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Robert and Joyce Coffin

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Resistant *Fusarium* biotypes have been found across the country. With its two fungicidal active ingredients, Cruiser Maxx D Potato delivers effective seed borne *Fusarium* control that includes these resistant biotypes, says Denys.

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On the cover: Robert and Joyce Coffin. Please see *From Our Desk* to learn how these two leading potato researchers and breeders based in Prince Edward Island are tackling late blight.

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Staying Ahead of Late Blight

By Julienne Isaacs



THE ICY Canadian winter may feel long, but it's never long enough for growers coast-to-coast to forget the worst threat that will face their crops each summer: late blight.

For Joyce and Robert Coffin, potato researchers and breeders based on Prince Edward Island, the fight against late blight is a year-round concern. "New strains of late blight are continually evolving," says Robert. "Some of the new strains are more aggressive and can attack potatoes under dryer conditions, and some have also developed resistance to fungicides. It's constantly changing and constantly challenging. Rick Peters [a plant pathologist at Agriculture and Agri-Food Canada based in Charlottetown] has been evaluating samples to confirm the identity of new strains."

Robert Coffin has worked on late blight research for Cavendish Farms for years. Recently, he's been working on potato storage projects in cooperation with other east coast researchers, hosting training initiatives for growers on minimizing rotting. This work has a direct connection with late blight, as late blight-infected tubers are highly susceptible to rotting in storage.

According to Robert, late blight is very much on the Canadian research radar. At a conference this winter, he met with several research scientists who are exploring the problem from various angles. "We're not going to get rid of it completely but the name of the game is to stay ahead of it," he says.

Joyce Coffin's ongoing project at Privar Farm Inc., which she is working on in cooperation with Gefu Wang-Pruski, associate professor at Dalhousie University, is to identify markers for genes for resistance to late blight. "They do the lab work and I do the breeding," says Joyce. "What we're looking at is in the progeny—what percentage of the progeny actually receive the resistant genes?"

The true potato seeds produced from the crosses between resistant and susceptible lines have been delivered to Wang-Pruski's team, which will use genetic markers to identify specific resistant genes. "Then the plantlets will be grown out and sprayed with late blight spores to see if the marker selected plants for late blight resistance actually are the only ones that show resistance when challenged with spores of late blight," explains Joyce.

"There are a lot of things going on. It's not simple," she continues. "A lot of regular potatoes we grow have the resistant genes in them but for some reason they don't get turned on. The more you dig the more you find out."

Ultimately, the goal is to find a layered solution, says Robert. "If we did not have fungicides we could not grow potatoes. But if you can breed varieties that at least have a fairly good level of resistance, you can use fewer applications. Then you're getting an integrated approach to managing late blight."

"What you've got to hope is that you can get a plant developed with a good "immune system" so that when it's challenged by an infection it can respond to and overcome it," concludes Joyce.

If anybody can develop a plant like that, it's the Coffins.

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SUSTAINABILITY MATTERS

At the base of sustainability discussions lies the soil—the last frontier of agricultural environmental stewardship. Canadian researchers and industry members are tackling soil health in a variety of creative ways.

IN NOVEMBER of 2012, the government of Prince Edward Island, the P.E.I. Federation of Agriculture, the P.E.I. Potato Board and the Kensington North Watersheds Association all signed a memorandum of understanding with the Canadian Fertilizer Institute to further the industry's goal of increasing environmental sustainability in the province through improved fertilizer use.

The agreement is entitled the *4R Nutrient Stewardship Memorandum of Understanding*, the four R's referring to "right source, right rate, right time, right place." According to Gary Linkletter, chair of the P.E.I. Potato Board, CFI will supply \$150,000 of funding to support education and demonstration projects largely in the Kensington North Watershed area of the province. A board will be appointed to help oversee the project during its three-year tenure. Prince Edward Island is the first province to get on board, but CFI's 4R system is designed to be adaptable across the country.

"When it comes to fertilizer, whether you put on more or less, it's about what's left after the crop has used what it needs. If you put on too much, the excess goes into the environment," says Linkletter. "It's always about tuning the fertilizer to the crop ... That's the big issue we're trying to target."

Linkletter believes growers have long been conscious of the need for improved fertilizer use, but there's always room for more education. "What is required to keep the environment in a sustainable condition?" he asks. "We're always trying to keep the environmental factor as part of our operations. I think this project will give growers a sense of the best way to do that. There are some growers who are really progressive but all of us can benefit from extra knowledge."

The initiative is an encouraging signal that the industry is pitching together to analyze and mitigate the impact of chemical inputs on the environment over the long-term. But it's only the tip of the iceberg. Across the industry, researchers and industry members are employing creative thinking in tackling sustainability matters.

Decreasing Phosphorous

It goes without saying that a major part of managing soil health involves the management of inputs.

Last May, the Department of Agriculture, Aquaculture and Fisheries in New Brunswick reduced its recommended phosphorous input levels as a means of reducing the risk of phosphorous runoff and leaching to tile that could negatively affect bodies of water.

"Phosphorous in acid soils as we have in eastern Canada is immobilized in a chemical complex with aluminum," reads the department's report. "As more and more phosphorous is added to the soil via fertilizer, manure, etc., over time phosphorous levels become excessive. Excess phosphorous in the soil may then move below plant roots to the subsoil tile water and/or as erosive runoff to surface water that may result in environmental degradation."

Prior to changing the recommendations, different groups of researchers conducted several years of Small Replicated Plots Trials followed by On Farm Field Demonstration Trials in Quebec and New Brunswick, in which they experimented with different levels of phosphorous. Following the On Farm Field Demonstration Trials in New Brunswick, the researchers met with a group of industry representatives to get feedback on the new numbers. What came out of those meetings was a sliding scale, with maximum and minimum recommended levels of phosphorous that worked for everyone. As well, recommendations would now be based on percentage ratios of phosphorus to aluminum instead of simply parts per million of phosphorous in the soil. For example, under the old recommendations soil tests greater than 78 ppm or H+ would call for 114 kg/ha of P₂O₅ fertilizer, whereas a P/Al ratio of greater than 22 per cent would now call for a range from 60-80 kg/ha of P₂O₅.

Pat Toner, a soil management specialist with the department who worked with Crop Development Officer Daniel Savoie on the On Farm Field Demonstration-Implementation Project, says the

“When it comes to fertilizer, whether you put on more or less, it’s about what’s left after the crop has used what it needs. If you put on too much, the excess goes into the environment.”

Gary Linkletter

ultimate intent of the recommendations, at least for East Coast growers, is to encourage a “build and maintain” approach to phosphorous application. “If you have a really low phosphorous-aluminum ratio, for example, you’re going to put on a higher amount of phosphorous fertilizer. That’s to meet the needs of the crop that year and build up the phosphorous in the soil for future years,” Toner explains. “When the prices of fertilizers increase, you could apply at the lower range of the recommendation to ride the year out. It saves you money and shouldn’t reduce your yield.”

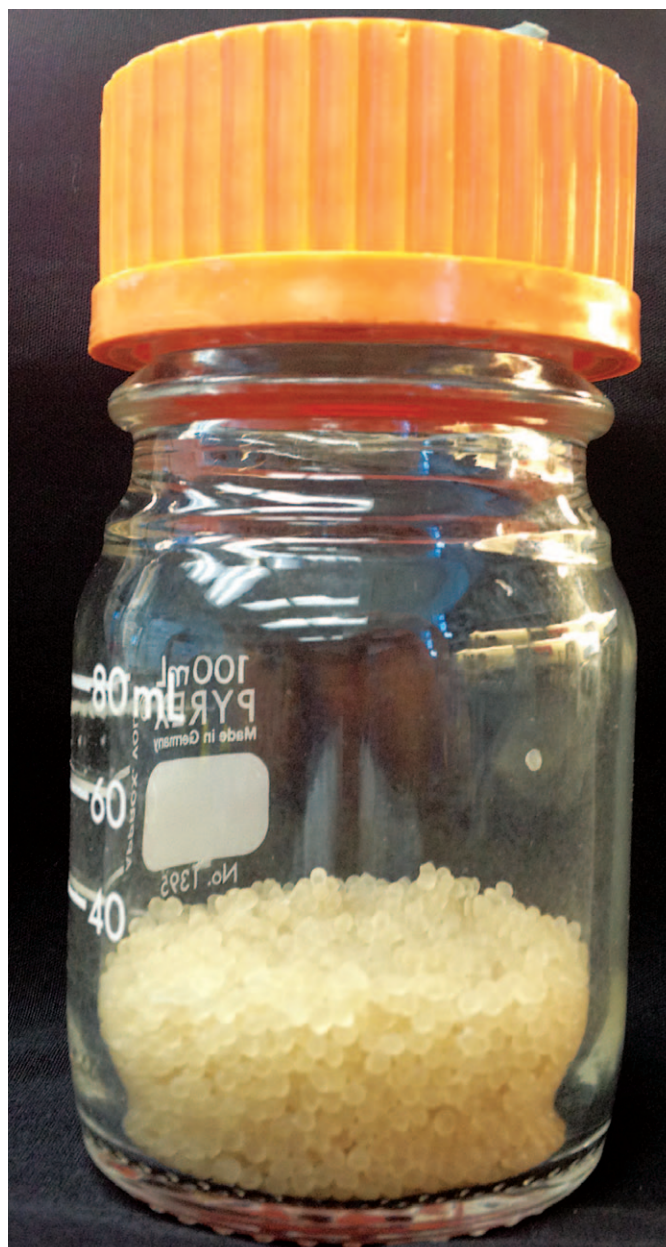
Toner explains that the plant can only access phosphorous the roots can reach—in other words, the plant will never use up everything that is added to the soil. “You could put a lot of phosphorous on, but a lot of it can get lost or locked up, and [the plant is] only going to get as much phosphorous as the root can reach. The excess phosphorous does not help the plants, and could create excessive phosphorous loading’ in the soil.”

What’s at stake for the environment if too much phosphorous is added that is lost from the crop? “In P.E.I., you’ve got more intense farming, and your soils there run into sandy loam, whereas New Brunswick soils are running loams, silt loam—usually a sand erodes a lot worse,” Toner explains. “If the sand moves down and goes into a shallow water body like an estuary, and it has light penetration coming in and the tide is in, water becomes slack and stationary. The phosphorous fertilizes the algae, and you get a big flush of algae which clogs up the area. That aquatic plant growth in the water demands more oxygen leaving less for the fish life which may also lead to suffocation.”

Improving Resistance

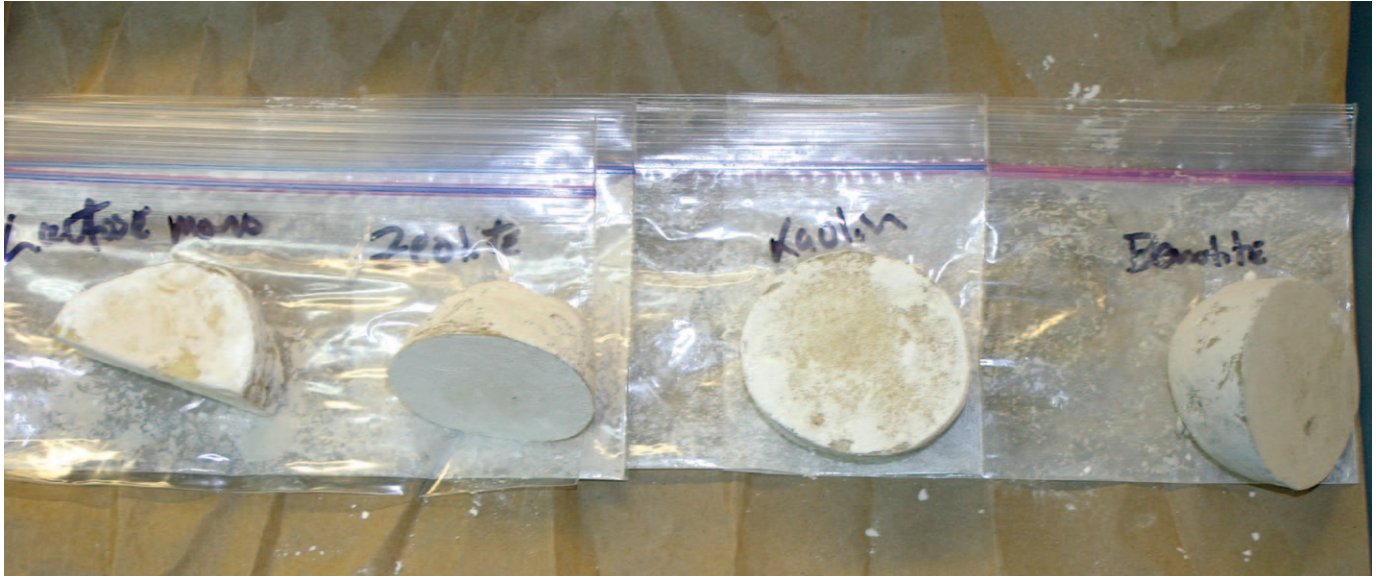
At the Potato Research Centre in New Brunswick, Benoit Bizimungu is tackling soil health from a different angle—through breeding potato selections with improved resistance to diseases and pests. The overall reduction in the use of chemical inputs, says Bizimungu, is a major goal of the project “because we are developing eco-friendly potatoes for industry. We require a variety that relies on fewer inputs and with improved water use efficiency.”

As an example, he says, late blight is a major focus of the project due to its destructive effects, as well as the fact that the pathogen keeps changing to resist chemical protection and to overcome



One way to formulate *Bacillus* sp is to use alginate beads. The *Bacillus* cells are encapsulated into beads and that permits a slow release.

All photos courtesy of Claudia Goyer, AAFC.



Another way to formulate *Bacillus sp* is to have the cells mixed with a solid support like talcum. This photo shows a seed piece covered with talcum that contains *Bacillus sp*.

genetic resistance. “Our goal is to keep looking for improved disease resistance so we can help the industry offer better protection with less use of pesticides.”

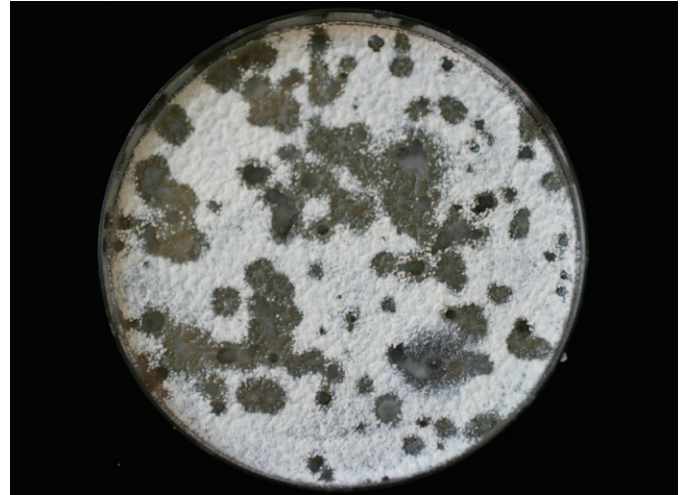
In addition to attempting to breed potatoes with broad-based resistance to late blight, Bizimungu and his colleagues are looking to breed varieties with cold-induced sweetening resistance. “If you can store varieties at low temperatures, you actually provide a way to reduce storage disease incidence and reduce the use of sprout inhibitors. The problem is that most of the varieties, when stored at temperatures of less than approximately 10°C, produce sugars, which is not good when they are processed into fries or chips. We are aiming at transferring genes from wild species that confer cold-induced sweetening resistance into improved varieties, which means they will produce lower sugar levels under long-term cold storage.”

Selections are currently on trial that already exhibit such resistance. They potentially will be released through Agriculture and Agri-Food Canada’s accelerated release program this spring.

Bizimungu believes that breeding new varieties with increased resistance is a means of stewardship—both of the potatoes and the environment—in a long-term sense. “Breeding as a mission is a long-term process where we build on what has been done, to bring new traits that industry is looking at. It’s a long-term endeavour. For late blight disease resistance, for example, you’re looking at a system that is always changing, so you need to keep track of the changes in pathogen population.”

In his view, an integrated approach to sustainability, which considers all aspects of production and management systems, is the best approach. “As breeders we are glad to hear that variety choice is taken into consideration. If you are talking about trying to use less fertilizer, we know that most varieties, including Russet Burbank, are very demanding in terms of fertilizer needs. To move into using less chemical nutrients, we’d require varieties that require fewer fertilizers, have improved resistance to disease and pests, and have cold-induced sweetening resistance,” says Bizimungu.

“There are differences in terms of chemical inputs requirements,” he emphasizes.



This plate shows the inhibition of the common scab pathogen *Streptomyces scabies* by *Bacillus sp*. The white background is the pathogen and it can be seen that the *Bacillus* succeed in stopping the growth of the pathogen by the small ‘holes’ in the lawn of the pathogen.

Bio-Control

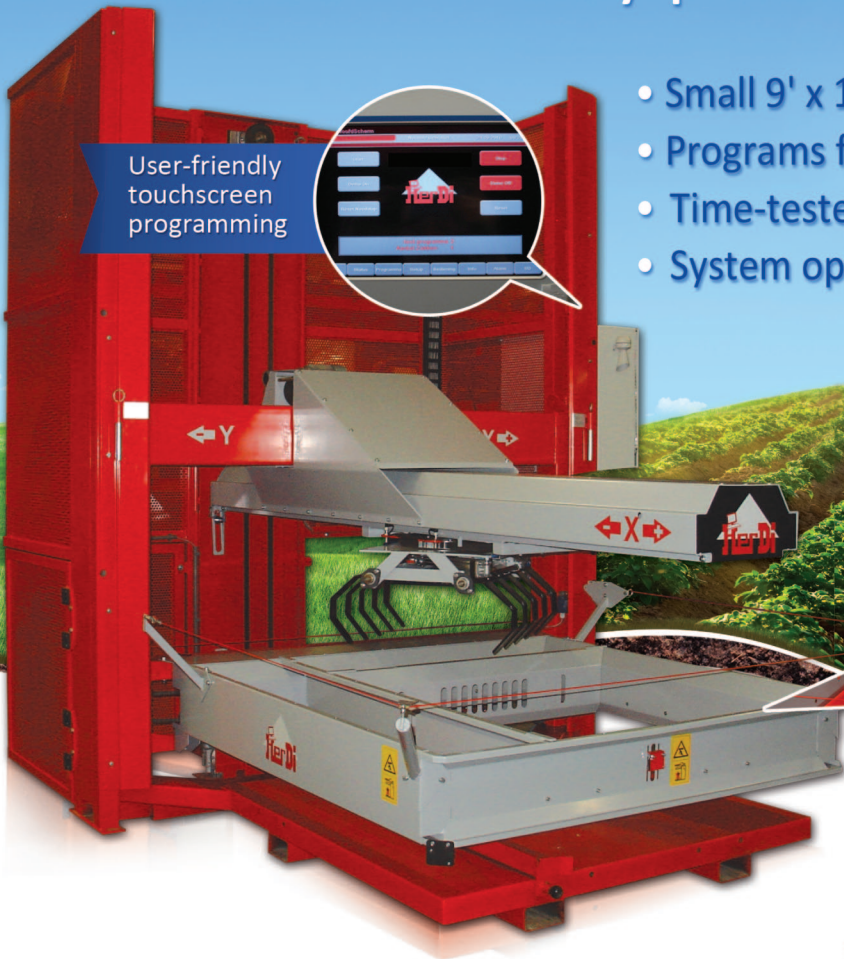
Total soil health is no longer possible, if it ever was, within any field in Canada. If potatoes are the crop of choice, they could be afflicted by a wide variety of problems that return ever year. What is possible, as Bizimungu argues, is an integrated approach to management. And a little creative thinking.

Among the many problems that cause headaches for potato growers across Canada is common scab, which renders potatoes unmarketable and causes significant crop losses each year. Common scab is caused by a naturally-occurring bacterium in the soil, *Streptomyces scabies*. “There are no real means to control common scab in Canada,” says Claudia Goyer, a molecular bacteriologist at the Potato Research Centre in Fredericton. “Sometimes people use fumigants, but [those are] very harsh. What we’re looking at are solutions to control it using naturally occurring soil bacteria.”



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This is where the creative thinking comes in. Goyer and her team selected soil samples from both healthy and afflicted fields, selecting bacteria in the soil that were effective in controlling common scab. They screened about 40 different bacteria, selecting the best possible isolates. "Then we looked at efficiency in the greenhouse and found that they could decrease 50 per cent of common scab in the greenhouse," she says.

More creative thinking will be needed as the team decides how to best deliver the helpful bacteria for application in the soil. They have considered a variety of options, including powder or hard-shelled beads which would release the bacteria slowly over the season. Trials will be performed next year, after which the common scab bio-control will begin the approval and registration process.

Goyer sees soil health as essential, but a difficult task facing growers, who must overcome plenty of hurdles to producing a successful crop. "The way I see that is that it's difficult. I think the growers already do a good job, but it's important to use simple things like longer crop rotations and being careful about how clean your potato seeds are—all the basic things are good insurance that your crop will be healthy. When you cut corners, especially for soil-borne diseases, this could increase the number of pathogens [in the soil]."

All things considered, in the effort to improve soil health for potato growers—through reduction and management of inputs, breeding resistant varieties and introducing bio-control measures—Canada is ahead of the game. **Julienne Isaacs**

Resistant Varieties

Common scab gives growers across the country a major headache each growing season. According to Claudia Goyer, molecular bacteriologist at the Potato Research Centre in Fredericton, there are no varieties that are completely resistant to common scab although some varieties show some tolerance to the disease. The level of tolerance also depends on the environmental conditions (dry summers are conducive to common scab) and the aggressiveness of the pathogen. "One of the easiest ways to ensure that you are having fewer problems with common scab is to ensure that you're using a tolerant variety whenever possible," says Goyer.

Common tolerant varieties include the following:

- Superior (table market)
- Satina (table market)
- Russet Burbanks (french fry)
- Gold Rush (french fry)
- Marcy (chipping)
- Dakota Pearl (chipping)

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Potatoes: Feeding the World?

Canadian and international researchers are working together to improve the potato's potential to help alleviate hunger in the developing world.

IN MARCH OF 2012, McGill University in Montreal, Que., announced a unique project in collaboration with Universidad Nacional de Colombia (UNC). Entitled *Developing a Better Potato for Indigenous Communities in Colombia*, the two-and-a-half-year project is funded by the Canadian International Food Security Research Fund, a five-year, \$62-million initiative of the International Development Research Centre which aims to assist collaborations between Canadian and international researchers to develop solutions to hunger in the developing world. The primary goal of McGill's project is to develop potatoes with resistance to late blight, which will be evaluated by indigenous communities in Colombia.

According to Ajjamada Kushalappa, McGill's lead researcher on the project, McGill will be collaborating with UNC and the International Potato Center (CIP) in Lima, Peru. The project will evaluate advanced potato clones with particular production qualities, along with cultivars from Colombian communities, to identify candidate genes for resistance to late blight through biochemical analysis and transfer them to elite cultivars through cisgenesis. "UNC will take molecular approaches to select suitable potato clones and CIP and UNC will analyze nutritional qualities, and the best clones will be given to the indigenous communities," Kushalappa explains. "McGill will also collaborate with UNC and CIP to come up with good agricultural practices, such as a late blight warning system to reduce fungicide applications, best nutritional guidelines and postharvest processing guidelines to educate indigenous communities."



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Additionally, part of the program's success will be evaluated based on its assistance in upgrading UNC's breeding capabilities, along with the successful delivery of new nutritional and postharvest processing guidelines. All three goals will help empower indigenous communities to improve potato production all along the value chain.

Kushalappa believes the potato has an important role to play in alleviating hunger in developing countries—but this is dependent on the quality of the spuds. "Potato yield depends on potato cultivars' genetic ability to produce more tuber yield, resist late blight and tolerate drought," he says. "Improved potato cultivars are expected to yield more, and thus can feed the family and, if there are more, [they can be sold] to buy other basic needs. Mineral deficiencies in the diet, such as zinc and iron, lead to poor health, and mineral deficiency is very prevalent in Latin America. We intend to select potato cultivars which can accumulate more

"Potato yield depends on potato cultivars' genetic ability to produce more tuber yield, resist late blight and tolerate drought. Improved potato cultivars are expected to yield more, and thus can feed the family and, if there are more, [they can be sold] to buy other basic needs."

Ajjamada Kushalappa

of these minerals in tubers." One of CIP's major initiatives in the Andes involves the identification of native cultivars high in zinc and iron. McGill will utilize CIP's breeding material in developing new varieties.

The project is ambitious, but essential to the continued success of potato cultivation in Colombia. Climate change is altering the landscape across the Andes, and in terms of changing weather patterns in the short term, it can have devastating effects on disease pressure.

Late blight, according to Kushalappa, is particularly sensitive to changes in rainfall or temperature and can increase accordingly in the hills of Narino, a department of Colombia. "Such threats can be reduced by the introduction of cultivars that are more resistant to late blight," he says. "In the current project, a significant amount of basic knowledge will be generated, which will make a solid foundation for the future potato breeding program of UNC. We hope to continue our collaboration even after the IDRC project."

International Partnerships

International partnerships are becoming increasingly important to the success of local potato production in the developing world. CIP is an active partner in many programs across the global South, according to Canadian researcher and grower Peter VanderZaag, who serves as a board member for CIP.

"CIP is actively working in collaboration with others. Everything we do is with partners in both developing and developed countries. We have a big mandate and the only way to do it is through partnerships," he says.

In recent years, VanderZaag continues, there has been an increasing recognition that potatoes have a role to play in enhancing food security around the world. "In general, the profile of roots, tubers and bananas has been raised substantially in the last five years. CIP leads the global research program of the Consultative Group on International Agricultural Research on roots, tubers and bananas. We have been able to get increased levels of funding to raise the profile and help boost the productivity of these crops."

In the last 40 years, potato production has quadrupled in the developing world. China leads global production, with a string of other developing nations coming in ahead of western countries in terms of overall production. However, the table stock market, which relies on local varieties, is still more important than processing markets in developing countries, and CIP researchers are working to ensure the rich potential of local varieties is preserved for the generations to come. "CIP keeps germplasm in a genebank in Lima [which comprises] thousands of native cultivars from the Andean region and wild species. That is the treasure house that we are and will be able to utilize for breeding for all these different traits in the years ahead," he says.

VanderZaag is excited about the future of potato breeding and its potential to tackle the problems increasing in the developing world. "We have a bright future ahead of us with the potato genome being fully mapped. We can start moving genes around within the species," he adds. In his view, cisgenesis—breeding potatoes at the genetic level using natural genes from other varieties of potatoes—is the way forward for potato breeding, and it will be key in the fight against late blight. "It's a fast way of doing traditional breeding, and very precise—you just move the genes you want," he explains. "This is the future."





However, VanderZaag advocates for caution in how partnerships between developed and developing nations are viewed. "You can't introduce new varieties or any new technology without fully evaluating them under [the developing country's] socioeconomic and agronomic/climatic conditions," he explains. First World solutions cannot be imposed on developing nations—far preferable are partnerships in which mutual learning and respect are guaranteed. "We never fully understand their situations," says VanderZaag.

A "Superior Crop"

Local potato production in the developing world doesn't only concern research and development organizations, as the waves of international investment and cooperation spread further and further. Successful local production has major implications for multinational corporations such as McCain Foods, which operates on six continents and has interests in China, India and across the developing world.

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"The reliability and affordability of the raw potatoes is critical to the success of our business," says Ghislain Pelletier, McCain's vice-president of global agronomy. "It is important that each of the regions in which we operate has a sustainable supply of potatoes and that the potato industry thrives, as we are there for the long term."

McCain is collaborating with various global organizations which aim to increase sustainable growing practices and the potato's development, including the World Potato Congress and the Sustainable Agriculture Initiative Platform.

Pelletier agrees with VanderZaag that cereals cannot provide a complete answer to global food insecurity. He argues that the potato "is a superior crop to both maize and wheat in terms of producing food with less water and land resources. Not only is the potato an important food for developing nations, but it is also a source of employment and business opportunity for local folks. All in all, potato is a more resilient food source crop for developing nations than either maize or wheat."

As international partnerships and investments increase, along with innovations for tackling old problems, such as late blight, and new problems, such as changing weather patterns, potatoes will increasingly be on the menu, offering a healthy alternative to struggling communities in the developing world. **Julienne Isaacs**

Farmers Helping Farmers

While partnerships between organizations are necessary for enhancing food security in developing nations, sometimes a little cross-cultural experience can be positive for individuals looking for a deeper connection with farmers across the oceans, says researcher and grower Peter VanderZaag. VanderZaag has worked directly with farmers in China, Vietnam and the Philippines for many years. "I have learned so much from these farmers," he says.

One Canadian program is offering one means of doing this. Prince Edward Island-based organization Farmers Helping Farmers, with the support of the Canadian International Development Agency, is currently sending volunteers to areas of Kenya to share technical assistance and training with horticultural growers. For more information, visit the website at farmershelpingfarmers.ca.

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Genetically Modified Potatoes: Making Slow Inroads

Limited acceptance has meant genetically modified potatoes aren't gaining much ground in the marketplace, but research continues into the possible benefits of their use in potato-growing regions around the world.

IN THE PAST decade, a number of different regions around the globe have developed genetically modified potatoes, but slow acceptance in the marketplace has meant new varieties often remain on the sidelines. Despite this, hope remains that GM potatoes will one day become valuable to end users, possibly in the near future.

With that in mind, researchers continue work on finding new benefits of GM potatoes. For example, this past summer, Teagasc, the Agriculture and Food Development Authority of Ireland, received approval from the country's Environmental Protection Agency to investigate the impact of GM blight-resistant potatoes on the environment.

While Teagasc did not develop the GM material they are testing, they were able to acquire this potato line from their colleagues at the University of Wageningen in the Netherlands.

Researchers Remain Determined

According to Ewen Mullins, senior research officer with Teagasc Crops Research Centre based in Carlow, Ireland, the centre's GM potato research will take them well into 2015 before it is completed. The work is being done as part of a 22-partner program known as AMIGA (Assessing and Monitoring the Impacts of Genetically Modified Plants on Agro-Ecosystems) and is funded by the European Commission representing 15 European Union countries.

"As we are part of AMIGA, we have been able to acquire this particular cisgenic potato line, which has durable blight resistance as a result of the insertion of a wild potato gene from *Solanum venturii*," explains Mullins. "Our field work is an environmental study designed to study the impact of such a resistant gene on Irish populations of blight and also on soil microbes."

Mullins is particularly interested in seeing how blight will respond to the *venturii* gene. "Will blight evolve and how quickly could this happen?" asks Mullins. "This is very important for any future integrated pest management strategy that would be adopted should a GM potato line ever get to market."



In 2010, BASF Plant Science received approval by the EU commission for Amflora, a starch potato that only contains pure amylopectin. In early 2012, however, BASF announced that it was stopping its development and commercialization.

Photo courtesy of BASF.



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“[Genetically modified] corn and soybeans in North America and many other countries have been accepted so I’m not sure why potatoes have hit a roadblock. If quick-service restaurants and consumers begin to accept GM potatoes, there will be a change in the marketplace.”

Vikram Bisht

Global Acceptance

Teagasc does not have plans to complete any other field-based studies after this GM study. However, similar work involving blight resistance is being conducted in the Netherlands and there have been separate studies completed in Belgium and in the United Kingdom.

In Canada, research is also limited as GM potatoes are not available for public testing. According to Vikram Bisht, a plant pathologist with Manitoba Agriculture, Foods and Rural Initiatives based in Carman, Man., there has simply been a lack of marketability. “When GM potatoes were initially being commercialized, growers discovered that acceptance within the marketplace was limited, which led to a chain reaction within the industry,” explains Bisht. “While there may be labs conducting research around the world, GM potatoes are not commercially accessible. If a quick-service restaurant will not accept GM—the marketability is very limited.”

In Europe, BASF announced in early 2012 that it was moving the headquarters of its Plant Science unit to Research Triangle Park, North Carolina, and halting the development and commercialization of all GM products targeted solely for cultivation in Europe. This included several GM starch potatoes, a potato resistant to the disease late blight, and a late blight resistant starch potato. According to Britta Stellbrink, spokesperson for BASF Plant Science based in Limburgerhof, Germany, the company intends to focus on the attractive markets in North and South America for the development of GM products.

“We see plant biotechnology as a key technology for the 21st century,” explains Stellbrink. “However, there is still a lack of acceptance for this technology in many parts of Europe. Therefore, it does not make business sense to invest any longer in products exclusively for cultivation there as it was the case with our potato projects. ”

GM Acceptance

As for whether GM potatoes may see greater acceptance in the near future, Mullins is unsure. “It is hard to say. The feedback we have received to date is that the public wants to know more about the technology.”

However, he notes that the blight resistant potato is something the Irish people appear to be interested in. “They can relate to this issue because of the impact blight has had in the country, and because we love our spuds. There is also a growing awareness among the public about the level of fungicide usage that exists to bring the national crop to market. This has people asking about alternatives,” explains Mullins.

Bisht also believes that GM potatoes may one day make it to the marketplace if cultural perceptions change. “We don’t know yet what will happen, he says. “[Genetically modified] corn and soybeans in North America and many other countries have been accepted so I’m not sure why potatoes have hit a roadblock. If quick-service restaurants and consumers begin to accept GM potatoes, there will be a change in the marketplace.”

Stellbrink maintains perceptions around GM products are changing slowly, but BASF does not perceive opportunities for the commercial cultivation of GM plants in Europe in the mid-term. “Today, imported GM products are mainly used for feed in Europe,” explains Stellbrink. “But there are many ongoing laboratory projects and also we are continuing our industry-leading research at our sites in Germany and Belgium. There is a global demand for more crops to be resistant to diseases and pests as well as crops with higher yield and improved drought resistance like the new Genuity DroughtGard Hybrids we have developed in collaboration with Monsanto.” **Shannon Schindle**

GM Potato Lines Halted

In 1995, Monsanto completed U.S. regulatory authorizations for NewLeaf potato, a Russet Burbank improved using biotechnology to provide protection from the Colorado potato beetle. Canadian authorization was completed in 1996. The NewLeaf potato used naturally-occurring bacteria found in the soil known as *Bacillus thuringiensis* to provide in-plant protection from the Colorado potato beetle. In 2001, Monsanto made the decision to focus its biotechnology program on its key row crops. Ongoing activities involving potatoes were scaled back. Sales and marketing of the NewLeaf potato varieties were suspended, but the products remain fully approved in the United States and Canada.

In 2010, BASF Plant Science received approval by the EU commission of Amflora, a starch potato that only contains pure amylopectin. Amflora is a variety of the medium-late to late maturity group with stable, high-starch contents in the form of pure amylopectin and has medium tuber yields. In early 2012, however, BASF announced that it was stopping development and commercialization of all products targeted solely for cultivation in Europe, including GM starch potatoes (Amflora, Amadea and Modena), a potato resistant to the disease late blight called Fortuna, and a blight resistant starch potato.

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FEW PRODUCTS ARE as versatile as potato starch. To name just a few of its many applications, potato starch can be found in the kitchens of most Chinese restaurants around the world, where it's used as a thickener. It is used in many snack foods, including dry-roasted peanuts, to hold the flavouring in place. Potato starch is utilized for filtration in yeast production, and it is widely used throughout the food processing industry as a general thickener, binder, texturizer, anti-caking and gelling agent. It is also found as an additive in many cosmetic and pharmaceutical products, and has numerous uses in the pet food industry.

Because potato starch is gluten-free, it is also used extensively by the rapidly expanding gluten-free market. "The gluten-free industry just keeps growing," says Earl McLaren, president of Manitoba Starch Products based in Carberry, Man., the only potato starch processing facility in Canada. "It's a market that we have found is increasingly serving both real and perceived needs for people who have a gluten intolerance and those who pursue a gluten-free diet because they feel it's a healthier thing to do," he says. MSP currently supplies potato starch to several of the largest gluten-free food manufacturers in Canada.

Another area where potato starch holds promise is as a feedstock to produce bioplastics. Much research around this application has been conducted in Canada at Agriculture and Agri-Food Canada's Guelph Food Research Centre in Guelph, Ont.

To produce bioplastics, potato starch is converted into a plastic-like resin that can be injection moulded into products that are biodegradable and compostable. There are many applications for the resulting material, including food packaging that allows food to breathe and yet is durable enough to be heated in an oven or microwave. "We are working to further improve the processing ability, mechanical properties and water absorption qualities of potato starch for bioplastics production," says Qiang Liu, a food scientist who is leading the research at AAFC. "The next step will be to have our technology picked up by companies for use in their products, because this is public research and we have made it available for the industry to use."

Commercializing potato starch-based bioplastics technology may prove to be a challenge, as some companies have already discovered. Probably the biggest hurdle facing the potato bioplastics industry is the need for displacing corn starch from its position as a well-established, cheap source of feedstock for bioplastics production.

About eight and a half years ago, Excellent Packaging and Supply in Richmond, Calif. launched a line of compostable cutlery called SpudWare made from potato starch. A few years later, the



Gluten-free bread made using potato starch.

Asian manufacturer of the product switched to corn starch, because a local supply was more readily available. "There are already systems in place where they process corn to get the starch, so the availability [of corn starch] is very robust all over the world," says Allen King, president of Excellent Packaging. "It's an easily available source of starch when you want to ferment PLA or some other bioplastic."

King says he doesn't know of many companies that are using potato starch exclusively in bioplastics production. Liu believes that's because potato starch is currently more expensive than competitors like corn starch.

Promising Future

Manitoba Starch Products has also given bioplastics a try. A few years ago, the company worked with Rodenburg Biopolymers B.V. of the Netherlands to bring its patented potato starch-based bioplastics technology to Canada. The companies developed some experimental

Photo courtesy of Manitoba Starch Products.

products under the brand name Solanyl, but found demand for the products was slow to build. As a consequence, MSP decided about three years ago to refocus its research efforts in different areas.

That's not to say, however, that potato starch doesn't hold promise for the future as a source of raw material in the bioplastics industry. The potential to develop localized production exists where there is a good supply of the raw material that offers growers an opportunity to invest in adding value to their crops.

Potato starch is derived from the cutting water of French fry production, something that would otherwise be a waste product. "To me it's similar to the story of polystyrene, which years ago was considered a toxic byproduct of oil refining and they had to pay to ship it to a toxic waste dump," says King. "Then some brilliant chemists at Dow Chemical realized they could expand it into polystyrene foam and use it for insulated food packaging, coffee cups and all these things. It really took off because they could make these products cheaply since the raw material was virtually free."

Many in the industry feel that there will be increasing demand for potato-based products such as bioplastics and functional food ingredients, which is driving some preliminary research to develop new potato varieties with higher starch content or having different starch structure with different amylase content. "The question is always about the value to the growers," says Liu. "It will depend on the market demand, but if there is a high demand for potato starch-based bioplastics products, I think potato varieties developed specifically for the bioplastics industry will come. There are some European countries where these have already been developed."

In the future, potato growers may have more options to grow



Photo courtesy of Excellent Packaging and Supply.

Compostable cutlery made from potato starch.

varieties to serve specific markets that add more value to the crop. Just as corn can be targeted to the ethanol, feed or food markets, potatoes may one day be grown specifically for niche markets within the food, feed, nutraceuticals or bioplastics industries.

Angela Lovell



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TOOLS^{of}the TRADE

Four growers from across Canada discuss their investments in new equipment and technology.

Rob Van Roessel, chairman of the Potato Growers of Alberta, and owner of Courtland Hill Farms, grows 390 acres of potatoes in Bow Island, Alta.

Terry Curley, owner of Monaghan Farms, grows 1100 acres of potatoes in the Kensington area of Prince Edward Island.

Jamie Lundy grows 1400 acres of potatoes with his brother Michael and father Alan near Alliston, Ont.

Scott Anderson is the farms manager for Barrich Farms and the True North Seed Potato Company, and grows 1400 acres of table and seed potatoes east of Outlook, Sask.

Spud Smart: What is the newest piece of equipment or technology in use on your operation?

RVR: The newest equipment is an 8530 John Deere tractor and the newest technology in use is the Valley Base Station, which is a telemetry system linking all our pivots.

TC: I think the newest piece of equipment would probably be the new John Deere environmentally-friendly exhaust systems on the tractors, which try and eliminate as much fumes as possible. Before that, [the newest purchase] was a GPS system with full control over the potato planters.

JL: As far as technology goes we're now running two planters with the John Deere RTK system. That's the newest piece of technology. It's working well. We were running one John Deere RTK system, and we got a second one, the reason being that we wanted to slow down ground speed for more accurate spacing. Having the GPS system allows us to have two planters in the same field. The benefit of that is that all your seeds go into one location. Once the fields are ready to be planted, you're running one operation. It streamlines things well.

SA: RTK precision ag equipment—real-time GPS equipment. It allows us to accurately and efficiently allow the trackers to drive themselves using the GPS system plus or minus one inch for very accurate row spacings, allowing for less air in the field and less unplanted ground. It also allows for more profitability with the fact that tractors are not causing any damage to the potatoes, so the marketability of the potatoes is better. Because the systems are accurate they're controlling pesticides, herbicides and fungicides as well, thus making for an accurate application rate which saves us money.

SS: What major purchases over the last five years have you found most useful (i.e. made the biggest impact on your bottom line)?

RVR: Every purchase, regardless of size, has to make some impact on the farm. It must somehow increase the efficiency of the operation. A shop expansion five years ago was probably the best investment I made. The larger shop allows us to service different units at once and we have built a few of our own specialized pieces of equipment as well.

TC: I would think that the GPS systems would be the first one. I think it makes more efficient use of the land, [as well as] fertilizer and all inputs. The second one would probably be the automatic

computer-controlled potato grader—it automatically sorts the potatoes using electric eyes. We've been able to grade a little faster because it's fully automated—it does a more accurate job.

JL: We built two storages within the last five-year period, and before that we were storing at four different locations. Eighty per cent of our crop goes to the home farm. The storages are made by Belhen. These buildings are larger and more efficient, and I get my empty trucks back quicker. They are equipped with two variable speed fans, humidifiers, and Dayson/Gellert ventilation systems.

SA: That would be the RTK GPS equipment—it's taken about five years to get it to the point we have it now. We have every tractor operating under that system. Everything is done with the GPS, which means less operator skill is needed, and it gives us a better job at the end of the day.

SS: How often on average does your operation make a major investment in a new piece of heavy equipment?

RVR: I usually run a tractor for about five years. I have been purchasing harvesters on a similar cycle but I don't foresee changing harvesters in the near future as the digging capacity is where it needs to be right now.

TC: I would think almost every year we're doing something.

JL: I would say once a year [we buy] two to four pieces depending on costs and what is required.

SA: Probably as we can afford it for sure, but every year we try to purchase a new piece of equipment. We purchased a harvester last year, and did an upgrade to our wash plant.

“The GPS is improving our quality for sure. To put a number on it is tough, but certainly we couldn't farm without it.”

Jamie Lundy

SS: Since your operation began using GPS, precision ag methods, fertility mapping or other software-based technology, have you noticed an increase in efficiency/profitability?

RVR: I have used variable rate irrigation coupled with some fertility mapping in the 2012 crop and am evaluating its benefits currently. I believe it will be beneficial, but I think it might take a few seasons to see exactly which of the field variables we can try to manage with the least cost or the highest return.

TC: We use GPS for planting and harvesting. I would say the quality has increased [especially at planting]. Everything is situated exactly where it should be. It doesn't always increase yields, but it does increase quality with less sunburn, bruising

and mechanical damage of the tubers. We do a lot of soil testing in various spots on different fields. We have a scouting division that goes over our fields every week—we don't use a satellite system for that.

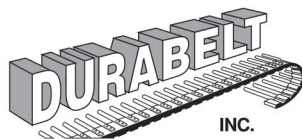
JL: As far as our fertility goes, we've kept things pretty simple. We don't have a lot of variability in our soils, so we're keeping our fertility pretty simple. The GPS is improving our quality for sure. To put a number on it is tough, but certainly we couldn't farm without it. We have competent operators, but the GPS will compensate for a lot of error. As helpful as GPS is, however, it is still not as valuable as a competent operator with common sense.

SA: In efficiencies alone, we're cutting the time down by 20 per cent, just in the days they work out in the field. We're gaining five per cent on ag inputs, so reduction in costs on inputs. Also with the GPS, we're just starting on fertility, variable rate fertilizer. We're unsure at this point how this will impact our business. Cutting down on labour and cutting down on the time, as well as the skill set of the operator at the equipment—your skill set doesn't need to be as high because the equipment does the work for you.



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SS: How do you finance your major equipment—do you buy it outright, lease it, or hire a custom operator to perform specific operations?

RVR: When I started growing potatoes 12 years ago, I used a custom operator for many operations. Since timing is so crucial for potatoes, I have purchased necessary equipment over the years to be able to do most operations myself. Currently, a custom trucker hauls my potatoes to the processor and an aerial applicator does the bulk of my pesticide applications after row closure. As far as financing, it depends on the situation. I have never leased anything.

“The world’s getting small now so most people have similar new technology. If something new comes along and it works it’s adopted pretty quickly across the industry.”

Terry Curley

TC: We buy or lease but mostly buy, depending on a whole lot of other things. It may depend on how much we’re going to use it if we decide to lease—if it’s a long-term piece of equipment we know we’re going to keep, we purchase it. If it’s something like a self-propelled sprayer, we lease those, because we want to keep them for a few years and then upgrade into new models. Here we do very little custom work. It’s a little difficult here because everybody wants it done at the same time, so we’ve found there’s very little custom harvesting of potatoes. The world’s getting small now so most people have similar new technology. If something new comes along and it works it’s adopted pretty quickly across the industry.

JL: We set up a machinery budget every year, and we try to keep it within our machinery budget. If we can’t afford to pay for it we don’t buy it. With the potato business being so risky, that’s one way we try to minimize our risk. I’m a third generation [grower] and we’ve always been a relatively conservative farm. We’ve taken a step-by-step approach. We still use custom operators for our fertilizer applications.

SA: We do a couple of things. We buy most of it and finance most of it, if we can see the benefit for the business—we ask, “Will it pay for itself?” We get some custom application done, such as fungicide sprays, but now we’re pretty much independent.

Julienne Isaacs

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What's New with GPS Technology?

There's a reason why potato growers have been among the earliest and most progressive adopters of global positioning systems over the past 30 years.

POTATOES ARE PROBABLY the crop that requires the highest level of accuracy from GPS-guided equipment to avoid crop damage during planting and harvesting.

To get the kind of accuracy required—typically to within an inch or better—farmers have had to rely up to now on RTK systems, which transmit signals from a base station via a wireless radio tower to the receiver in the tractor or other equipment. One disadvantage of RTK is that it has a limited range and coverage isn't universal, as the infrastructure is expensive to install for retailers who usually provide the service on a subscription basis to farmers in the local area.

Farmers now have another option, thanks to a new product from Trimble. The company's CentrePoint RTX correction service provides near-RTK accuracy and is delivered direct from a satellite, so it covers extremely large geographic areas and is simple to use. The farmer doesn't require extra devices or other gear as the system is compatible with any Trimble equipment already on the tractor or other farm machinery. While Trimble still recommends using RTK for potato planting and harvesting, it says CentrePoint RTX is ideal for other applications such as fertilizing and applying pesticides.

"We conduct annual producer surveys and one of the things we find year after year is that farmers see a lot of value in precision agriculture, but they still think it's a little too difficult to use," says Mike Martinez, marketing manager for Trimble's Ag Division. "The CentrePoint RTX is another step in simplifying precision agriculture and still getting high accuracy. It's the only product that exists right now that gives the farmers inch and a half accuracy virtually anywhere in the world."

Farmers can also get GPS guidance systems for the planter and harvester as well as the tractor, to further improve accuracy. "We measured the variation of movement in a harvester and it can move six to eight inches side-to-side even though the tractor is perfectly straight," says Martinez.



Farmers can get GPS guidance systems for the planter and harvester as well as the tractor, to further improve accuracy.

Photo courtesy of Trimble.

Probably the biggest trend in the GPS industry, however, is in software development that allows the integration of data collected from field equipment and provides better information management options for growers. Again, it's an area that is being adopted by the potato industry.



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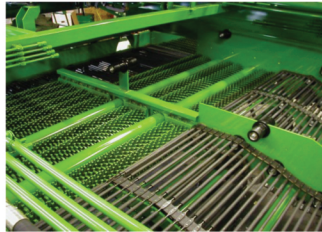
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Record Keeping

The Farm Records Management Project, partially funded by Agriculture and Agri-Food Canada's Canadian Agriculture Adaptation Program and co-ordinated by the Canadian Potato Council (CPC) of the Canadian Horticultural Council, brings together a working group composed of potato growers, Farm Credit Canada and farm equipment and GPS manufacturers. Its goal is to try and figure out how to seamlessly connect farm management records software currently available with GPS information generated in the field.

"I think it is important to give the potato growers a lot of credit for being proactive in getting the program initiated and getting the players to the table."

Glen Kroeker

In the spring of 2011, the Farm Records Management Working Group (FRM WG) of the CPC conducted a survey that identified FCC's farm financial software programs and GPS systems produced by John Deere, Trimble and AutoFarm as those most commonly used by growers across Canada. As a result of further

consultations with a grower panel about the improvements they would like to see, FCC signed an agreement with John Deere that they would collaborate on integrating the John Deere farm field GPS systems with FCC's financial programs.

"I think it is important to give the potato growers a lot of credit for being proactive in getting the program initiated and getting the players to the table," says Glen Kroeker, director of FCC Management Software.

In January 2012, FCC released its new software program, Field Manager Pro 360, with John Deere integration. "The biggest thing is being able to bring in the field data from John Deere equipment and have it auto-populate the software," says Kroeker. "The equipment is gathering a lot of information and it saves producers from having to re-enter it into a different program, because they can download it directly. They have everything consolidated into one place rather than having some information in a harvester, some in a combine and some in a tractor."

It does mean that growers need to make sure their equipment is set up to keep good records. That's something some growers may have been a little lax about in the past, largely because data collection was a separate process from data analysis. With the new system, the two are combined as one function.

"Whatever records are in the equipment, that is what will transfer over, and they need to be keeping the records and utilizing the equipment capabilities," says Kroeker. "But growers are realizing more value with the records and the things that they are able to use them for, so it's worth that little bit of extra time and that is why it is growing in popularity."

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Managing Data

Another reason why uptake has been good with the new software is that it gives growers the option to retrieve data for different aspects of their operation. That includes functions that help with inventory control and traceability. As an example, for potato growers certified under the CanadaGAP food safety program, the software will auto-populate CanadaGAP forms with the relevant information, helping to simplify the process and save time.

That has proven to be one of the major advantages of the new system, says Marlon Kuhl, chair of the FRM WG, who began using Field Manager Pro 360 on his own farm near Winkler, Man., this past summer. "It gives us all the information we need for our food safety audit and our field records all in one location," says Kuhl.

"[GPS] is going to be faster to initialize and more reliable. You can basically trust that it will always be there."

Mike Dentinger

"In the past we have had kept our farm records in one place, our storage records in another, and our inventory in another. This system incorporates them all into one place and allows us to pull off reports that we can use."

The next step for the FRM WG is to try and get some of the other farm equipment and GPS manufacturers in the industry involved, says David Jones, manager of potato industry co-ordination at the CHC. "There is a commercial program available now, and the next step is to get the other manufacturers involved and also to refine the program," says Jones. "Our working group will be meeting in the new year to evaluate how the system worked and gather any suggestions about how to improve it."

Trimble has also introduced its own software service, Connected Farm, designed to better manage and integrate GPS field data. "The GPS is recording where it planted and where it spread fertilizer, where it did harvesting, all this data, but there's not really been a central repository for all that data or a way to use it,"

says Martinez. "Connected Farm is a way of centralizing that data and giving the grower a tool to compile it and make informed decisions about any aspect of his operation."

While GPS hardware continues to evolve and becomes standard in a lot of farm equipment now available on the market, it's the software aspect that Martinez feels will give the farmers more functionality and translate into more value in the future. "The information piece is really what is going to bring everything together and take growers to the next level," he says. **Angela Lovell**

New Generation GPS Satellites Improve Accuracy

It's nice to know that GPS technology is going to be around for a while, thanks to a new generation of 2F satellites.

"The first satellites were launched in the 1970s but the lifetime of a satellite is eight to seven years, so they have constantly been putting up new GPS satellites over the years to replenish the constellation," says Mike Dentinger of Trimble's Ag Division. "Each time they add capability and technology to the system that has been developed since the last satellite generation went up. The 2Fs are the last of the generation two GPS satellites, and the next step will be generation three."

How that translates into benefits for the potato grower using a GPS-guided planter, tractor or harvester is in improved accuracy.

Satellites transmit signals down to earth which are received by GPS receivers. By receiving signals from a group of satellites, it's possible to mathematically calculate the actual position and velocity in time of that receiver on earth. "The 2F satellites include an L5 band, which is a new signal coming off the satellite," says Dentinger. "That gives another observable in your calculated position fix. Having multiple observables allows you to calculate a position fix with greater accuracy."

Accuracy is the name of the game in GPS, and as the technology progresses it's just going to get better, faster and more accurate. "It is going to be faster to initialize and more reliable," says Dentinger. "You can basically trust that it will always be there."



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eye on the nation

CANADIAN POTATO COUNCIL

David Jones, Manager, Potato Industry Co-ordination Canadian Horticultural Council/Canadian Potato Council

The Canadian Potato Council continues to be active in advocating for Canadian potato producers and has made significant progress on a number of initiatives over the past year.

A major milestone was reached with the completion of the National Potato Research and Innovation Strategy. Based on a series of industry stakeholder consultations conducted across the country last summer, the strategy articulates stakeholder priorities for research and innovation in the Canadian potato industry over the next 10 years, and serves to focus research efforts for Growing Forward 2 funding opportunities. Its development was partially funded by the Agriculture and Agri-Food Canada's Agricultural Innovation Program. The strategy is available on the CPC page of the CHC website.

The Canadian Food Inspection Agency has released the voluntary National Farm-Level Biosecurity Standard for the Potato Sector (available on the CFIA website). This first plant sector biosecurity standard was a collaborative effort by the CFIA, the CPC, potato industry sector organizations and provincial departments of agriculture, with funding provided by AAFC. It identifies specific biosecurity target outcomes for potatoes related to access management, plant health management and operational management. An accompanying producer guide will provide current information on a variety of biosecurity best practices that may be implemented by growers on their farms to meet the target outcomes. All potato producers in Canada will soon receive directly through their provincial organizations a biosecurity package that includes the Standard, Producer Guide, Biosecurity Checklist and Biosecurity Mini-Poster.

The CPC has also completed a project to identify plant pest response best practices for the greenhouse and potato industries in Canada. Activities included the completion of a literature review to identify the components of existing plant pest response plans in key identified countries of interest. This was followed by a survey of stakeholders in foreign countries with experience with plant pest response plans, to understand how these programs worked at the practical level. Based on this information, a model of best practices was proposed as components of a plant pest response framework for Canada. This project was partially funded through AAFC's Canadian Agricultural Adaptation Program. Taking the framework developed in this project, the next step will be to initiate a new project to develop a

detailed plant pest response plan proposal for Canada.

The collaboration of New Brunswick and Prince Edward Island growers on export development through Potatoes Canada continued this past year. Activities included exhibiting at international trade shows, hosting incoming trade missions and entering Canadian potato varieties in foreign in-country performance and/or registration trials, and developing a web-based potato variety catalogue. Funding for this project is being provided by the AAFC AgriMarketing Program, the governments of New Brunswick and Prince Edward Island, Potatoes New Brunswick and the P.E.I. Potato Board.

The CPC continues to advocate for potato producers in Canada by engaging in consultations on CFIA modernization initiatives and responding to other important industry issues including the repeal of container standards, potato cyst nematode and the associated implementation of testing fees, the Canadian Partners in Quality Program, Plant Breeders' Rights renewal, and changes to the Seed Potato Quality Management Program.

The next meeting of the CPC is March 11 and 12 at the Westin Hotel in Ottawa, prior to the CHC Annual General Meeting. The CHC's Potato Committee meeting is slated for March 15 in Ottawa.

SASKATCHEWAN

By Kirk Flaman, President Saskatchewan Seed Potato Growers Association

Saskatchewan potato producers harvested an average crop during the fall of 2012. Conditions were dry later in the fall, which was different than the previous couple of years.

The Saskatchewan Seed Potato Growers Association held their annual conference in late November. Our members had another great list of speakers! Topics such as "Falgro for Small Potato Production," "Herbicide Drift," "Effectiveness of Different Disinfectants on BRR," "Varietal Development," "Control of Wireworm" and an update from CFIA were presented. Thank you to our sponsors and trade show representatives for your continued support for our industry.

Members of our Board of Directors were elected, and a few new growers have stepped up. Our board consists of the following members: Scott Anderson, Elly Konst-vander Veldt, Andrew Kazakoff, Jan Konst, Jeff Curtis and Jaap Huininga. Thank you to those who have stepped forward!

The board and membership of the SSPGA extends to all potato producers a happy holiday season and all the best in 2013.

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ALBERTA

By Helmut Leili, Executive Director
Potato Growers of Alberta



Potato growers in Alberta had an excellent season in 2012, starting with the planting period. The total acreage planted was the highest ever for the province. The vast majority of the acreage was planted for processing (75 per cent), while seed was second (20 per cent) and that grown for the fresh market came in third (five per cent).

A few problems developed over the summer growing period, but with excellent weather—especially during the harvest period—the crop yielded better than average. The current crop is doing very well in storage, although in the late fall, some problem bins needed to be managed by the processors to minimize storage damage while maintaining finished product quality. Crop contract negotiations have not yet started for 2013, but will be initiated in the coming weeks.

The purchase of the Maple Leaf potato processing plant in Lethbridge by Cavendish Farms is being viewed as very good for Alberta's potato growers. They have publicly stated that their vision is to grow their western Canadian business. The main challenges for Alberta growers will be the government cutbacks in applied and theoretical research, particularly in areas of disease control and new variety development.

We have a strong land base for crop rotation and strong focus on land stewardship. Coupled with a very good climate, growers continue to feel very optimistic about growing potatoes in Alberta in the near term.

MANITOBA

By Garry Sloik, Manager
Keystone Potato Producers' Association



As reported in our last Eye on the Nation report, Manitoba processing potatoes experienced a tremendous variation in production in 2012. The season until mid-June was ideal; it was then followed by a few months of stress. Thankfully there are a lot of very good quality potatoes in storage, and processors shouldn't have to import potatoes this season. The processing plants will need to be efficient and match the raw to the different runs of finished products. To a large extent, this has been and is being done on a consistent basis with some challenges. The growers with top-quality product will need to be patient and fill in when requested—gone are the days of constant deliveries.

Growers and processors will be discussing which varieties work best in those areas where there are variety options. Growers are thankful that some variety options exist, although not nearly to the extent that many producers want. A stressful season always highlights the weaknesses of Russet Burbanks.

Seed availability will enter the picture as seed growers also faced some challenges in 2012. This raises concern as to where the early generation seed potatoes are going to come from, as this is a shrinking base in our neighbouring province of Saskatchewan. In addition, better commodity prices in the last few years entice small acreage seed growers to concentrate on less intensive, less capital-demanding crops rather than seed potatoes, which affects production of early generation seed potatoes.



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Waging War on Waste

Why improving potato crop quality in the field could be the key to reducing waste.

TT



By
**Lukie
Pieterse**

Lukie Pieterse is a consultant and writer with decades of experience in the potato sector, from growing his own drip-irrigated potatoes to writing international potato news. Tuber Talk is an insider's take on the issues impacting the industry.

WASTE IS A reality for all potato operations. Just how much waste varies, and the degree of waste often differs from season to season. Canadian growers commonly view waste as potatoes unusable for fresh market, processing or dehydration because they do not meet minimum size, grade or quality standards. Potatoes disposed of due to low market value caused by overproduction—typically referred to as cull potatoes—are also considered waste.

Solanum, a potato processor in the United Kingdom, is taking a broader view on potato waste. According to a report posted to the British Potato Council website entitled *War on Waste in the Potato Supply Chain*, the company is planning to dramatically reduce waste in the supply chain by improving quality in the field. Inefficiencies and waste occur throughout the potato production and supply chain, but Solanum's agronomy director maintains that the most important area to address regarding waste prevention is how the crop is grown and managed in the field.

In 2008, Solanum initiated a five-year project dubbed War on Waste in collaboration with a large supermarket chain. Its goal is to assess the level of waste produced in the potato supply chain and come up with practical solutions for reducing it.

According to the BPC report, the War on Waste project found that for every 1,000 tonnes of potatoes produced for a retail crop, just 583 tonnes eventually made it to the consumer. The project also determined that about half of these losses occurred directly on the farm. Six per cent of potatoes failed at field level before or



Bruising is one of the leading contributors to potato crops failing at field level.

soon after lifting began, due to size, quality or bruising problems. Defects removed during initial grading—including damaged, misshapen, scabbed and green tubers—resulted in a further 12 per cent loss, while storage waste accounted for five per cent. During the packing phase, size grading took out another two per cent while post-washing defects removed 22 per cent.

Causes of Waste

The War on Waste project team categorizes the key causes of potato waste as follows:

Field failure:

- Unsuitable soils
- Lack of irrigation
- Pests and diseases

Gross defects:

- Over/undersized tubers
- Misshapen tubers
- Green tubers
- Mechanical damage

Storage waste:

- Skin disease
- Weight loss
- Loss of skin brightness

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Post-washing loss:

- Greens
- Mechanical damage
- Skin disease

The project has an overall waste reduction target of 12 per cent. Central to this goal is an agronomic plan for tackling wastage in the field that focuses on three key areas—soil, seed and water.

The War on Waste team believes many potato defects are caused by soils, which may be inherently unsuitable, harbour pests or have poor moisture retentiveness. Quality soils typically save between 10 to 40 per cent on cultivation and input bills, while producing a 15 per cent improvement in packing out-turn.

Growers are urged to consider extending or following different crop rotation practices, introducing brassica or green manure crops. Better crop programming along with raising organic matter levels, will help reduce waste.

Soil structure, as well as pest and disease pressure, should be examined before planting, while cropping history is another important consideration. Solanum is building a database of soil information across its grower group to keep track of how well crops are performing in each field.

Soil structure is crucial, and compaction is a key reason for poor crop consistency and loss of marketable yield, according to Solanum. Misshaped tubers are the main defect caused by poor soil structure, but scab risk is also increased.

The War on Waste team maintains seed should be integrated with ware programs to improve quality. In addition, tuber size distribution can be optimized through physiological and chronological aging. Solanum field staff members carry out detailed in-field examinations before a particular crop is lifted in order to highlight any potential problems which will need to be managed in-store.

Better use of water is another key aspect in preventing in-field damage and subsequent waste. The War on Waste team believes that fewer crops should be targeted in areas where irrigation is limited rather than risking wholesale rejection. Greater attention to irrigation scheduling is also important. The team stresses that rain guns, for example, are quite variable and should be phased out—replacing them with drip irrigation typically increases yields by five to 10 per cent.

Actions can also be taken during harvest to prevent waste potatoes, such as ridge rolling to reduce greening. Rapid store loading and cooling can also minimize potential damage.

Preventative agronomic measures like these will help, but in reality, potato growers will still have to deal with some potato waste or cull potatoes every season.

Cull Potatoes

Cull potatoes may accumulate any time during the year, but several periods are especially critical. At planting, potato waste material may accumulate when seed pieces or tubers are discarded due to size (slivers) or disease problems. At harvest, potatoes that do not make grade due to size, disease, or defects are sorted out and discarded prior to moving the crop into storage. Any time po-

tatoes are removed from storage, those that are diseased, damaged, out of grade, or in oversupply are once again culled and discarded.

Allowing cull potatoes to accumulate without proper disposal practices can have undesirable consequences, which include the following:

- cull potatoes can be a source of late blight inoculum, leaf roll virus and other diseases that can spread to a grower's own fields and neighbouring fields;
- rotting cull potatoes can produce offensive odours and attract undesirable insect pests; and
- decomposing potato piles provide a point source for nutrient leaching to ground and surface waters.

Waste Control Guidelines

In the document entitled *Agricultural Waste Management*, the P.E.I. government and Environment Canada provide a number of practical guidelines for growers to deal with potato waste management. The guidelines cover several areas, including value-added processing, animal feed, composting and land spread.

Dehydration of cull and other waste potatoes is a very effective and efficient method of turning a waste material into a value-added product. This process dehydrates the raw potato into dry material such as potato flakes and granules which can then be used to create new potato and other food products.

Cull potatoes and processing vegetable wastes are an excellent energy source suitable for finishing rations in beef feedlots. Cull potatoes and processing plant wastes can be ensilaged and used as animal feed. For example, potato culls and processing plant wastes can be ensilaged by placing them in layers in silos with well-wilted hay crop silage at a 2:1 ratio. A mixture of three parts potato waste to one part chopped hay can also be ensilaged.

The composting of cull potatoes is an environmentally acceptable method of disposal. To obtain the correct amounts of carbon and nitrogen, potatoes must be mixed with other materials for effective composting. Common materials that are mixed with potatoes include sawdust, straw and solid manure.

Spreading cull potatoes over frozen ground during the winter is another effective disposal method, but care must be taken to evenly distribute the potatoes and not dump them in piles to ensure freezing. Maximum application rates should not be more than 10 tonnes per acre. In addition, growers should avoid fields that will be planted later with potatoes, since cull potatoes can introduce nematodes, weed seeds and other soil-borne diseases to the field.

The accumulation of cull potatoes occurs year-round on farms, as well as at fresh pack and processing operations. Managing cull potatoes and associated dirt and plant debris needs to be incorporated into the normal management routines of growers, fresh packers, and processors.

It's apparent that some potato waste is unavoidable, but there are ways to limit the impact on yields. In the fight against waste, a grower's best defence is knowledge about the proper preventative agronomic measures.



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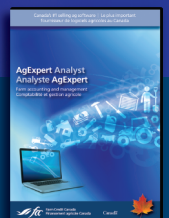
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farmers and food producers start to adapt now, they can stave off some of the dour food production and distribution scenarios laid out in this research,” explains Thornton. “But they can’t face these complex, interrelated problems, which vary from crop to crop and region to region, alone. They need support from the highest levels.”

Source: CCAFS Communications, CGIAR

Peru

For its fourth edition, CIP’s *Catalogue of Potato Varieties and Advanced Clones* has been released and now lists 399 clones and 70 varieties developed by the institution. The catalogue is available in English, Spanish, Chinese and, for the first time, French—while versions in Dutch, German, Portuguese and Russian are planned for the fifth edition.

The 2013 catalogue also provides more information on advanced clones, pollen viability and flesh colour. The hard copy comes with two leaflets: *Breeders’ Choice*, which details heat-tolerant clones, and *Rainbow Choice*, which lists novel clones with red- to dark purple-coloured flesh. The clones are made available for worldwide distribution to potato research programs and other interested parties, including national programs, universities, producer associations and farmer communities, either for the direct selection of candidate varieties or for use as parental material.

Source: CIP

United Kingdom

Researchers are looking to reduce dietary levels of the carcinogen acrylamide by developing a new variety of potato. Acrylamide is formed during high-temperature cooking. The chemical has been linked to an elevated risk of cancer, so regulators are keen to limit the amount present in wheat, rye and potato products. One approach is to develop potato varieties that are low in acrylamide precursors in other words, the amino acid asparagine and reducing sugars. This is the goal of a large project funded by the

Biotechnology and Biological Sciences Research Council; however, in potatoes, the link between the precursors and acrylamide levels are far from simple.

As part of efforts to identify the characteristics required by a low acrylamide-forming potato, researchers investigated the formation of the chemical in nine different potato varieties which are all used for processing. The team, led by Nigel Halford from Rothamsted Research, U.K., measured the levels of acrylamide precursors in each variety, along with the amount of acrylamide formed during frying. The precursor-acrylamide relationship was found to be variety-dependent, making it very difficult to identify specific targets for breeding programs. “We are also looking at the effects of different growing conditions and trying to understand the genetics and biochemistry of precursor metabolism,” says Halford. “Our aim is to come up with the tools to produce low acrylamide varieties for 10–15 years in the future when there may be stricter regulatory limits.”

Source: *Chemistry World*, *ResearchGate*, *PubMed.gov*

United States

The National Potato Council in the United States has sent reports to the Office of the United States Trade Representative on the barriers faced by exporters of U.S. potatoes in 2012. The NCP’s reports included sanitary and phytosanitary (SPS) barriers and foreign standards-related barriers. These, along with a third report on tariff and quota-based barriers submitted in October, are collectively known as the *National Trade Estimate Report*. SPS barriers include issues related to plant health, such as nematodes and zebra chip disease.

Standards-related measures include interpretation and implementation of various foreign regulations as they pertain to United States potato exports. As noted in the reports, exports, which now account for 16 per cent of U.S. potato production, were valued at US\$1.6 billion from July 2011 to June 2012. Ongoing efforts to

resolve the market barriers outlined in the reports could potentially double the current level of U.S. potato exports.

Source: *United States National Potato Council*, *HZPC Americas*

Cameroon

The United States Department of Agriculture has purchased 240 metric tonnes of dehydrated potato granules and 320 metric tonnes of dehydrated potato flakes under the McGovern-Dole International Food for Education and Child Nutrition Program.

The McGovern-Dole program is a global school feeding program promoting education, child development, and food security for some of the world’s poorest children. The potato granules purchased under this program will be utilized in Cameroon by the private voluntary organization Counterpart International as part of a three-year school feeding project. The project will ultimately use 1,986 metric tonnes of dehydrated potatoes and will promote the growing of fresh potatoes by Cameroon’s citizens to develop a more sustainable food source. Prior to the purchase, only U.S. dehydrated potato flakes had been approved and purchased for food assistance programs. The inclusion of fortified potato granules marks an achievement for the USPB, which promotes the suitability of dehydrated potato products as a base for fortification.

This is the first time U.S. dehydrated potato granules have been purchased for a U.S. international food assistance program. “The significance of this purchase is the long-term potential for the potato industry,” said Ritchey Toevs, co-chair of the United States Potato Board’s international marketing committee. “By developing demand and opportunities in international food assistance programming, we are creating a new outlet for U.S. potato growers that did not previously exist.”

Source: USPB

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CROP PROTECTION

SYNGENTA, a global crop protection company, is offering Cruiser Maxx D Potato, a new liquid potato seed piece treatment aimed at enhancing potato production.

Cruiser Maxx D Potato combines three chemistries in one liquid application. Fludioxonil and difenoconazole control Fusarium, including resistant biotypes, seed-borne Rhizoctonia and silver scurf. A third chemical—thiamethoxam—stops early-season insects for up to 100 days.

“Syngenta continues to advance its seed care technology for potato growers. With Cruiser Maxx D Potato, growers benefit from an enhanced liquid seed care formulation, offering excellent coverage for disease and insect control,” says Mitch Reid, seed care asset lead with Syngenta Canada. “Additionally, because this seed treatment incorporates multiple modes of action, managing Fusarium resistance is made easier and more effective.”

Cruiser Maxx D Potato also controls silver scurf and seed-borne Rhizoctonia, two other diseases that are potentially devastating to potato plants. The seed treatment also has flexible application rates to allow growers to adjust to their needs. While some growers prefer to have some Rhizoctonia to promote tuber sizing, others—particularly in the seed and fresh markets—need to manage the disease for yield and quality. Syngenta says using Cruiser Maxx D Potato seed treatment and Quadris fungicide in-furrow provides effective control of seed- and soil-borne disease, respectively.

The use of an enclosed liquid applicator, such as a Milestone liquid seed treater, is the preferred technology for applying Cruiser Maxx D Potato. According to Syngenta, the Milestone’s two-phase application and gently rotating drum provide an improved closed environment for treating potatoes and delivers optimal seed coverage when compared with other treatment methods.

Visit syngentafarm.ca for more information.



The Milestone liquid seed treater is the preferred technology for applying Cruiser Maxx D Potato.

Photo courtesy of Syngenta.

INSECTICIDE

DOW AGROSCIENCES'S Delegate WG delivers fast-acting control of Colorado potato beetle, European corn borer and many other chewing pests in potato crops.

Dow’s Delegate WG is a Group 5 spinetoram insecticide, formulated as a wettable granule. According to the company, it has the lowest environmental impact on beneficial, predatory insects such as lacewings and ladybird beetles and is non-toxic to bees once the spray residue has been dry for three hours.



The Colorado potato beetle is among the pests controlled by Delegate WG, a reduced-risk insecticide from Dow AgroSciences.

“Because it has such a low impact on most beneficial insects, Delegate is an excellent fit with integrated pest management programs,” says Jerry Olechowski, horticulture portfolio manager with Dow AgroSciences.

Spinetoram insecticide is derived from a fermentation process, followed by a secondary chemical modification to create a unique active ingredient. Because of its natural origin, Delegate is classified as a reduced risk pesticide by the Canadian Pest Management Regulatory Agency. After dozens of field trials in key crops since 2004, Delegate has been found to have very low impact on populations of beneficials, including big-eyed bugs, damsel bugs, ladybugs and lacewings.

“Delegate controls insects in two ways—by contact and ingestion—which provides quick knockdown and residual control,” explains Olechowski. “No other class of products—organophosphates, carbamates, pyrethroids and neonicotinoids—affects the insect nervous system with the same mode of action as Delegate. It’s an ideal rotational product.”

For more information, visit dow.com/canada.

RHIZOCTONIA CONTROL

IF YOU asked potato growers to draw up a wish list for crop protection, a more effective solution for early blight and Rhizoctonia would be near the top. A definitive control option has proved elusive, but DuPont says it has the answer—a new fungicide called Vertisan registered in 2012.

Vertisan is an advanced fungicide powered by a next-generation SDHI mode of action,” says Ray Janssen, product manager with DuPont Crop Protection. “This fungicide binds tightly with the site of action on the fungicide molecule, stopping disease in its tracks. Applied in-furrow, it provides superior protection for young potato plants against Rhizoctonia. When used for foliar application, Vertisan manages early blight and grey mould too.”

“IVERTISANI PROVIDES SUPERIOR PROTECTION FOR YOUNG POTATO PLANTS AGAINST RHIZOCTONIA.”

RAY JANSSEN

As Janssen explains, when Vertisan is applied in-furrow, it creates a zone of protection against Rhizoctonia, protecting the seed potatoes and emerging plant tissue by inhibiting the pathogens in the soil. Its locally systemic movement also protects roots, stolons and foliar tissue as the plant grows. This helps with early crop establishment, which provides the opportunity for improved yield at harvest.

As a Group 7 SDHI fungicide, Vertisan is also a valuable tool for resistance management. DuPont says the fungicide’s optimized product formulation makes for superior crop safety, abundant tank-mix compatibility and excellent rainfastness.

To learn more about Vertisan, visit dupont.com.

LATE BLIGHT CONTROL

ENGAGE AGRO, the Guelph, Ont., firm specializing in niche market crop protection products, offers Torrent 400SC for the prevention of diseases caused by oomycete fungi in all varieties of potatoes. Unlike other fungicides, Torrent 400SC effectively controls late blight at all stages of the life cycle. Torrent 400SC’s mode of action kills oomycetes fungi by respiration inhibition in the mitochondria.

According to Engage Agro, the benefits of using Torrent 400SC include the following:

- contact fungicide with anti-sporulating effects and some systemic activity, for enhanced crop protection and yields;
- low use rates, resulting in fewer containers to handle;
- FRAC Group 21—an excellent partner for IPM resistance management of late blight;
- exceptional rain fastness and long residual control due to Torrent’s affinity to the waxy surfaces of potato leaves; and
- great disease control right up to harvest with a PHI of seven days and a short REI of 12 hours.

For best results, begin foliar applications when warning systems are forecasting disease infection periods—generally at row closure or when conditions are favourable for disease development, but prior to the appearance of the disease. For late blight control, the recommended usage is 0.1–0.2 litres in 200 to 600 litres of water per hectare on a seven-day schedule. Applications should include Sylgard 309 or non-ionic surfactant.

Additional information is available at engageagro.com. Growers can also talk with their agronomist or crop protection supplier for more details on how to use Torrent 400SC.



Photo courtesy of Engage Agro

Torrent 400SC helps prevent diseases caused by oomycete fungi in all varieties of potatoes.

For more information on the products listed or to submit new E&T product offerings, email Mark Halsall at mhalsall@issuesink.com

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People News

HEATHER MOYSE REMAINS BRAND AMBASSADOR FOR P.E.I. POTATOES

The P.E.I. Potato Board is proud to announce that Heather Moyse, an Olympic gold medalist hailing from Prince Edward Island, will continue in her role as brand ambassador for P.E.I. Potatoes. After a successful first year representing P.E.I. Potatoes at consumer and trade events across Canada and via social media, Moyse will be active in promoting the brand while competing for spots on both Canada's women's rugby sevens team and Canada's women's bobsled team.

Product News

BASF RECEIVES U.S. FUNGICIDE REGISTRATION

U.S. vegetable, grape and hops growers will have a new mode of action for managing downy mildew and Phytophthora blight (crown rot) on their crops. BASF has announced that Zampro

fungicide has received U.S. Environmental Protection Agency registration. Zampro fungicide is a multi-site preventative fungicide containing a unique new chemistry for use on crops including potato, cucurbits, leaf vegetables, grape, fruiting and bulb vegetables, and hops. "With its new chemical class, Zampro fungicide offers an excellent tool for successful resistance management," says Katherine Walker, BASF technical service representative.

Business News

CANADIAN GOVERNMENT INVESTS IN NEW PLANT TECHNOLOGY

A new technology to extract valuable nutrients from plants, which has potential benefits for both producers and consumers, is getting a boost from the Canadian government with an investment for Mazza Innovation Ltd. to help scale up its novel environmentally-friendly process. Mazza will use the

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NATIONAL POTATO STANDARD RELEASED

A new biosecurity standard has been introduced that will help the Canadian potato industry protect its crops. The national standard is a tool designed to minimize or prevent and control the introduction and spread of major plant pests and diseases in the potato industry. The National Farm-Level Biosecurity Standard for Potato Growers is a collaboration between the Canadian Food Inspection Agency and the Canadian Potato Council of the Canadian Horticultural Council. The potato standard offers a consistent national approach to controlling major plant pests and diseases

in the industry. The standard was designed specifically for the potato industry, and is applicable to farm-level operations of all types and sizes.

GOVERNMENT HELPS POTATO FARMERS BOOST EXPORTS

Potato farmers will be able to tap into new markets and increase their profitability with an investment from the Canadian government to help find export markets for Canadian varieties of seed potatoes. The investment of \$36,000 will allow the P.E.I. Potato Board to work with Canadian potato breeders to select newly-registered varieties of seed potatoes that have commercial potential in export markets. Samples of each selected variety will be put through trials in order to determine which are best suited for countries in various climate zones. This will help create a stable supply of Canadian-bred varieties that growers can tap into to compete in the international marketplace.

CANADAGAP PROGRAM UNDER NEW OWNERSHIP

CanadaGAP, the national food safety program for fresh fruit and vegetable suppliers, is now operated by CanAgPlus, a new Canadian not-for-profit corporation that will operate CanadaGAP independently of the program's founding organization, the Canadian Horticultural Council. Under the new corporation, CanadaGAP program requirements and the audit and certification process will remain the same for participants and for certification bodies delivering third-party audits. However, the change in ownership has created new opportunities for those enrolled in CanadaGAP. Program participants will become members of CanAgPlus, offering new rights and privileges to attend annual general meetings, submit resolutions, elect the board of directors, etc. The fully integrated program is not yet available, although work is in progress and will continue into 2013.

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INTERNATIONAL CONVENTION PLANNED FOR 2013

The International Potato Processing and Storage Convention 2013 is a unique annual event that rotates between North America and Europe. Philadelphia has been chosen to host the conference from June 4 to 6. Registration is now open. Topics that will be addressed at the convention include sprout suppression, storage specific presentations and a discussion forum on sustainability.

P.E.I. ANALYTICAL LABORATORIES AMALGAMATE

P.E.I. Analytical Laboratories has amalgamated its five labs into one facility located in Charlottetown. The lab provides analytical services for drinking water, surface water, wastewater, soil, feed, dairy seed, plant tissue, manure and compost samples. PEIAL is accredited by the Standards Council of Canada to a recognized international standard,

and provides testing services for the public, farmers, municipalities, the processing industry, extension specialists, corporations and research scientists.

CAVENDISH FARMS EXPANDS TO WESTERN CANADA

Cavendish Farms has concluded an agreement to buy the assets of Maple Leaf Potatoes, the frozen potato business of Maple Leaf Foods Inc., including a 142,000-square foot processing facility in Lethbridge, Alta. The company expects to retain all employees currently working at the Lethbridge plant in addition to international employees. Cavendish Farms will continue to produce and market all products formerly offered by Maple Leaf Potatoes in the near term and will seek to retain all existing customer relationships. The Lethbridge plant currently produces a variety of high-quality products, including frozen french fries and other specialty potato products.

FRITO-LAY FILES FOR PATENT

Frito-Lay North America has filed an international patent for a method it has developed to reduce the oil content of potato chips by about one-third. The snack giant has established an oil temperature scheme that it says reduces oil pick-up during frying. Its method uses a continuous-frying process to produce kettle-style potato chips.

Industry News

BAKERY AND SNACK FOOD INDUSTRY TO SEE ANNUAL GROWTH THROUGH 2015

A recent market report released by the Packaging Machinery Manufacturers' Association entitled *Bakery and Snacks—Market Assessment 2012*, details the effects of current trends in the industry. The market report notes bakery and snack products manufacturers will see continued growth, with four per cent growth predicted in U.S. sales of packaged snacks through 2015, but



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DID YOU KNOW?

Aphids can be a vector for two potato viruses: PLRV and PVY?

seven per cent annual growth to US\$334 billion in global sales of snack foods in the same period. Globally, bakery product sales are expected to increase 4.5 per cent annually to US\$410 billion by 2015. The United States is the world's largest market for snacks, while European markets top the list for baked goods sales. And while 62 per cent of the snack food companies surveyed for this market assessment see Asia-Pacific markets as the source of the largest fraction of their sales growth, only 20 per cent of bakery companies share that experience.

VBC TO ACQUIRE PACE INTERNATIONAL

Valent BioSciences Corporation has signed a definitive agreement to acquire Pace International LLC, a global leader in the post-harvest segment of commercial agriculture with operations in the United States, Mexico and South America. The acquisition adds another platform to VBC's rapidly-expanding global biorational business. Based in Seattle, Wash., Pace specializes in the development and commercialization of coatings, sanitizers

and post-harvest disease management products for use in many crops, including citrus, stone fruit, pome fruit, potatoes and others.



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Canadian production estimates for 2012 are up from 2011's devastating numbers, but a glut in the U.S. market may make marketing potatoes south of the border difficult.

crop up about 8.6 per cent

A GLANCE at 2011's production figures is cringe-worthy, due to the poor crop conditions in many areas during the growing season which drastically lowered crop yields. Statistics Canada's 2012 production estimates are much improved, with totals that are slightly above trend-line averages. "We'll adjust these numbers again in January, but the crop is recorded at being up about 8.6 per cent over the previous year," says Kevin Maclsaac, general manager of the United Potato Growers of Canada. "This year's yield is estimated to be 275.5 hundredweight per acre, due to better growing conditions in almost all areas."

Additionally, the planted area was very close to the harvested acres, says Maclsaac. "Acreage increased based on additional processing contracts, and growing conditions increased yields," he explains. However, growers should be cautious about relying too much on the Statistics Canada figures. "Those were the mid-November numbers," says Maclsaac. "Some areas are being challenged with some storage issues in the west and the east and also higher cullage rates, so we'll have to see if that will bring down our net production."

SUPPLY IS UP, says Maclsaac, but this was expected after a good growing season in 2012. "Compared to a year ago on Jan. 1, our holdings are up 13.1 per cent," he says. "But we have to keep in mind that 2011 was a year that had below-average production in most provinces. It's important to keep it relative."

"Our holdings were 65 million hundredweight on Jan. 1, 2013, versus 57.5 million hundredweight on Jan. 1, 2012, so we're still above average." Maclsaac adds. "A lot of that production increase is in Manitoba. Manitoba's holdings, compared to a year ago, are up 25 per cent."

2012 Canadian Potato Production Estimates

Province	Planted Acres	Harvested Acres	Yield (cwt/acre)	Production (cwt)
N.L.	500	500	175	88,000
P.E.I.	89,500	87,500	285	24,938,000
N.S.	1,900	1,900	220	418,000
N.B.	53,500	52,500	265	13,913,000
Que.	41,300	40,800	268	10,938,000
Ont.	39,800	39,500	190	7,505,000
Man.	76,000	75,500	275	20,763,000
Sask.	7,000	6,500	250	1,625,000
Alta.	55,700	54,000	344	18,576,000
B.C.	6,500	6,000	285	1,710,000
CANADA	371,700	364,700	275	100,474,000

Source: Statistics Canada, Nov. 16, 2012

Other notable production increases occurred in New Brunswick (31 per cent) and Alberta (19 per cent).

PRICES ARE DOWN in Canada. "Manitoba reported [recently] that their fresh prices are down compared to a year ago, and right across the country it's a consistent story. That's related to the ability to move product in the marketplace, and supply," says Maclsaac.

According to Maclsaac, movement is slow in almost all areas of the country, with most provinces reporting difficulties moving product into the marketplace—which is partly due to the glut in the U.S. supply. "With the U.S. supply up, it's become almost impossible in some areas to ship potatoes into the U.S. With the number of potatoes they have to sell, they're shipping them into Canada at below-competitive prices. In P.E.I., for example, the prices are 34 cents lower per ten-pound bag than last year at this time."

"MANITOBA REPORTED [RECENTLY] THAT THEIR FRESH PRICES ARE DOWN COMPARED TO A YEAR AGO, AND RIGHT ACROSS THE COUNTRY IT'S A CONSISTENT STORY."

Kevin Maclsaac, general manager of UPGC

However, the fall season saw some excellent movement for processors. "The processors have been running really hard throughout the fall—there was good demand for the product, and they have worked diligently to keep ahead of storage issues" says Maclsaac.

Overall, the Canadian crop appears to be in a fairly good position heading into 2013.



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Left to right: Dale, Scott, Mark and Carol Rutledge.

“We are tracking that potato all the way through the process. The consumer could call us and we can trace it right back to the seed piece that we put in the ground.”

Scott Rutledge

Shifting with the Trends

DALE RUTLEDGE remembers a time when drivers delivering the farm’s potatoes would tell their customers that the potatoes had slept in the ground the night before. “Our markets were more direct and local back then,” says Dale. “We would have our potatoes into the stores by 11 a.m.”

Over the years, much has changed, with potatoes now having to travel much farther to warehouses to reach distant markets. Rutledge Farms has changed as well, expanding from the 300 acres of land that Dale and his wife, Carol, took over from his dad in 1974 to more than 2,000 acres in 2012, making it one of the largest potato operations in the Melancthon township area in southern Ontario.

Now Dale and Carol’s sons, Scott and Mark, are the fifth Rutledge generation to grow fresh table potatoes, and they are starting to notice that the trend is shifting again. They estimate that 30 to 40 per cent of their business is now direct-marketed to local stores, and more customers are stopping by the farm to buy fresh potatoes. “Everything used to be within 100 miles, and it seems to be going back that way now with all the promotion of buying local,” says Scott. “I think the consumer has a right to say what they want to buy, and I think we are starting to see that influence a little bit.”

Scott feels the traceability and food safety initiatives they have implemented on the farm are another important selling point for consumers, who increasingly are more interested in knowing where their food is coming from. “We are tracking that potato all the way through the process. The consumer could call us and we can trace it right back to the seed piece that we put in the ground and where and who we bought it from. It’s definitely a good thing.”

Technology has improved the productivity of the farm and the quality of the products the Rutledges grow. “Our product is perishable, so whatever we can do to prolong it is a big part of it,” says Mark. Future plans revolve around maintaining and improving the quality of the product. “Our markets are the most important thing, and our goal is to keep our product looking better than everyone else’s. Whether it’s equipment, or however we do it, the bottom line is to provide what the market demands.”

With a sixth generation waiting in the wings, Rutledge Farms is looking forward to the future, something the family has fought hard to ensure for the next generation. For the past five years Dale has led a group of local farmers fighting a proposal to build a 2,300-hectare limestone quarry in the area, amid fears it may affect water quality and groundwater supplies for irrigation and drinking water. His continued dedication to the land that has sustained his family since 1883 paid off in November when the quarry proposal was declined. Dale hopes the next step will entail changes to the Aggregates Resources Act, which currently governs the development of aggregates such as gravel, sand, clay, earth and stone, that will provide more protection for agricultural land. “Then we know we will be able to keep growing potatoes for the future,” says Dale.

Angela Lovell



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