noodles. Starch from mung beans was originally used to make these noodles but as that supply decreased, the search was on for a replacement. Starch from Canadian yellow peas is now commonly used as an ingredient in these noodles which are very popular in the Asian market.

HOW CUSTOMERS USE CANADIAN FIELD CROPS

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Seeding wet areas late

In my rolling land there are sloughs that do not dry up in time to seed as usual. There is also an area where a slough spills over and keeps ground wet. With no rain I was able to get on it by May 25 but did not want to drag the press wheels of drill through the struggling crop. So I “Johnny applesseeded” and worked fairly deep with 16” sweeps and a mounted tine harrow. The idea was not to grow more crop — too much difference in seeding dates. The objective was to keep the weeds out. It worked in spades and I would do it again in a heartbeat.

I took this picture on August 18, at swathing time. The broadcast seeding came up quickly and very thick and it did pod well by swath time, but there was not much seed. If it were a larger area that was worth leaving it would have been a fair yield. We had no killing fall frost until well into October.

Les Henry

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Review of 2015 and look forward

In this issue Andy Sirski reviews the ups and downs of his portfolio last year.

Every year I try to review the previous year. 2015 was a tricky year with many ups and downs. It was a stock picker’s year, any investor who relied on the major indexes as an investment guide likely did not make much money. I actually do not follow the value of my overall portfolio as closely as I used to. That’s partly because I don’t worry or think about it all that much. Also I made a lot of changes to my portfolio — to my thinking that usually slows down a portfolio. Finally, the market turned from an overall bullish tone to a stock picker’s market and until tax season ended in June, I was too busy to accurately find those winning stocks. During 2015 I moved a significant amount of money from Canadian to U.S. dollars. The U.S. dollar investments didn’t make much money, but the drop in our Canadian dollar helped to offset some of that. Sadly, I learned a lot on Alcoa (AA) in the earlier part of the year. It was up and down like a yoyo and I lost money on it. I also had a lot of our portfolio in Canadian cash during the first few months of the year, which did not make me much money. I was not happy with the fees my bank was charging, so I kept a lot of my portfolio in cash until I could move my three accounts to another bank. As you would expect, being in cash did not make me much money.

**LEARNED A LOT**

As you likely know I put a lot of value on learning and this was a good year for learning for me. First, I learned the hard way to sell when the daily price dropped through its 10-day moving average. I did not sell Alcoa with that rule and it cost me money. The price of shares dropped through the 10 dma at around $17 early in 2015. I tried to fight that drop by selling calls and that helped offset some of that drop but it was a hard way to hold onto equity. I finally caved in and sold out but it hurt. So, I had my portfolio in cash for a good part of the year, lost some money because I did not follow selling rules and made some money converting from Canadian to U.S. dollars. 2015 was not a very profitable year, at least not in the first eight months of the year. In late August I went to about 95 per cent cash and stayed there until about late September. I did dabble a bit with a stock or two but I was testing my updated stock picking strategy and had to get in step with the volatile market.

**WHAT I LEARNED IN 2015**

First of all, the market drove home to me that it’s important to follow selling rules. I was not so proud as to say that my stock picking skills were for sale, so now when I buy a stock and it starts to lose money, I sell out. Second, I learned that to win with stocks I need a list of good quality stocks. At the months go by, it looks to me that for the next few years we will have a stock picker’s market, not one where a rising market raises all stocks. All stocks might go up but I think the big money will use that word rotation. After a stock goes up some reasonable amount, those buyers will turn into sellers, and short sellers will step in to drive the price of shares back down to some price where the stock will be a good buy again.

If you look at a bunch of charts you will see over and over again how the “hump” in the price of a stock has been taken out. I think the world is in a stage of slow or low growth and it’s going to take years to work through this new era.

**People have a lot of debt**

There is also much debt in the world. Governments have a lot of debt. People have a lot of debt. After the recession, it will take us a while to turn “too much” debt into “manageable” debt.

In the meantime the “one baby” policy in China and the aging baby boomers in North America have capped or stymied the growth most of us baby boomers have known throughout our life.

I don’t know if this will lead to massive inflation like we had in the 1970s. I’m more inclined to think that the easy money has been used by the banking system to prop up the reserves in our banks and to drive down the cost of borrowing to accommodate bigger debt. For a few years, going for capital gains might be a tough battle with stocks. It may also be harder to find growth than it has been in the past. What might be easier is to use a three part system to make money with stocks. One part is to find good stocks that pay a rising dividend. The next part is to buy those stocks as they bottom and sell them as they top out. And third is to sell covered calls on some stocks to get extra cash from our stocks.

**Columns**

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Wheat in Barley
I have to admit I am more than a little sceptical of the term “consumer demand.” If I believed every TV commercial, news report, magazine article and corporate pitch talking about consumer demand I doubt I’d be able to leave the house without running into an ad telling me to buy Web-enabled food in front of some office or business screwscrewing our demands. The fact is I haven’t seen that.

And yet you can hardly go to a meeting, hear a news report, or read a headline where someone isn’t confirming that “consumers are demanding” or “sales are down.”

Consumers probably have a lot of wants, but I really wonder how many are demanding, and if they are, then precisely where are they doing this demanding?

Yet you listen to conference speakers, retailers, restaurant chains — even many industry associations — and we are reminded time and again consumers are demanding a certain product or practice.

Yes, consumer trends and preferences change, but I think a lot of the talk about “demand” is self-serving commercial hype. A company like Costco, or Walmart or the board of directors at A & W might be “demanding” something but it may only be partly based on consumer preferences.

MARKETING STRATEGY

I wonder if the real strategy isn’t more about let’s create a problem, or at least allude to a potential consumer concern and present ourselves as the solution. “Isn’t it awful that horses go to packing plants, well we are one retailer that will never sell horse meat.”

Or “conventionally raised ham, we won’t do that.”

To be honest I have yet to hear that claim, but it wouldn’t one day surprise me to see if featured on a menu “antibiotic-free, hormone-free, bovine-free zone.”

The so-called consumer demand is more often than not based on a marketing strategy — find a problem and offer ourselves as a solution.

I like A & W burgers. I have from the get go been one of the first places I hit when I finally got a driver’s licence, borrowed my parents’ car, and was warned by my mother to stay on the country roads close to the farm, was straight to the city to an A & W drive-in restaurant. Even the potential wrath of mother could not come between me and a Papa burger.

A is W is a good restaurant, has good products, reasonably good value, and certainly is a good marketer. One improvement I suggested to a company vice-president at a conference this past fall was that could come up with zero-calorie poutine, they’d really be on to something. But, A & W has reinvented itself on the back of the livestock industry, all around a myth that somehow conventionally produced beef and chicken is not as good as an antibiotic- and hormone-free product that has never been fed animal protein.

The danger with the usual words “conventional is bad” but the message is clear. So was that based on something the consumer was demanding, or did A & W just indirectly tell consumers something wasn’t good, but we have the solution? And they are not the only restaurant or food retailer to do this.

Another questionable practice are industry associations who spend a fair chunk of checkoff dollars producing warm and fuzzy videos showing farmers and ranchers who are the most kind and considerate and environmentally and animal welfare-conscious people on the face of the earth. And they very well may be and likely are just that. They are nice to look at, but how many consumers actually ever see them? The association feels good about doing this consumer education, but does it ever win over a single borderline consumer? Does it change an attitude? If this message is so vital perhaps crop protection companies, animal health companies, processors and retailers should foot the bill for these productions.

BUSY RETAILERS

I don’t believe consumers are at Costco or Walmart because they are searching out hormone- and antibiotic-free products produced by happy farmers using environmentally sound and humane production practices. The consumers might think those are all features that are nice to know, but they are there for price and value.

I think what the consumer wants, and perhaps mostly demands, is a good-quality product, safe and healthy, hopefully tasty, and available at the lowest price possible. I think they like to see a farmer’s face, like to know products are produced with good environmental stewardship, want to believe animals are treated properly and raised with humane production practices, but those are all secondary or bonus features.

I put conventionally raised hamburger on sale for $1/pound and watch out for the stampede.

There is no doubt a small percentage that will ignore price to search out retailers offering these “better” food products, but they are a minority.

This list of “consumer demands” and the changes it brings to the agriculture industry isn’t necessarily a bad thing. Crops and livestock should be produced with the minimum of crop protection products, or antibiotics or added hormones, in the most environmentally sustainable manner and with safe and humane livestock production practices. There is an old line, “if you are doing something you wouldn’t tell your wife, then you shouldn’t be doing it.” Similarly with agriculture if you are doing something you don’t want people to see, then you shouldn’t be doing it.

It is important to keep “consumer demand” in perspective. Use the best production practices, and the consumers will come.

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Heading toward autonomy

On display at Agritechnica: a driverless Dutch-built tractor hits the market

General purpose, completely autonomous (driverless) tractors may be the holy grail of farm equipment design. And over the past few years a wide variety of companies have offered farmers enticing glimpses of what the future may hold in that area. There have been a number of limited-use robotic machines introduced to do specific tasks on the farm. But so far, however, North American fields aren't exactly crawling with mechanical drones toiling away while owners put their feet up in the farm office.

It may be fair to say, though, it's only a matter of time until that happens.

In November at Agritechnica 2015, one more market-ready, autonomous tractor was introduced to farmers. And this one is ready — it's developers say — to work fields or do other jobs on its own. The Dutch-built Greenbot can do about 80 per cent of all typical field jobs, according to Peter Mouthaan, CEO of Dutch Power Company, creator of the Greenbot. "It's an autonomous tractor with 100 horsepower, complete with safety devices," he says. "We've developed it in two years. One year of development and building, and testing for one year. Now this is the production version."

It's an autonomous tractor with 100 horsepower, complete with safety devices," he says. "We've developed it in two years. One year of development and building, and testing for one year. Now this is the production version."

The Greenbot is designed specifically to be as versatile as possible, and to be capable in the field. A Perkins diesel engine provides the power, which is distributed to all four wheels via a hydrostatic drive system. It has both front and rear three-point hitches, hydraulic remotes at both ends and a PTO. It weighs 3,000 kilograms, which makes it a little light when it comes to the typical horsepower-to-weight ratio of a western Canadian field tractor. Top speed is 25 km/h.

Mouthaan's company has been producing robotic system components for some time and has been a supplier to other companies that have incorporated a variety of autonomous systems, but this is the first full-fledged driverless tractor the company has offered. And it is built entirely of Dutch Power's own systems, including the computer program software.

The Greenbot can be controlled in several ways. It can be steered remotely, respond to GPS map input, given a specific travel route or taken to a field, given boundaries and allowed to determine its own most efficient travel pattern to complete a job.

"We have three ways to implement the system," he explains. "You can do it with radio controls — a joystick. You can also put a (GPS) map in that you make on your computer. You can also go out to the field, let the machine go around one time and then say, OK, optimize itself."

Some farmers who were involved with the initial field trials were a bit sceptical at first, says Mouthaan. But that's been a familiar pattern with autonomous system introductions. "At first they're a little bit scared," he says. "Then they see it working. It's kind of the same process like when milking robots started."

"This one is already sold," he says, as he stands beside one model at the company display in Hanover Germany. "This one is the full-option version. Complete, this one is 150,000 Euros (about CDN$213,000). It does 80 percent of your standardized work in a field."

Mouthaan says interest from farmers stopping by his booth during Agritechnica has been high. "People have asked at the fair, how, for a 200 hp version," he adds. "We'll start with this one, then we'll go further."

Scott Garvey is machinery editor for Grainews. Contact him at Scott.Garvey@fbcpublishing.com.

1. An Autonomous Greenbot tractor with attached rototiller on display at Agritechnica.
2. The tractor has both front and rear three-point hitches and PTO.
3. Field jobs can be programmed into the Greenbot's onboard system.
This is a real silage baler

Agronic Multibaler turns chopped silage into round bales

BY SCOTT GARVEY

When you’re walking the aisles at the giant Agritechnica machinery show in Hanover, Germany, you sometimes have to stop and do a double take to figure just what some machines displayed there actually do. That was the case for me when I spotted the Agronic Multibaler.

Built by a company in the Netherlands, the two models of Multibalers take chopped silage, compact it and turn it into round bales wrapped in plastic. “Why would you want to do that?” I asked a marketing rep at the company’s display.

Faster ensiling operations requiring fewer workers, convenience when feeding and easier, lower-cost transport was the answer.

If a farm uses multiple silage clamps and one is running out near the end of the feeding season, having a store of round bales to use would make it unnecessary to open up another sealed pit for just a few weeks’ feed. If you want to sell feed or move it any distance, packaging silage in the form of round bales can make those processes easier as well.

But perhaps most significant of all is it can speed up ensiling operations and make it a one-man job. By allowing one operator with a front-mounted forage harvester on a tractor to feed silage directly into the Multibaler, he can continue working in the field all day. The baler would leave a trail of wrapped silage bales behind it. There is no need to race back and forth to the yard with a truck load of loose silage that has to be packed into a pit. So one man gets the job done instead of three. The wrapped bales can be picked up later after chopping is finished and hauled back as time permits.

When you break open one of the bales, you still have the same type and quality of feed you’d get from a packed silage pit.

The 820 and 1210 models produce two sizes of bales ranging from 250 to 450 kilograms with the 820 and 600 to 1,000 kilograms with the 1210. A standard 540 PTO provides power to the Multibalers, which require only a 70-horsepower tractor for the smaller model and 90 for the larger 1210. The Multibalers can also be ordered with their own onboard diesel power supply.

Aside from taking silage directly from a forage harvester in the field, they can work in a stationary environment, allowing silage to be dumped into the onboard hopper with a grapple loader and processed into bales right in the farmyard.

Depending on the model and features, a multibaler will set you back something north of $140,000. The company’s website is www.gebknoll.nl.

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New X8 tractors from McCormick

Italian manufacturer Argo adds larger tractors to its McCormick brand

By Scott Garvey

Italian manufacturer Argo has been in the process of updating the models in its McCormick tractor brand for a few years now. Last year it brought the most recent addition to its line, the X7 Series, to North America, and executives promised there was more to come. At the Agritechnica machinery expo in Hanover Germany in November, they made good on that promise by debuting the all-new and larger X8 Series.

Topping out at 310 engine horsepower, these tractors will be the most powerful models the brand offers when they start production in early 2017. And they won’t be shy on high-end features.

“The X8 is a new beast that we will launch in production at the end of next year, in the first quarter of 2017,” said Mirco Candiani, product manager for McCormick tractors at the company’s display at Agritechnica. “There will be three models starting at 264 horsepower and ending at 310.”

Under the hood the X8s will use Tier 4 Final-compliant, six-cylinder, 6.7-litre Fiat Powertrain (FPT) diesels with variable geometry turbochargers. All models will use a programmable four-range CVT transmission built by German transmission manufacturer ZF. McCormick calls it the “VT Drive”. Those transmissions will also be available with a 50 km/hr option.

A front-mounted three-point hitch integrated into the chassis will be standard equipment, offering a five-tonne lift capacity. Rear hitch lift capacity hits 12 tonnes. A closed-centre hydraulic pump will provide a standard flow rate of 157 l/min. If that’s not enough, it can be upgraded to 212. The tractors can accommodate up to 10 SCV valves at the front, rear and mid-mount positions.

X8s offer three PTO speeds — 540 eco, 1,000 and 1,000 eco. To help avoid driveline damage when using mounted equipment, the tractors will automatically stop the PTO at pre-set three-point hitch lift heights. A front PTO is available, too.

The chassis will be able to accommodate some pretty large rear tire sizes, including a 900/60R42. Also standard is a cab suspension, with an active dampening system, along with an electronically controlled hydraulic front axle suspension. Inside the cab operators will find a typical multi-function armrest and a 12-inch monitor. A forward instrument cluster will tilt along with the steering column.

The X8s carry on the new McCormick body styling. Up to 18 LED work lights can be incorporated into the hood, fenders and cab roof.

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One of the downsides to living in a rural area is not having access to the kind of amenities city residents do. That includes the opportunity to take part-time training courses in many trades that are useful on the farm, like welding. But these days Internet resources can help bridge that training gap. Welding equipment manufacturer Victor Technologies is one company that has a website offering educational opportunities.

“We want the Victor Technologies’ training site to become the go-to resource of the cutting and welding industry,” says Robert Shigley, senior training manager. “End users and distributor partners need easy access to a full range of information, wherever they are, and they can easily get it by accessing this site.”

The website http://training.victortechnologies.com is free for anyone to access. It no longer requires students to log in or register. The site contains a variety of videos and training tutorials that cover most aspects of welding and oxy-acetylene cutting. The site’s search feature allows visitors to quickly find all relevant content for a specific topic.

“The new site provides immediate value to visitors by giving them the resources they need up front, without having to log in,” says Shigley. “However, additional learning opportunities are available by registering, which is free.” If visitors wish, they can track their learning history by creating a log in and building a profile.

The site can also be accessed through the company’s home page, www.victortechnologies.com and clicking on the “training and resources” tab. The site’s content has been optimized for viewing on mobile devices.

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NEW MACHINERY

Fendt 500 Varios arrive in Canada
AGCO brings the compact-chassis 500 Vario Series tractors to North America

AGCO's Fendt brand debuted the 500 Vario Series tractors at an event in Germany in 2012. As of this year, they are available in Canada.

BY SCOTT GARVEY

AGCO used this summer’s U.S. Farm Progress Show in Illinois as the venue to finally debut the 107- to 137-PTO horsepower Fendt 500 Vario Series tractors in North America. The models were first introduced in September of 2012 in Germany for the European market, but at that time brand executives explained it would take a while to develop versions of the tractors that met North American engineering standards. European machines still differ slightly from ours in a variety of ways.

The 500s offer a compact chassis design with a little more horsepower than you’d expect for a machine of that size. They fit into that relatively new compact, mid-range tractor category that packs bigger horsepower into smaller packages. The idea is to create a more versatile machine that is as capable with a front-end loader as it is in the field. Although topping out at 137 PTO horsepower, field jobs for 500s on the prairie will be limited.

Inside the cab, these tractors, like their larger brothers, come with 7.0- or 10.4-inch screens that use the brand’s own Varioterminal for control of all tractor and implement functions in a single monitor. And Varioterminals are fully ISOBUS compatible, so in most cases there shouldn’t be any need for a second dedicated implement monitor.

In the press release announcing the arrival of the 500 Varios, the company describes the tractors’ digital capability this way: “The Fendt 500s are among AGCO’s top-of-the-line, high-end technology machines, powered by AGCO’s Fuse precision agriculture products and services.”

Looking out of the cab through the 65 square feet of glass, operators get a 320-degree panoramic view to make it easier when working at close-quarter jobs, such as in livestock pens. The curved windshield also extends up into the cab roof to improve visibility when doing front-end loader work.

The 500s come with standard pneumatic self-levelling cab suspension to improve ride comfort. The cab gets supported on four points with integrated self-levelling bearings at the front and air springs at the rear. The self-levelling front axle suspension can improve the tractors’ overall ride quality even further.

The 500s are fast, too, claiming a top road speed of 31 m.p.h.

These tractors can be ordered with the brand’s CargoProfi front-end loader that offers its own high-end features, like preset positions, bucket tilt sensors and load weighing capability. All of these are controlled through the Varioterminal.

All in all, the Fendt brand offers the highest-end features AGCO builds into a tractor. Of course, those options boost the price tags for these pale green machines. But company executives say they believe that along with the higher cost comes increased benefits, so the extra investment makes sense.

“Ultimately, all this technology will give the operator the ability to use the machine for optimum performance and the ability to turn his or her attention to other management decisions, away from the setting and adjustments of the machines,” says Josh Keeney, AGCO Fendt tactical marketing manager.

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A larger mower conditioner from Vermeer

The MC4500 brings the maximum cutting width in Vermeer’s line of mower conditioners to 15 feet.

The MC4500 pushes the brand’s widest cutting width to 15 feet

By Scott Garvey

Vermeer announced in September that it was stretching the maximum cutting width on its line of mower conditioner models to 15 feet. To do that it introduced the new MC4500, which becomes the fourth and widest model in the brand’s mco line.

“The MC4500 mower conditioner brings more size, speed, versatility and reliability to the operator in the field,” said Vermeer product manager, Josh Vrieze, in the company announcement.

The 15-foot MC4500 uses a drawbar swivel hitch, which makes hooking up the implement a little easier. Also designed to make things easier on the operator across the full line of the brand’s mco’s is the Quick-Clip Blade Retention System, which makes replacing and reversing cutter blades quicker and simpler.

The company claims its Q3 Cutter Bar technology helps the tractor powering it to be more fuel-efficient, because its drive system requires less horsepower to turn than other gear-bed style cutter bars. It also uses Vermeer’s Quick-Change shear ring to protect the bar from damage, making down time a little shorter when something does go wrong.

The entire mower conditioner line uses an adjustable suspension system that includes nitrogen-charged accumulators to soften shocks to the header. All of which, apparently does a better job in preventing damage to the header and frame than standard metal springs.

All models in the line come with the option of either a steel roller or v-tine conditioner.

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Genetics point to 'easy keepers'

Producers may be able to trim 10 to 15 per cent off feeding costs by selecting cattle for feed efficiency

BY LISA GUENTHER

S
outhern Alberta rancher Daniel Doerksen likes a certain type of cow—a functional, easy-keeper that can raise a good calf. “Our bull selection is based on raising productive females,” Daniel said during an interview at recent western Canadian beef show. Part of that strategy has been to select smaller-framed cows that should be feed efficient, he adds. “Feed is our most expensive cost throughout the year, so cattle that can convert their feed into pounds most efficiently are going to be the most profitable.”

The Doerksen family has been raising registered Herefords for more than 40 years. Today they run purebred Hereford and Angus heifers under Gemstone Cattle, named for the nearby town of Gem in southern Alberta. Daniel’s family also runs a commercial herd and a small feedlot.

Daniel says they put tough selection pressure on calves early in the process. “We have had more feedlot losses than expected, and is feed efficient. RFI is a heritable trait and doesn’t influence other traits. That means producers could select for it without affecting other desirable traits. According to the Canadian Hereford Association’s website, selecting for RFI could cut maintenance costs by nine to 10 per cent. Methane emissions and manure could also drop substantially.

To test whether their cattle were, in fact, feed efficient, the Doerksen family entered 26 bulls in the Hereford breeders. Daniel plans to enrol in another year of RFI testing for interested Hereford breeders. Daniel says they were “really happy” with the early results from the Canadian Hereford Association’s trials. That research “found our cattle appear to be above breed average for RFI,” he says. Gemstone Cattle entered 26 bulls in the trials, and 23 ranked among the top 18 per cent for low RFI. The trials revealed a 1.73 lb/day gap in feed consumption between the most and least efficient bulls. The Canadian Hereford Association notes that if feed costs $0.065 per lb, the least efficient bull would cost $40 more to feed each year. The Hereford Association’s project included three years of RFI trials at Cattle Feedyards. Researchers assessed RFI in 1,000 Hereford bulls provided by 63 beef producers during the trials. Each trial included 77 days of testing, plus a 21-day warmup period for the bulls. Growers’ bunks measured feed intake of individual animals through their I.D. tags.

Researchers collected data including weight, hip height, and ultrasound results for marbling score, rib-eye area and backfat thickness. The Canadian Hereford Association trial was funded by the Natural Sciences and Engineering Council. Other partners in the RFI project included the University of Alberta, Livestock Genetic, Alberta Agriculture and Forestry, Cattle Feedyards and Olds College.

Next steps

The research trial has wrapped, but the Canadian Hereford Association is facilitating another year of RFI testing for interested Hereford breeders. Producers don’t have to pick up as much of the cost, Daniel said, although they still had to pay to enrol bulls. Now that that trial is done, producers will have to pay about $400 per head to test bulls. That includes 104 days of feeding, bedding and the testing itself. The Alberta Livestock and Meat Agency is covering the HD Genotype Analysis, which would come to $110 per head.

RFI EPDs are available on performance-tested animals and some of their relatives. Dr. John Crowley writes via email, “RFI EPDs are not everything. It needs to be considered in tandem with a suite of other traits.” Daniel adds, “Our bull selection is based on raising productive females, but it is a functional, easy-keeper that can raise a good calf.”

Adding insulation to heated water tanks

BY MICHAEL THOMAS

It is that time of the year when we find ourselves battling the cold weather to provide water for our stock. Many ranchers and farmers use heated water tanks to increase water consumption for stock/ horeses while reducing or eliminating the battle with ice and wasted water. Unfortunately heaters are expensive to operate and, are not inoffiable in sub-zero temperatures. With a bit of innovation, some recycled material and a little ingenuity, many of us have laying around the barnyard, it is possible to increase the efficiency and reduce sub-zero freeze up of these tanks. There are some thermastatically controlled to maintain the temperature of the water to a precise amount, above freezing. As air temperature drops the heating element is activated for longer periods of time. Often, the first place the owner notices the impact of colder weather is the increase in the electric bill. As temperatures continue to drop tanks begin to freeze as a point is reached where the heater can no longer offset the cold air temperatures.

Adding insulation

Many of us have bought tanks with drain plug heaters or added the heaters to tanks ourselves. Most of these tanks are made of a single layer material, either galvanized metal or plastic. These tanks have lost efficiency and freeze up become an issue. If you have ever noticed snow melted away from the tank, you are losing a considerable amount of energy from the tank and are at risk of sub-zero freeze up. Simply by creating a dead-air space of an inch or two (2.5-5.0 cm) between the tank and outside temperature the amount of energy required to keep the water warm is dramatically reduced.

The following process can be applied to both small individual tubs and larger tanks. Small tubs (16 gallon/60 litre) use smaller heating elements (approximately 200 watt) and are most susceptible to freezing at temperatures below 0°F/-18°C.

Materials Needed

Used cattle supplement tubs (blue in photos) work great to provide an outer jacket for these small tubs. You will need a couple of cans of expanding insulating spray foam, some water-proof filler material (Styrofoam packing peanuts work great), and a can of all-weather spray paint.

Steps

Clean the inside of the live-stock supplement (blue) tub.

1. Drill a hole on the side of the supplement tub, near the bottom, just large enough to allow for the heater’s power cord.

2. Drill a series of small holes, about a foot apart, in the side of the supplement tub near the bottom to allow any moisture that might accumulate with the jacket to escape.

3. Next apply expanding spray foam to the inside bottom of the supplement tub in a spiral pattern from the outside edge to the centre.

4. Allow the spray foam a few minutes to expand to its limit and then carefully insert the water tub into the supplement tub, down into the power cord for the heater unit through the hole in the bottom supplement tub as you go. Centre the water tub in the supplement tub as it settles into the foam. It works best to allow the water tub to nest in the foam, allowing a small space between the bottom of the water tub and the supplement tub.

5. Next, insert the filler material (Styrofoam peanuts) loosely into the void between the water tub and the supplement tub.

6. When you have filled the void to about six inches (15.24 cm) of the top of the supplement tub, apply more spray foam, a layer at a time, until you reach the top of the supplement tub. Allow the spray foam time to cure.

7. Using a sharp knife or thin-bladed saw, trim away any excess foam material that has expanded above the supplement tub.

8. Apply two to three coats of all-weather spray paint to protect the foam and allow it to cure. The newly insulated heated water tub is now ready to begin giving you electrical savings and less headaches on cold days.

WINTERIZING
Milk production and reproductive performance are at risk

Don’t feed mouldy corn to dairy cattle

BY PETER VITTI

L ast year’s weather was not particularly kind to growing corn on the eastern Prairies. A late spring planting, cold weather in July, and topped off by a cloudy fall created millions of bushels of high-moisture corn in a bin not initially dry enough for storage. Some of this wet corn was dried down and augered into a bin, much of it was also put up as high-moisture corn, and even a small portion was left out in the field until harvested earlier this year. Regardless of how this corn was eventually handled, mould (re: zearalenone) seems to have hit this previous corn crop particularly hard. Without taking the necessary actions and precautions when it does occur, feeding mouldy to dairy cattle can be very dangerous.

Mould growth in corn can develop in a grain bin when grain moisture levels are above 14 per cent, the storage temperature is above freezing and the corn is exposed to air (oxygen). High moisture grain corn also can be at risk for mould growth, if the moisture content of storage is incorrect (recommended at 25 to 28 per cent moisture for oxygen-limiting tower and 30 to 35 per cent moisture for a-bags and bunks) or pH of the corn mass is not quickly stabilized to an acidic 4.5 by proper respiration (oxygen removal) and fermentation processes.

THREE MAJOR Moulds

Of the many moulds that can grow and proliferate in harvested corn due to improper storage conditions, three major moulds pose the greatest dairy cow threat with associated deadly mycotoxins:

- Aspergillus flavus that produce aflatoxins, Penicillium moulds that produce vomitoxin and zearalenone, and Fusarium fungi that produce related penicillic mycotoxins.

Most Canadian climates do not favour the growth of Aspergillus flavus and therefore Aflatoxins are of little threat to our dairy cattle. Fusarium-derived vomitoxin is of minor concern, yet zearalenone, another aspergillus mycotoxin is more of a danger to our livestock than aflatoxins, because they grow in cooler conditions found in Western Canada.

In contrast, zearalenone, another Fusarium mycotoxin has estrogen-like properties, which will cause infertility in dairy cattle. As little as 300 ppb (parts per billion) in the total dairy diet (dmi, basis) from z-contaminated corn has been implicated in disrupting heat cycles, reducing conception rates, causing visible symptoms such as swollen vulvas, and prolapsed vagi,

cause liver damage and has been shown to suppress the immune system in dairy cattle.

An honourable mention should be given to other fusarium mycotoxins such as T2 and Fumonisin that can cause reproductive and health problems in cattle but are seldom found in Canadian feedstuffs. Similarly, Penicillium mycotoxins have also been linked to reproductive and health problems in dairy cattle.

NO SMOKING GUN

Unfortunately, without “the smoking gun” of large known amounts of mouldy corn consumed by all dairy cattle and causing direct negative effects, it is very difficult to many dairy producers to know that they might have a mouldy corn problem in the first place; namely, for two major reasons.

First, mouldy corn kernels are often not uniformly distributed in a bin of corn, but are located in isolated pockets or along the bin walls. Even if a significant amount of mouldy corn goes into the total mixed ration (TMR) for dairy cows, most people may simply not notice as it gets hammermilled or rolled and then mixed along with the “good corn” in the TMR and become invisible anyways!

Secondly, symptoms of mould and mycotoxin poisoning in cattle is likely non-specific and often the result of a negative progression of health, reproductive and performance problems caused by the contamination. Even a post-mortem examination of a dead cow may yield inconclusive results, which could mistakenly be attributed to another cause such as poor nutrition or disease.

If one suspects a mouldy corn problem on the farm such as mouldy corn is seen coming out of bin or cows are off their feed/leak down of cud-chewing/loose manure/abnormal cals and mycotoxins poisoning in cattle, it is a good idea to see a representative corn sample from the bin for laboratory mould testing.

Mould count tests are expensive, but their usefulness as sound information is limited, since most moulds are not poisonous and it says little about the presence of any mycotoxins in grain corn. A more reliable test called a mould screen test is very useful in identifying and eliminating what mould species and their mycotoxins that might be present.

Moulding corn (re: zearalenone) with “clean” feed is not a good idea, because this does not eliminate the problem and reduces the quality and safety of the available good feed. In situations of vomitoxin, commercial mould binders might offer a suitable solution, when there are no other viable dairy feeds are available.

To reach Peter Vitti call 204-254-7497 or by email at vitti@mts.net.

The 2016 Alberta Beef Industry Conference will present valuable information and perspectives that will help foster innovation, improve profitability, prepare for the unknown, and grow a forward-thinking beef industry, while meeting the needs of the consumer.

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Events immediately following birth are important to future health of the calf.

**BREATHING**

In the past, veterinarians often recommended holding a calf up by its hind legs to allow fluid to drain from the airsacs. However, now it is realized that the fluid that drains out is from the stomadas, and these fluids are important for the health of the calf. Holding the calf up by the hind legs is counterproductive, putting pressure on the diaphragm from the abdominal organs, which may interfere with normal respiratory movements. It’s better to use a suction bulb (or even a turkey baster) to clear the airways. Another way to help stimulate a calf to breathe is to rub him briskly with a towel.

If a calf was stressed during a hard birth and does not start breathing immediately, it may be a sign it’s suffering from acidosis—a pH imbalance due to shortage of oxygen—which can have an adverse effect on heart and lung function. It may take several hours or days for the calf’s system to correct this. Watch to see how soon the calf lifts its head and positions itself upright, rather than lying flat, after delivery. This is one way to tell if the calf is normal or compromised.

After a normal birth the calf should be looking around and trying to get up, within two to five minutes. If he just lies there, stimulate him by rubbing him to get his circulation going better, and position him upright. Lung function and respiratory movements are impeded when he’s lying flat.

**EATING**

If the calf is a bit slow or the mother cow a bit reluctant, the calf may need to be guided toward the udder. If a loop of prolapsed intestine is encased in the navel cord, put the calf on his back and gently squeeze the intestine back up into the abdomen, then put an elastor band over the umbilical membrane, next to the belly, to keep the hole tightly closed. It will usually grow together and seal off and the calf will be fine.

On occasion a calf may bleed profusely when the navel cord breaks. Halt it with a clamp of some kind (like a hair clip) or tie it with string for a couple hours to stop the bleeding.

Get the newborn breathing and eating immediately after birth is important to future health of the calf.

**COLOSTRUM**

Make sure the calf nurses soon after birth. If it doesn’t accomplish this on its own, guide the calf to the udder. If it can’t nurse its mother, feed it by bottle, stomach tube or esophageal feeder. The cow’s first milk is crucial to health and survival of the calf. It contains a creamy fat that gives him energy (and generates body warmth in cold weather), and acts as a laxative to help him pass his first bowel movements.

Colostrum also provides antibodies against disease. Some antibodies are absorbed directly into his blood and lymph systems (passing through the intestinal wall) if he nurses soon enough. These help fight systemic infections, attacking pathogens like pasteurella, streptococcus or salmonella that might cause septickemia. Other antibodies stay in the gut to attack scavenger pathogens the calf might ingest.

If the cow was on a good vaccination program before calving, she’s already strong immunity in the antibodies in her colostrum will give her calf immediate protection as soon as he nurses. It does no good to vaccinate the cow against scavenger E. coli, rotavirus or coronavirus, however, if the calf doesn’t nurse within a few hours of birth. If he is unable to nurse, give him subcutaneous colostrum from another cow, or a commercial product. Don’t use dairy colostrum; it won’t have as many antibodies because of the immense volume produced, and may be nontoxic. The calf may get salmonella or some other unwanted pathogen from a dairy cow. A cow on your own place has better colostrum because she creates the antibodies needed to protect a calf in your environment.

A partial feeding of frozen or commercial substitute can be used to “jump start” a calf if you think it will stimulate it to nurse the dam right away. But a full feeding can be counterproductive if it doesn’t ingest a full meal soon. The little bit you feed the calf stimulates the “open” gut to close more quickly and it won’t be able to absorb any more antibodies. If the calf won’t be nursing its mother soon, give it a full feeding.

Neonatal calves can absorb large antibody molecules directly through the intestinal lining, but pathogens can also slip through. It’s a race between pathogens and the antibodies, so make sure the antibodies get there first. Other components in colostrum coat the gut and provide a different type of antibody to combat pathogens ingested during the calf’s first hours of life. If the “good guys” in colostrum get to the first they close the door to pathogenic organisms, preventing penetration of the intestinal lining by bacteria and their toxins.

Stress can shorten the window of opportunity for absorbing antibodies. Cold weather, hot weather, difficult birth, or any other stress makes it crucial to get colostrum into the calf immediately. Antibody levels obtained by calves at first nursing are significantly lower in calves that experienced difficult birth, even when the cow is milked immediately after calving and the calf is force-fed. If the calf was short on oxygen during birth, it may suffer from temporary acidosis, which inhibits the gut from efficiently absorbing antibodies.

**NAVEL CARE**

After the calf starts breathing, disinfect the navel stump. If the cow calved on clean grass pasture there’s less chance for bacteria entering the navel. But if the nearby environment happened to be on dirt or mud/manure in a pen or dirty bedding material, there’s risk for infection. Dip the navel stump in tincture of iodine or chlorhexidine. Iodine kills pathogens and acts as an astringent to help the stump dry quickly and seal off.

An easy way to apply iodine is to dip the entire stump in a small wide-mouth jar containing a half inch of iodine, putting it up to the abdomen and swishing it around, making sure the entire stump is saturated. If the navel cord broke off long and might be dragging on the ground, break it shorter before you immerse it in iodine. Leave a three to four inch stump. Do this with very clean hands, or wearing surgical gloves and pull it between your hands. Never create a jerk on the calf’s belly. Breaking it is better than cutting it; the stump is more apt to bleed if it’s cut.

One application of iodine may not be enough to dry the stump quickly. You may have to repeat it a couple times during the first 24 hours, to prevent navel infection. Bull calves take longer for the cord to dry, since they often urinate while lying down, keeping the navel area wet. Occasionally you’ll encounter a calf with an umbilical hernia. If the opening is large, it needs to be surgically repaired. On rare occasion the intestines will start to come out through the hole, or a loop will fall down into the umbilical membrane. If intestines are falling out, take the calf to your vet, keeping the intestines clean by coveting them with a towel. The vet may be able to replace them and stitch the hole.

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Heather Smith Thomas ranches with her husband Lynn near Salmon, Idaho. Contact her at 208-764-2447.
Sheep achieve dual-purpose status

Meat is important, but proper breeding can deliver both carcass and fleece

**ECONOMICS FIRST**

Since this farming adventure was not a hobby the economic realities of paying for feed necessitated the meat qualities of the lambs override the fleece qualities at least for a few years. Then we started to observe that the denser, tighter fleece of the finer wool breeds such as Rambouillet and Merino. Those types of fleeces actually help keep the sheep warmer in our windy winters, which added to my interest in the breeds. These fleeces do not split or separate like a hair part down the back of the live sheep, helping to keep them warmer.

The biggest advantage is in winter— the snow doesn’t melt into the sheep’s back. This keeps them dry and warm and comfortable when they are outside eating their hay. The further removed from breeders like a hair part down the back of the live sheep, the closer the animal is to being able to grow our flock into a meat flock that is economically sound as well as a fibre producer that is aesthetically pleasing. The people we originally bought our sheep from said they had added the black-faced rams because they increased their finishing weights by about 10 to 15 pounds a lamb. At that time there really wasn’t a solid brand-spanning market for the pure Rambouillet fleeces so the choice was easy. Now, times have changed. Wool testing can be performed for private farmers through Yosom-McColl Testing Laboratories Inc. by calling 303-294-0582 or fax 303-295-6944. The company address is 540 West Elk Place, Denver, CO 80216-1823 USA. — email: ymccoll@ymccoll.com or visit their website at www.ymccoll.com.

To add to the feasibility of growing quality fleeces, we already have the well-established Canadian Woolgrower, where we can ship our white wool. As well that connects us with a giant worldwide community of breeders very eager for naturally coloured fleeces. This adds to the appeal that we privately have a desire to use the fleeces but did not want to give up our market lambs. So, dreams really can come true when you plan and have patience it seems.

**BARTHOLOMEW ARRIVES**

These two rams will help greatly in improving the genetics and performance of Chikousky Farm sheep. The white ram, Bartholomew, is a purebred Rambouillet, while the black ram is Jim, a Clun Forest/Rambouillet.

Over the years our family has often been told we are living a life most people only dream about. We hear we are unique in that we work together as a family, raise most of our own food and accept the reality we are stewards of the lives entrusted to us even though we have no real control of the outcome most days. All these are lofty expectations for our little farm, but we are working diligently to keep our focus. This past year we managed to see a few of our own dreams become reality. One of my desires when we started raising sheep was to find a Pure Black Suffolk/Percheron. One of my favorite sheep’s back. This keeps them dry and is much harder to pick up debris.

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**S T A R T**

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**BONUS**


**REMINDER** Contact your Rep to tell them about your Profit Sale Results so we can publish them in Canadian Cattlemen...
Thomas' latest project recounts ranch- and farm life-related topics. She's written on a wide range of topics, illustrating some of the places mentioned in this "typical" journey over the range.

He enjoyed his daily rides out there to check on things and monitor the cattle. Each ride is a special experience.

This chapter is a look at what a typical day might entail, at some point during those years. Every ride was different, with different tactics and priorities, but this is a sampling of those experiences. Photos are rare that were taken on various range rides over the past forty years, illustrating some of the places mentioned in this "typical" journey over the range.

He heads up the steep trail through the rocks and sagebrush behind our house. The smell of dewy sage fills my nostrils as my horse brushes the shrubs along the trail, and a horned lark flits up from her nest on the ground as we go by. A mother grouse bursts into the air and does her brood-wring act (her strategy to lead a predator away from her babies, who are scattering out through the grass).

My horse heathers deeply as she climbs the crest of the hill, then pauses, scanning, as a group of antelope leap to their feet from the smalls where they were bedded, and across our path. My mare snorts again as she detects their strong, musky scent. They disappear over the hill in a puff of dust, and we continue along the trail.

We soon head down into the Baker Creek canyon, approaching a bristle draw where a small trough collects spring water. A herd of cow elk with calves have been drinking there, and they mill about for a moment when they see me, the cows and calves talking to each other with their high-pitched "eep-eep." Then they stick their heads in the air and march up out of the draw, disgusted at having their morning interrupted.

We descend into Baker Creek and up the rocky trail into the timber, dodging overlapping fence branches. A golden eagle soars above the canyon, and a pine squirrel scolds us from the tree overhead, knocking fit cones down into the trail. Colorful Indian paintbrush (red, orange, pale cream) and blue lupine dot the greensy clear- ing ahead. We reach the wire gate in the range fence, and I get off to open it and lead my mare through.

In the meadow beyond, some of our cattle are bunched down chewing their cuds. They are used to seeing me and my horse, and don’t bother to get up as I ride through them, weaving my way between nipping calves. One calf is nursing each mother, slapping insistently at the udder. I make sure they are all healthy, then continue up the trail to check another water trough.

The day is warm and my horse takes a long, grateful drink while I fix the overflow pipe that has been obstructed with fir needles. This spring comes directly out of the rocky canyon wall and the water is icy cold, and more pure and clean than boggy springs where the elk like to cool their mouths, so I quench my thirst at the renewed flow through the pipe into the trough.

Sometimes it can take days or even weeks of riding to find cattle when they have wandered out of the range. Because it’s a large area, with lots of timber where cattle can be hard to see — so we like to make sure the fences stay in good shape. I prop the next back up, spicing the broken top wire with my handy baling twine. This will hold the fence together until my husband can get back out here to install a new post to set. He can probably bring it up the ridge on his four-wheeler and only have to carry it a quarter of a mile down the steep hill through the timber, to the fence.

On my way back over the ridge that serves as the dividing point between Baker Creek and Whiting Creek, I check on another water trough, served by a spring my father helped develop nearly sixty years ago. This is an amazing spring, to be located on such a high ridge. A person wonders how any underground water channel could be this far above other water sources. The topmost point of Baker Creek bubbles out of an even larger spring, just under the crest of the ridge.

There are cattle bedded down around the gravelly area near this trough, having climbed up to it after their morning grazing on nearby mountain slopes. They are full and content, lying in this high spot to take their midday siesta and chew their cuds, enjoying a bit of breeze on this high point.

It’s hot by the time my horse and I start back down to the valley, and her feet stir up little clouds of dust. The sweet smell of syringa (the blooming briskes along the creek, Idaho’s state flower) delightfully mixes with the smell of hay as we cross the little stream, where Baker Creek meanders through our lower range pasture. As a kid, I always thought there could be a cool-Aid flavor that tasted as sweet and good as the smell of syringa. After we cross the little creek, my mare spooks at a coyote pup sticking his head up over an old log and looks at us. The sudden movement startles her, but once she realizes what we are, she calms and heads down the trail, quickening her pace as she thinks about home. Both of us are pleased with our ride, side happy to be heading back to pasture bud- des, and I have enjoyed this peaceful interlude with nature’s creatures while doing my daily tasks.
Gleanings and goals of young farmers for their future

Eager ag entrepreneurs are looking for ways to improve themselves and their businesses.

Advice from young farmers at AgXCONF 2015: The “new” list.
- Have a global perspective
- This is about money, not a lifestyle
- Understand your values, and your capital and communicate it
- Manage risk but don’t be scared of it
- Work smarter not harder
- Think outside the box
- Figure out your expertise
- Not easy to change jobs just because you are tired of it
- Set goals, have a plan
- Be proud of what you do
- Start succession plan now
- Open communications with other generations
- Be active in industry
- Don’t try to do everything on your own... hire in weak areas
- Be OK with mistakes
- Evaluate your business regularly with family and employees
- Keep family planning separate from operational planning
- Proper income
- Reputation is your best asset
- Satisfy your customers
- Have a network of mentors
- Be a good neighbour
- Work/Life balance
- Get an off-farm perspective
- Face time is important

The top five as voted by the young farmers:
1. PLAN! succession and business
2. Risk management. Start early and don’t be afraid
3. Farming is a business
4. Figure out your expertise, it is OK to make mistakes, you can’t do everything
5. Communicate...more and better

We wish parents understood...
- Work/life balance. This comes up in my coaching conversations all the time. The founders concede that the “next” generation is not going to work as hard as the founders did. I call balance a “polarity.” I see it as something to be managed, not something that will ever be “done.” What is a good day on the farm to you? Could you consider only doing cow chores on Sunday, and then take the rest of the day off for renewal and family time?
- 2. This is 2016... I suspect this relates to my phrase “that was then and this is now.” Things are different. Different is not wrong it is just different. What is it about the new ways of doing things in 2016 that threatens the founders? What exactly do you mean by “this is 2016?”
- 3. Let’s get a plan. Many farm teams are suffering from the “pain of not knowing.” Get out of the high-stress, and high-anxiety place of not knowing what the future holds. Email me for a set of binder tabs (costs $10) to start getting your plans organized. Talk at regular business planning meetings, meet with your advisers: accountant, financial planner, lawyer, insurance agent, broker, coach, and get things written down to give everyone a better sense of security.
- 4. Parents are entitled to retire. Interesting. The parents sometimes feel pushed and shoved off the farm by strong-willed young farmers who have different ideas about how things should run. The happy parents are those who realize that their adult successors feel that the parents should take more time off and enjoy the fruit of their 40 years of labour. Most dads are afraid to give up total control until they are assured that the next generation can really manage well. Parents don’t think of really retiring, they like to reframe it as “reinventing roles, or becoming the hired man again.” Talk to your farm team about what a reasonable expectation for workload and job descriptions looks like when mom and dad are 65.
- 5. Partners get to choose, they don’t have to be involved. Pressure here for young women to act just like their mothers-in-law. Some sons-in-law have off-farm work and don’t want to have much to do with their wife’s farm. It can go both ways. Adopt a learner mindset with curiosity to find out what each partner in the successor’s home wants their roles to look like. What level of involvement in the farm are they happy with? Will it change when the grandchildren are in school?

Needs of young farmers to succeed:
1. Farm Business planning, the cycles and nature of the business
2. Education and skills development
3. Access to capital and be prudent with debt
4. Policy, understand agricultural policy and get involved
5. Understand business structures and options

Terry Betker of Backswath Management shared his fundamentals... this is about business:
- You will be the owners and managers
- You need to have a vision, a written statement that defines the future for your farm and family
- You need to understand the relationship between risk and return on investment
- Work to separate business from emotion
- You to need to continually enhance your management skill sets

Five things we need to communicate to the general public by Steve Denys:
1. We live where we work. We breathe the air and drink the water
2. We want to leave our land in even better shape for the next generation
3. We take pride in growing, high-quality food. We eat the same food that everyone else does and we eat what we grow
4. We want and need to have conversation about food and farming
5. We are proud of what we do and how we do it

Nuffield scholar, Brenda Schoepp says, “Mentors don’t provide solutions, they LEIP: liberate, empower, inspire, permit.” Read Brenda Schoepp’s Nuffield Report: The Development of Mentorship Programs for Women in Agriculture A Global Perspective. “Equality is standing up for the excellence of the other,” says Brenda Schoepp. So lots to think about as you embrace a new year on your farm and set some new goals and targets for a successful farm operation and happy farm family.

Visit Farm Management’s website www.fmc-gac.com and the www.agriwebinar.com site for great resources to grow your skills for a great year ahead.

Elaine Friesen, CFP, CAPA, CRICFA is the author of three books to help empower farm families, increase profit, and secure legacy. Visit www.elainefriesen.com. She is often asked to be a speaker at local, regional and Australia. Facebook “Farm family coach.”

Image: "Farm family coach.”

This is a great opportunity to learn from great, powerful women in Ag and other industries. Sometimes it can be easy to forget all the possible connections we can make, so getting into a room with 500 women really helps. Visit www.ladies4leaders.com and be a part of it. Facebook “Building Leaders.”
International Year of Pulses

United Nations has declared this for 2016 — and with good reason

Pulses are a good source of protein yet less stressful on the environment than raising livestock. Pulses provide 20 to 25 per cent protein by weight, double that of wheat at 10 per cent and about half that of meat at 30 to 40 per cent.

However, growing pulses uses much less water than raising livestock. According to the UN, a kilogram of lentils requires 50 litres of water while a kilogram of chicken takes more than 4,000 litres and a kilogram of beef consumes a whopping 13,000 litres of water.

Pulses help reduce food waste, which the UN estimates at one-third of all food produced worldwide. Since pulses are a simple food and stored dry, there is little lost in processing and much less spoilage compared to vegetables, fruits and meat.

The UN also notes that pulse crops replace nitrogen in the soil, reducing the use of petrochemical fertilizers. This is a prime reason why pulse crops are so popular in Western Canada — they make economic and environmental sense when included in rotation with other crops such as wheat, flax and canola.

Pulses fit with another UN initiative: eliminating world hunger by 2030 while, at the same time, tackling climate change and improving sustainable farming. If we all start eating more pulses in 2016, that goal will be easier to reach.

Of course, I don’t need to recommend more hummus and lentil soup. We’ve got that covered.

But, I will propose this recipe for yellow pea fava, a Greek mezze (appetizer) made with yellow split peas. If you like hummus, you’ll like this.

The UN website includes many pulse recipes from around the world. You’ll find one you like this.

The United Nations has proffered several reasons for declaring 2016 the International Year of Pulses. In developing countries, pulses account for 75 per cent of the daily diet. Yet, worldwide, pulse consumption is declining. The UN would like to reverse this trend.

In India, they prefer small red lentils. In Chile, it’s large green lentils. And in Spain, it’s pardina lentils, also known as black caviar of the beluga sturgeon. Chefs love them.

The United Nations has proclaimed its love them.

Spain, it’s pardina lentils, also known as Spanish brown. We grow them all here and more, such as little black beluga lentils, de la Abuela, like grandma used to make. All with lentils from Canada.

Not only do we grow a lot of lentils (a record harvest of 2.2 million tonnes in 2015), we grow more varieties of lentils than anywhere else.

In India, they prefer small red lentils. In Chile, it’s large green lentils. And in Spain, it’s pardina lentils, also known as yellow split peas. If you like hummus, you’ll like this.

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Volunteering gives new appreciation of home farm

Working in underdeveloped countries an eye-opener for Saskatchewan couple

BY CHRISTALEE FROESE

A closer view of the world has given Clayton and Carrie Kotylak a better insight into their own farming operation. Having volunteered in Nepal and Jordan with Habitat for Humanity, the Saskatchewan mixed farmers know first hand that what they produce actually feeds the world.

“While in Jordan I ate with families and they were eating lentils and peas and I was thinking, ‘this probably came from my area of the world,’” said Carrie, who travelled to Jordan in the summer of 2013 to build a house with Habitat for Humanity.

“I think it’s eye opening in that you go and see the people in underdeveloped countries who are looking for sources of protein and nutrients and we are in the position to provide that.”

Clayton volunteered to go to Nepal in 2014 during the Christmas break. The lifelong farmer and 14 other Canadians worked for two weeks to construct a Habitat for Humanity house in the South Asia developing country.

He said the most surprising thing he witnessed was the lack of agricultural knowledge in the rural community where the build was located.

“Having weed-free crops and healthy productive animals was just not something they’re educated in and they’re paying the price socially,” said Clayton.

Both Clayton and Carrie said the trips changed their view of farm life, making them grateful for the abundance of food, shelter and knowledge in Canada.

“We now realize we won the social lottery here in farm life, and while that doesn’t mean we have to give our products away, we do need to give back and pay it forward,” said Carrie, who studies international agricultural trends to help us out,” said Carrie.

With two daughters, one aged 22 who lives in Regina and a 14-year-old in school, the Kotylaks built a spare apartment above their detached garage several years ago with an eye on immigrant labour. After Clayton met a European immigration specialist at the 2013 Farm Progress Show in Regina, the couple applied to bring an agricultural student to their farm for spring, summer and fall.

A second student, Mike Hutchings from the U.K., is now employed by them through the Saskatchewan Immigrant Nominee Program. Hutchings said while he grew up on a farm in Europe, his home operation was nothing like what he has witnessed in Canada.

“The average size of a farm in the U.K. is 150 to 250 acres, whereas here it’s 2,000 to 3,000 acres and more, and because of the bigger equipment here, the labour requirements in Canada are about half of what they are at home,” said Hutchings.

The Kotylaks said they will always be mixed farmers because their land best suits that kind of operation. And while current trends are leaning toward more acres, the couple is focused on having a well-rounded operation rather than a larger one.

“For me, I farm because I love the land, regardless of what it’s producing and I produce what is best suited, whether it’s grain of livestock or pulse crops,” said Clayton.

Clayton Kotylak feeds his cows.

The couple plans to continue their overseas benevolent work, but in the meantime, they are concentrating on local initiatives. Clayton and Carrie are active in lobbying provincial and federal governments to make access to international agricultural workers simpler for farmers.

In order to effectively operate their 2,500-acre operation, which includes 125 head of commercial cattle, they employed a U.K. resident for an eight-month period in 2014. Last year the Kotylaks sponsored a second U.K. immigrant since finding local workers has proven extremely difficult.

“We always realized that we needed more manpower, but our labour pool in southeast Saskatchewan was almost nonexistent and we don’t have sons or anybody of the right age or interests to help us out,” said Carrie.

Clayton volunteering in Nepal and Carrie volunteering in Jordan with Habitat for Humanity through the Immigrant Nominee Program has given the couple a better appreciation of home farm operations and the importance of feeding the world.
Welcome Graingtext readers to the Singing Gardener page wherever you are and thanks for being part of my audience. Got lots to talk about from planting ornamental kale to cobs of pink corn kernels for popping corn and, though not on kidstones and home treat- ments. Plus — a wet sock in bed doesn’t sound too warm in January but I, Ted, shall talk how to offset the chill with a good ending. Does anyone remember the days when gentlemen tipped their hat to ladies? That tradition reminds me of these lyrics I once sang years ago. I’m a decent man I am, I am and I don’t know how to tip my hat when I came in, I’ll tip it again when I go out for certain that’s a fact.

Meet a Senior Who Grew Ornamental Kale

My visit with Lena Meeyton at her backyard Portage la Prairie, Man. garden centre. Late October 2013 revealed a colourful display of orna- mentally flowering kale a.k.a. cabbage. Lena commented, “There wasn’t a whole lot of anything else that was showy in the autumn garden.” Other annuals had packed it in “but these plants began their best display once nighttime tem- peratures dropped below 12 C for a couple of weeks.” She revealed how her striking patch of autumn kale to cobs of pink pop- ping corn, and kidney stonesPlus, wet socks to treat ailments? Give it a try and see what you think you might consider setting out a few ‘pink ornamental kale’ plants between stalks of pink pop- ping corn or other corn varieties in the garden. This method of com- bination planting can be made to enhance panache from a kale variety is easily grown in the home garden, but be patient as seeds can take three weeks or longer to sprout, so get them planted in moist spring soil ASAP! Here’s how I make parsley green tea. Add two or three tablespoons of fresh chopped parsley leaves and stems to a cup of distilled water and bring slowly to a boil. Reduce heat and simmer gently for a few minutes then remove from heat, cover and let it brew for 10 minutes. Avoid simmering for too long as to not lose some beneficial nutrients that may be dis- sipated into steam. Strain through a sieve and let the parsley tea slowly cool. So do not gulp it all down at once. COLD, WET COTTON SOCKS ON WARM FEET, WOOLEN SOCKS ON TOP, THEN GO TO SLEEP

Does the following really work? Decide for yourself whether you venture to try, or discuss it with your health-care provider. I have tried it myself. This home rem- edy comes from an old-timer who lived for decades in the woods. Over the years he used it to treat various sorts of ailments, espe- cially things like pain relief, upper respiratory, chest congestion, and pain related to old injuries, colds, flue, sore throats, and muscle and joint aches. All that’s required is a pair of cotton socks, a pair of woolen socks, a backdrop of warm water and a towel. (Whoops!) Good thing I didn’t write a trawl. Save that tool for turning soil in the garden. Directions are fairly straightforward.

Pink Popcorn seed (as it’s called) for planting is available at West Coast Seeds. Plant WCS for a cata- logue seed at this size for reach. 1.5 (4.5 ft) tall, the cobs 15 to 15 cm (six to eight inches) long in stalk encased within purple and dark-green leaves. The real treat of this crop is the polka- tooned, pollinated kernels that come at har- vest time. Dried pink kernels make a welcome addition to your kitchen store cupboard. In addition parsley can assist eliminat- ing water retention in bodily tissues. You can buy a good seed mix of fresh and dried parsley and various varie- ties of parsnip seeds with one of our Canadian $30 greenbacks and maybe a chunk of change left over. Known as the herb of longevity, parsley is easily grown in the home garden, but be patient as seeds can take three weeks or longer to sprout, so get them planted in moist spring soil ASAP! Here’s how I make parsley green tea. Add two or three tablespoons of fresh chopped parsley leaves and stems to a cup of distilled water and bring slowly to a boil. Reduce heat and simmer gently for a few minutes then remove from heat, cover and let it brew for 10 minutes. Avoid simmering for too long as to not lose some beneficial nutrients that may be dis- sipated into steam. Strain through a sieve and let the parsley tea slowly cool. So do not gulp it all down at once. COLD, WET COTTON SOCKS ON WARM FEET, WOOLEN SOCKS ON TOP, THEN GO TO SLEEP

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