

INTEGRATED PEST MANAGEMENT

The future: something old, something new



For the last two decades, Dr. Mary Ruth McDonald (right) has mentored dozens of students in her role as professor of plant agriculture, University of Guelph. Equally at home in the field, she's pictured with Master's student Alexandra Dacey. Together, they are documenting carrot weevil found in carrot trials at the Muck Crops Research Station in Bradford, Ontario. Photos by Glenn Lawson.

KAREN DAVIDSON

Get set to count bodies on sticky traps.

It's not everybody's idea of a summer job, yet dozens apply for the painstaking work of identifying insect pests at the Muck Crops Research Station, Bradford, Ontario. Know the difference between a carrot rust fly and a carrot weevil? Better yet, can you differentiate between the damage of the larvae? You're hired.

"Not much has changed," says Dr. Mary Ruth McDonald, professor of plant agriculture at the University of Guelph since 1997. "We're still training summer students to identify insects and diseases. We thought drones with their aerial imagery would have a promising future, but there are still wrinkles to be sorted out."

These rituals are the basis of Integrated Pest Management (IPM) for onion and carrot growers, mostly resident in Ontario and Quebec. Together, they

steward 20,000 acres of carrots and 13,400 acres of onions using IPM strategies: genetic, cultural, physical, biological and if necessary, chemical. Pesticides are a last resort. Growers rely on the crop scouts to say when an economic threshold has been exceeded and when it's time to spray with reduced-risk insecticides.

Onion and carrot grower Kyle Horlings is a neighbour to the Muck Crops Research Station. He knows first-hand how valuable the weekly crop

scouting is, in addition to replicated, annual research trials. He cites the example of several years of fumigant testing with chloropicrin (Pic-Plus).

"Instead of using a broadcast fumigant, we now use a site-specific fumigant in the hill of the carrot to kill nematodes and Pythium," he says. "We've seen better crop yields in the Marsh."

Continued on page 3

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OFVGA Award of Merit PG 6

Potato production PG 12

Crop protection/spraying PG 18

AT PRESS TIME...

Opportunities to expand fruits and vegetables in Ontario

A report commissioned by the Greenbelt Foundation has identified opportunities for expansion in several fruits and vegetables in Ontario. They include fresh grapes, pears, strawberries, garlic, eggplant, sweet potatoes and vertical farms. These commodities could increase their market share in a very competitive environment despite downward trends in overall acreage.

As consultant John Groenewegen reveals in his report, fruit and vegetable acreage has decreased in Ontario between 1996 and 2016. Fruit acreage has decreased by 1.8 per cent each year, while vegetable acreage has decreased by 1.0 per cent each year. In contrast, greenhouse production has expanded by 15 per cent per year.

Some of the pressures include no business succession plan, high cost of labour, scale of operation and operating margins, weather risks, price takers and margins and food safety requirements.

Those acreage declines aside, production capacity has increased on many acres due to a number of factors. Yields are higher due to modern cultivars, more timely harvesting and appropriate storage.

The opportunity in garlic, as identified in the report, is to

expand from 10 per cent of annual consumption to 20 per cent. The current constraints are: seed supply and the seed multiplication factor, reliance on primarily one variety, competition from low-cost Chinese garlic, need to lower cost structure and to build storage, need for critical mass to serve major retail markets.

What could enable expansion of the garlic sector?

- development of a seed supply sector for Ontario garlic growers;
- using only certified disease-free seed;
- developing cultivar selection and/or plant breeding program;
- building a critical mass of garlic for retail accounts;
- investing in controlled atmospheric storage;
- encouraging retailer support for Ontario grown garlic;
- promoting the attributes of Ontario garlic through Foodland Ontario
- gaining access to crop protection materials available to U.S. growers

The complete report is expected later this spring.

Ontario grape sector boosted by \$2M in funding

About 500 Ontario grape growers are eligible to apply for up to \$2 million in funding under Marketing and Vineyard Improvement Programming. The intake for applications

opens March 5, 2020.

Application forms are available at Agricorp.com.

The program will accept applications that implement new technologies to supply high-quality grapes to Ontario wine producers. Eligible activities for funding include:

- Equipment to help improve grape growing practices
- Infrastructure to enhance vineyard irrigation
- Projects to acquire environmental monitoring equipment
- Consultation with a viticulture (vine growing) expert for new technology and innovation
- Implementation of testing for pest management, including viral diseases
- Installation of non-acoustical pest management systems such as bird netting, night guard retrofit, electric fencing.

Up to 35 per cent of eligible costs will be reimbursed to eligible vineyard activity up to \$100,000 per vineyard.

The February 10 announcement of \$2 million, fifth year of the Marketing and Vineyard Improvement Program (MVIP) highlights the importance of research and new technologies to enhance the sustainability of Ontario's 18,000 acres of vineyards and recognizes that local grapes matter, said Matthias Oppenlaender, chair of the Grape Growers of Ontario.

NEWSMAKERS

The Ontario Fruit & Vegetable Growers' Association has honoured the **Ontario Food Terminal** – all its farmers' market vendors, wholesalers, salespeople, cashiers, tow motor operators, buyers, maintenance workers and management team – with the 2020 Award of Merit. Due to the workers' spirited defense of the current Etobicoke location and its economic benefits to the Ontario agri-food chain, the provincial government agreed to continue supporting the current location with a view to ongoing upgrades.

Well-known apple industry innovator **Don Peters** has been named the 2019 Arysta Golden Apple Award winner. The award was presented posthumously on February 18 at the Ontario Fruit and Vegetable Growers' Association annual meeting. Peters, who had served as vice president of N.M. Bartlett Inc. since 1987, died in December 2019 after battling cancer.

Two new vegetable crops specialists have been hired by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). **Cassandra Russell** will be responsible for tomatoes, peppers, eggplants and red beets. **Andrew Wylie** will be responsible for sweet corn, cucurbits, beans, peas and asparagus. Both are stationed at Ridgetown, Ontario.



The British Columbia Fruit Growers' Association held its 131st annual general meeting in Kelowna on February 11-12, re-electing Oliver grower **Pinder Dhaliwal** as president. He is joined by **Peter Simonsen**, vice-president. Directors include: **Ravinder Bains, Deep Brar, Avi Gill, Sukhdev Goraya, Talwinder Bassi** and **David Dobernigg**.

The Nova Scotia Fruit Growers' Association held its annual general meeting in late January 2020 electing **Peter Eisses**, Centreville, to the role of president. He fills the shoes of past-president **Larry Lutz**. Joining him on the executive are vice-president **Janet Chappel** and treasurer **Robert Peill**. Congratulations to **Michael Walsh**, Rockland, winner of the Golden Apple Award for best management of an on-farm apple tree nursery. Also honoured was **Dr. John DeLong**, storage physiologist at the Agriculture and Agri-Food Canada research station at Kentville.

The 2020 Fruit Logistica Innovation Award went to the tomato "Yoom" from the company **Syngenta Seeds**. The purple-coloured tomato is high in antioxidants and has an appealing sweet-sour and tangy flavour.



Congrats to the Farmers' Markets Ontario winners of Awards of Excellence. The 2019 Farmers' Market of the Year goes to **Lisa Cooper** and the Uxbridge Farmers' Market for its turnaround performance at a new location, The Second Wedge Brewing Company's parking lot. The 2019 Best in Innovation award goes to Innisfil Farmer's Market under management by **Jaime Grant**. A loyalty program using handcrafted wood coins were a nostalgic hit. The 2019 Best Special Event award goes to **Carmen Locke** who organized a fundraising supper for the Simcoe Farmers' Market, celebrating its 40th anniversary this year.

Vineland Research and Innovation Centre welcomes **Hussam Haroun** as director of automation. In his new role, he will oversee activities related to automation, artificial intelligence and digital agriculture technologies. He launched his own start-up after patenting and commercializing a new technology during graduate school. As CEO, he secured more than \$3 million in seed investment and grew the company to 30 employees with multi-million dollar annual revenues.

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COVER STORY

The future: something old, something new

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Ten years ago, I thought that the future of plant protection revolved around more and better reduced-risk pesticides and improvements in IPM monitoring methods and programs. Now there are so many more options.

~ DR. MARY RUTH MCDONALD

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Continued from page 1

These refined crop protection strategies are working. In 2019, the weather was such in Ontario's Holland Marsh that no insecticides were recommended for onion thrips or fungicides for downy mildew. It was too cool and dry. Because thrips counts remained below the spray threshold, growers saved four to six insecticide sprays. In the case of downy mildew, growers had a savings of four to eight fungicide sprays.

In previous outbreaks of thrips, the grower would spray the same insecticide twice, then change to a different mode of action. This targets a single generation with a single insecticide. The next generation of thrips would be exposed to a different mode of action. With this tailored recommendation, the spray threshold can now be increased from one to three thrips per leaf. A biological control fungus has been tested but is not effective.

This case study was shared by Dr. McDonald in her 'back to the future' presentation at the McGill Sustainability Research Symposium on January 30.

"Ten years ago, I thought that the future of plant protection revolved around more and better reduced-risk pesticides and improvements in IPM monitoring methods and programs," she said. "Now there are so many more options."

Here are five ways crop protection is changing.

New equipment for new disease

Spore traps have modernized in that they collect spores in vials that are checked daily. Through DNA extraction, the spores can be identified and quantified as to whether thresholds are high enough to

warrant spraying. This equipment is proving helpful with a new foliar disease, *Stemphylium* leaf blight which has emerged only in the last decade in onions.

"It's still a puzzle," explains McDonald, referring to the rise of *Stemphylium*. "We're not sure if it's global warming. It tends to develop in warmer temperatures but we also see it at cooler temperatures. With enough warm growing seasons, maybe there are enough of the pathogen to overwinter."

This disease has proven tough to control, showing resistance to commonly used fungicides. Even some new products are not as effective as they should be.

Insecticide-coated seeds

Growers are now fortunate to source onion seed from California that has been pre-treated with a microscopic coating of insecticide to fight against onion maggot. This delivery system means that growers don't have to handle the insecticide application. Additionally, a much smaller amount of insecticide is used and targeted.

Marker assisted selection

Plant genetics are progressing rapidly for better resistance to insects and diseases. Similar genetics but with different genes for disease resistance should slow the development of plant disease epidemics. Another interesting development is that vegetables are bred to emerge faster so that they can outcompete weeds. This is an important part of breeding carrots for organic production.

Field robots

McDonald foresees more use of small, self-propelled



Two generations of specialists examine the trial plots at the Muck Crops Research Station, Bradford, Ontario. L-R: Dennis Van Dyk, OMAFRA vegetable specialist; Kevin Vander Kooi, research technician, Muck Crops Research Station; Dr. Mary Ruth McDonald, professor of plant agriculture, University of Guelph; Master's student Alexandra Dacey.



This trap collects spores in a vial each day. *Stemphylium* leaf blight, for example, can be identified by its spores using molecular means. Twenty years ago, this modern spore trap was not in existence nor was the disease found in onions in the Holland Marsh north of Toronto, Ontario.

equipment, some using solar power. Planters, harvesters, monitors and sprayers will be highly efficient and able to work day and night. Spacing can vary so that plants can be seeded and harvested as needed, at optimum timing. Monitoring can be site-specific to an individual plant or leaf. If sprays are needed, they can be applied to very small, specific areas or to the whole field.

More and more, robotic weeders are being adopted for physical, non-chemical control of weeds. A robotic weeder made by Nexus in Nova Scotia will be tested in Ontario's Holland Marsh in 2020.

Communication channels

Kevin Vander Kooi, research technician for the Muck Crops Research Station since 1997, has witnessed many changes over the years. The forecasting systems for disease have evolved and improved with new equipment. Resistant weeds, particularly pigweed, are becoming troublesome. He's worried about the lack of

herbicides to control pigweed in carrots.

What has changed the most is the way in which information is communicated to growers through Twitter (@MuckIPM) and a website: www.uoguelph.ca/muckcrop/.

"We had an Agri-phone with a pre-recorded message and a dedicated phone line," says Vander Kooi. "And we used to fax. That's all changed. We are emailing, texting, posting to a Twitter account and website."

Next-generation grower Kyle Horlings surfs all of these channels, but most surprising perhaps, is that he still believes in face-to-face encounters.

"There's an open-door policy at the Muck Crops Research Station so I drop in all the time to talk to the station manager, the IPM coordinator, the vegetable specialist. I have a very high trust level in what they are telling me."

"The station is of the utmost importance to growers," he continues. "The research grants to the station allow all of us to benefit."

Editor's note: The Muck Vegetable Growers' Conference to be held April 1 and 2 in Bradford, Ontario will be available live through Adobe Connect. If you can't attend in person, you can see the slide and hear the speakers. It's also possible to forward a question in real time.

The Grower goes "Behind the Scenes" with Dr. Mary Ruth McDonald, professor of plant agriculture at the University of Guelph to discuss what's new in integrated pest management. A return to old manual practices is getting a thumbs-up with field robots.



CROSS COUNTRY DIGEST

BRITISH COLUMBIA

Apple grower margins sliced too thin

MYRNA STARK LEADER

With many apple growers facing a third year of losses and 2019 costs of production growing larger compared to poor returns, the tone was somber at the 131st BC Fruit Growers' Association (BCFGA) annual general meeting and convention held in Kelowna Feb. 11 and 12.

Although BCFGA represents about 400 members who grow mostly apples and cherries, challenges in the apple business were the focus for the approximately 100 growers who attended.

"The tree fruit sector is at a crossroads," says Pinder Dhaliwal, president of BCFGA.

Eighty to 90 per cent of BCFGA members market through the BC Tree Fruit Cooperative which distributed an average initial production payment of \$0.15/lb for all fruits marketed. The average cost to grow is between \$.20 to \$0.50/lb depending on various factors.

To help address the critical situation, the BCFGA board of directors brought forward a late resolution entitled Disastrous 2019 Apple Crop Returns (assistance). The resolution asked for further changes to AgriStability, a PST exemption/rebate for agriculture, a provincial rebate

of irrigation water fees, a rebate of the Sterile Insect Release fees in 2020, a reduction of tree fruit production insurance premiums to 4.5 percent until prices recover, provincial guarantees and interest-free grower operating loans and pursuing a provisional duty on apples sold into Canada from the U.S. at below cost of production.

In 2019, growers faced rain, sunburn and lack of apple colouring as well as insect pressures. Twenty-three per cent of growers in the Okanagan Valley saw more damage from apple clearwing moths -- some from bin movement, some from poor farming practices and neglected farms, some from backyard trees as well as some from old orchard wood being transported and used as firewood. For 2020, the budget of the Sterile Insect Release (SIR) program remains at \$440 per acre, of which growers pay \$140/acre thanks in part to revenue generated by sales of sterile moths to the U.S.

"It's worse everywhere -- U.S., Australia," says Melissa Tesche, SIR's general manager.

Compounding the pressures are labour issues such as attracting and keeping staff, on-farm housing, increased requirements for foreign worker programs and minimum wage of \$13.85 per hour rising to \$14.60



President Pinder Dhaliwal, third from left, listens to fellow growers at the BC Fruit Growers' Association Annual General Meeting held in Kelowna. Photo by Myrna Stark Leader.

on June 1, 2020. Agricultural Land Reserve changes are adding more regulations for farmers including what can be done to value-add on the farm, limiting home size and number of homes. And, apple prices face downward pressure from U.S. apple imports and smaller packers opting out of the coop system.

Both new Cooperative president Steve Brown and new CEO Warren Sarafinchan said the coop is close to finishing a go-forward plan and promised to share it with growers shortly.

"But make no mistake about it, the biggest hurdle will be saying united," says Brown.

By video from Asia where he was attending marketing meetings, Sarafinchan says every element of the business

has been studied and the way forward will involve trust, collaboration and innovation including more communication with growers.

"We have a lot of work to do. I don't want to minimize the effort to get there . . . I'm convinced we have a future but it will come down to some decisions . . . When you don't make decisions, that's a decision and we won't put ourselves in that position."

Economics are such that most of the province's replant dollars are going into new cherry orchards, not apples. In 2019, 97 apple acres and 202 cherries, compared to 152 and 45 in 2015. (Ambrosia apples and Staccato cherries are top varieties) That said, BCFGA has requested immediate action to renew the program for a further seven years. The current program ends in 2021 with the deadline to apply April 20 of this year.

"This long-term program is important, particularly during these challenging times," says Dhaliwal.

One bright spot is the popularity of the Ambrosia apple.

"Ambrosia is not a commodity apple," says Glen Lucas, general manager, BCFGA. "Our problem is that we are trying to sell it all in western Canada. Trade agreements with Asia are good and an opportunity for us. We used to ship apples to Britain."

One development is that the New Varieties Development Council, formerly the Ambrosia Council, applied for and received funding to promote Ambrosia in the under-served eastern Canadian market. With new apple varieties still in the future, Lucas says Ambrosia efforts should be directed to markets outside Canada, maybe even Europe now that Brexit is reality.

Given challenging times, more than 30 resolutions came to the floor, everything from

opposing new provincial burning regulations to requesting changes to AgriStability, for example to make it more equitable for multi-crop farms. There were also calls that the CAP program provide a grant for food safety equipment such as hand washing stations and other equipment now required to meet standards, a call for an independent study of the cherry production insurance program and a call to reduce the Ignite pre-harvest interval from 40 to 14 days. Growers also called for immediate federal research funding to find effective ways to combat Apple Clearwing Moth.

Producers were also strongly encouraged to apply for AgriStability and use their Agri-invest funds for these rainy days

"It's very scary," commented one grower. "The government might come through once but what happens if this situation happens again next year?"

"The late resolution has hit the nail on the head," said south delegate Denise MacDonald.

"This time around, I feel like the rules have changed. We're getting too many programs that farmers have to pay for to be compliant . . . climate change adaptation, food safety . . . If we really want food security in this country, then we really need to support the primary producers."

Referring to the Agricultural Land Reserve, one grower opined, "I think it comes back to when they (the province) protected the land, now they have to protect the farmers."

Myrna Stark Leader is a freelance agricultural journalist based in Kelowna, BC.

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AWARDS

Lifelong innovator wins Golden Apple Award in Ontario

Well-known apple industry innovator Don Peters has been named the 2019 Arysta Golden Apple Award winner. The award was presented posthumously on February 18 at the Ontario Fruit and Vegetable Growers' Association annual meeting. Peters, who had served as vice president of N.M. Bartlett Inc. since 1987, died in December 2019 after battling cancer.

"Don was very well respected throughout our sector and dedicated his career to working with growers, designing solutions to help improve apple growing in Ontario," says Cathy McKay, chair of the Ontario Apple Growers. "He had an uncanny ability to problem-solve and think outside the box, and left his mark on many apple technologies and facilities across our province."

An inventor at heart, Peters designed and built a wide range of innovations, from the first fully automated apple packing line with electronic grading and defect sorting in 1990 to an electrically-driven, remote control bin moving system in 2016. He also designed apple packhouse layouts for many of Ontario's leading apple producers, and travelled widely to find the best equipment and practices for his customers.

Peters was passionate about crop protection and pest control, working together with a professor from Western University to develop the first electrostatic sprayer. This technology is still offered on sprayers around the world today to reduce off-target pesticide application. He also served as chair of the Ontario Provincial Council of CropLife Canada in 1989, where he tackled issues such as triple rinse containers, and was involved nationally on CropLife Canada's Marketing-Code of Ethics Committee in the 1990s.

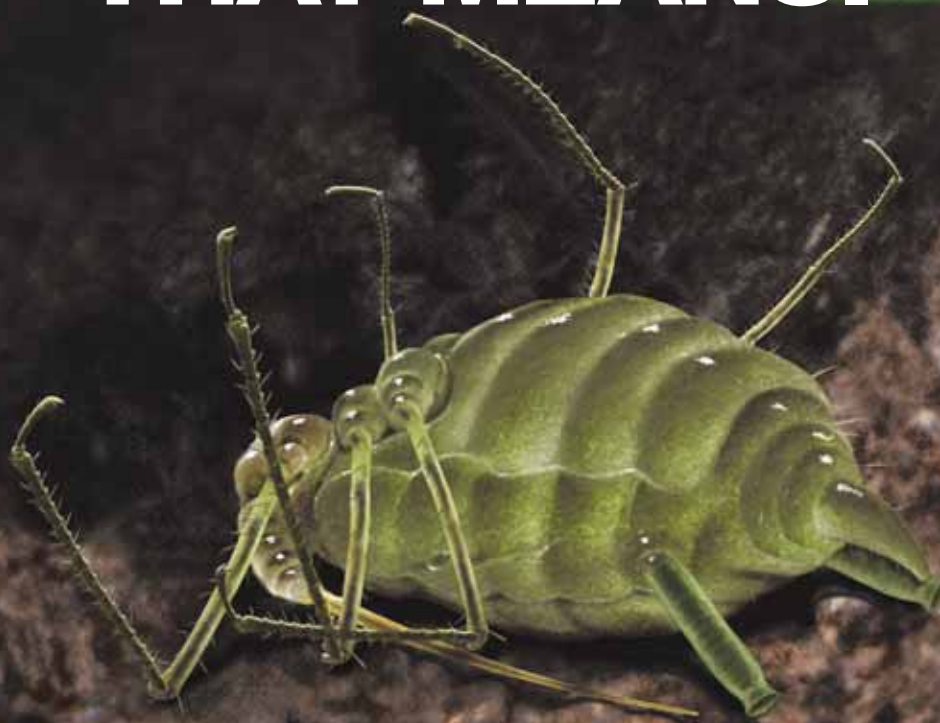
Peters grew up on a small fruit farm in Jordan Station and graduated from Brock University in 1972 with a Bachelor of Science degree. He first joined Bartlett's in 1973, and became a territory sales representative in the Leamington area the following year where he worked closely with local growers on care and use of crop protection products and orchard equipment.

"Don loved his work and working with people and dedicated his life to the betterment of agriculture and the Ontario apple industry," says McKay.

The Arysta Golden Apple Award is presented annually to a recipient who has made outstanding contributions to the Ontario apple industry. The Ontario Apple Growers represents the province's commercial apple farmers. Visit www.onapples.com.



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OFVGA AWARD OF MERIT

And the 2020 winner is . . . the Ontario Food Terminal



ALISON ROBERTSON

Traditionally, the Ontario Fruit and Vegetable Growers'

Association (OFVGA) gives its award of merit to an individual

in recognition of service to the industry. Occasionally, it has been awarded to a program or a couple of people. This year the award is going to thousands of people for their dedication to the Ontario Food Terminal.

The OFVGA would like to show its appreciation to the farmers, wholesalers, salespeople, cashiers, tow motor operators, drivers, the people that clean the docks, remove the snow, provide security, the buyers, maintenance workers, food terminal board, office staff, and the management team.

The Ontario Food Terminal is a public-private partnership that provides Ontarians and Canadians with fresh and affordable produce. No public monies are used in the operation of this facility as the operation is entirely self-funded from fees charged to users of the terminal. On any given day, more than 5,000 people work there. Today, the Ontario Food Terminal is the largest produce distribution centre in Canada, and the third largest in North America, after New York and Los Angeles.

By having a facility where both Ontario growers and wholesalers are together – a one-stop shopping environment is created. This is a win for the

buyers, wholesalers, and growers.

The Food Terminal provides the space for small- and medium-sized operations to participate in the growing, buying, and selling of fruits and vegetables. The market supports Ontario farmers, local fruit and vegetable stores, independent grocers, restaurants, caterers, farmers' markets, food distributors, non-profits and charities, institutions, as well as larger grocery stores that require specialty produce.

Anyone who has visited the Food Terminal knows that it is a special kind of person that works and thrives there! Some employees arrive between midnight and 1:00 am. The majority arrive between 3:30 and 6:00 am. Where else would you find people willing to start their job so early in the day? These are all special people and each and every one of them needs to be thanked for all that they do. Without this huge team of individuals working together we would not have an Ontario Food Terminal.

Alison Robertson is executive director, Ontario Fruit & Vegetable Growers' Association. Photos by Glenn Lawson

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OFVGA ISSUES AND ACTIVITIES

Engaging and coordinating multiple voices to government



GORDON STOCK
SENIOR POLICY ADVISOR &
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organizations such as the OFVGA needed to work through their national association, such as the Canadian Horticultural Council (CHC), to get traction on federal issues. More and more the federal government has become receptive to receiving regional perspectives, recognizing policies can impact provinces in drastically different ways.

National organizations continue to have a vital role to play. Having staff in Ottawa is valuable to maintaining ongoing relationships and point of contact with the federal government. CHC, for example, needs to be strong to coordinate messaging for the provinces.

So, what does this mean for government relations activities at the OFVGA? For starters, it means we need to employ the grassroots to carry messages to local Members of Parliament and Members of Provincial Parliament. To prepare farmers for some of this work, the OFVGA has recently partnered with Farm and Food Care Ontario to offer Speak Up training during two sessions in March.

Nationally, the OFVGA is increasing its efforts on federal issues. Two of the sector's top issues are crop protection and labour, which are impacted substantially by federal legislation. To support this, the OFVGA is working to increase its efforts at the federal level both directly in Ottawa, but also meeting with local Members of Parliament who, if informed, can effectively carry our message to Parliament Hill. It is important for all provinces to consider this targeted outreach to support the work done in Ottawa by our national voice, CHC.

The themes I just noted don't override my primary approach which is to build relationships within government and be as collaborative as possible. Government relations is not an exact science, which can be even more challenging during turbulent times. This is why OFVGA works so closely with McMillan as we work to carry and coordinate the voice of Ontario's fruit and vegetable sector at the provincial and national level.

Want to see an issue highlighted here, or learn more about how OFVGA represents growers? Contact Gordon Stock, senior policy and government relations advisor, at gstock@ofvga.org or 519-763-6160, ext. 125. More detailed updates can also be found at www.ofvga.org/news.

Early in February OFVGA met with its government relations firm, McMillan Vantage to strategize priority issues for the coming months and year. The staff at McMillan has become very strategic assets for the OFVGA as it navigates today's political landscape. The provincial government is nearly two years old and with that comes changing priorities as it positions itself for the next election. The federal landscape is considerably different with a minority government at play.

So, what does this all mean for government relations strategy? From the meeting with McMillan, some themes became clear.

A single voice is not enough. In an age where it is easy for anyone and everyone to influence government through social media, having a single voice, even if representing thousands of fruit and vegetable farmers, is still only a single voice.

Government needs to demonstrate that it has heard from all sides and that the position taken is going to be supported by the majority of stakeholders who have an opinion on the matter.

The message needs to remain consistent. Multiple voices do not mean multiple messages. Messaging to government needs to be done in a consistent and coordinated manner so that elected officials are not getting conflicting perspectives.

A few phone calls are more impactful than many emails. Elected officials can receive hundreds, if not thousands of emails in short periods of time, especially on contentious issues. When industry needs to get the government's attention on a matter in a hurry, coordinated calls from grassroots farmers to their elected representatives are far more likely to incite action.

Provincial organizations have an increasing role in lobbying the federal government. In the past, I believed that provincial



L-R: Bill George, chair, OFVGA; Dave Epp, MP Chatham-Kent-Leamington; and Gordon Stock, senior policy advisor and government relations, OFVGA.



A single voice is not enough. In an age where it is easy for anyone and everyone to influence government through social media, having a single voice, even if representing thousands of fruit and vegetable farmers, is still only a single voice.

~ GORDON STOCK











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CHAIR'S PERSPECTIVE

Grower priorities for the next provincial budget



BILL GEORGE JR.
CHAIR, OFVGA

The Ontario government is getting ready to bring down its next budget. Part of that preparation includes consultations with many different stakeholders to learn about what is important to Ontarians when it comes to provincial government spending.

The government actually undertakes these kinds of consultations on many different legislative changes they are contemplating, not just the provincial budget.

That's why one of the activities OFVGA spends quite a bit of time on is participating in these consultations, whether

by attending in person to make a presentation or by submitting written comments.

This is one of these behind-the-scenes activities that makes up an important part of advocacy and of how OFVGA makes sure grower concerns are brought to the forefront. We also work collaboratively with the fruit and vegetable commodity organizations on these consultations to ensure our messaging is consistent and complementary when we are attending similar events or responding to the same consultations.

Here are the issues we have put in front of the provincial government as part of the budget consultation:

Competitiveness pressures.

Growers continue to deal with ongoing competitiveness challenges from legacy government policy and current trade instability. We appreciate ongoing efforts to reduce red tape and make it easier to do business in Ontario, but in light of these pressures, we are asking the government to maintain adequate supports for Ontario's second largest agricultural sector.

OMAFRA budget and resourcing. We support the government's focus on fiscal responsibility and efficiency, but we're concerned about potential program and service cuts at the Ontario Ministry of Agriculture, Food and Rural Affairs that could have negative impacts on our long-term sustainability and competitiveness. For example, OMAFRA's strong network of extension specialists is an invaluable resource to the sector that we encourage the government to maintain.

Risk Management Program (RMP) cap. We've been actively working with Minister Hardeman and OMAFRA staff on a review and redesign of the Self-Directed Risk Management (SDRM) program for horticulture. We appreciate the government's ongoing support of RMP and SDRM, and are asking for implementation of the 2018 campaign promise to raise the overall program cap from \$100 to \$150 million.

Financial protection for growers. There has been little progress federally to establish a national

system to protect fruit and vegetable growers from risks related to slow payment, non-payment and bankruptcy. So we've had some meetings with provincial government representatives around the potential of addressing some of these risks at the Ontario level and are asking the government to investigate some possible options.

Foodland Ontario funding.

Foodland Ontario is one of the most visible aspects of OMAFRA's services to the industry and is very well recognized by consumers. It's in the interest of everyone involved in local food that the brand remains strong and well supported, and we would welcome discussions with the ministry about how we can collectively ensure the ongoing success of the program.

Industry input into Canadian Agricultural Partnership (CAP).

In order to leverage the CAP funding programs successfully, they must be delivered in an accessible, ongoing and predictable manner. We're asking for the opportunity to provide input into how funding

is accessed, allocated and delivered.

Northern Fruit and Vegetable Program and Fresh from the Farm. Through the northern school program, we provide more than three million servings of fresh fruits and vegetables to more than 76,000 students in more than 415 northern Ontario and Indigenous schools. Fresh from the Farm offers healthy fundraising options for Ontario schools. We have appreciated the strong government support of both of these programs and encourage the province to continue to partner with us on these initiatives in the years to come.

To some of you reading this, it may seem as though we talk about the same issues all the time. And you're not wrong. Government advocacy takes time and with many different organizations and sectors vying for the government's ear, it's important for us to be persistent and consistent – especially when many decision-makers are unfamiliar with who we are and what we do.

WEATHER VANE



Inside a DelFrescoPure greenhouse at Leamington, Ontario, hydroponically-fed plants are growing luscious strawberries in a pristine controlled environment. The year-round venture is operated by Carl Mastronardi and Jamie D'Alimonte. Here, Nicole Quiring plucks ripe berries on February 6, 2020. Photo by Glenn Lawson.

STAFF

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URBAN COWBOY

Who will rise up to explain farming?



OWEN ROBERTS
U OF GUELPH

But it's also a lot of pressure. There are almost 38 million Canadians . . . and about 193,000 farmers. That's a tonne of people with questions, but comparatively speaking, not that many with answers.

Yet some in the industry think 193,000 voices is too many. Speak with one voice, they say. I think they mean speak with one opinion on policy issues; they believe too many opinions emanating from the farm community are confusing. That's especially true if the audience is decision makers who don't really understand agriculture, but are making policies that impact a wide range of commodities.

The question of who will rise up nationally to explain farming practices to the public has been asked many times and for many years, but seldom answered.

Now, a couple of initiatives are underway, or pending, that makes it look like Ottawa is following the lead of grassroots

efforts such as Canada's Food Day in August, and stepping to the plate.

First, momentum is gaining for Canada's Agriculture Day, a national celebration intended to put the spotlight on agriculture and food production. This event, now in its fourth year, is strategically held in February to remind everyone that agriculture is a year-round pursuit.

This year the organizers, Ag More Than Ever (another national effort), staged a campaign called "Forks Up," asking participants to post a selfie of themselves with some Canadian food on their forks. It was a good use of social media and the ongoing drive to reach a wide audience.

But the big dog's still on the horizon.

Over the next five years, Agriculture and Agri-Food Canada (AAFC) is planning to spend about \$25 million on a campaign to promote Canadian food and agriculture. No one knows much about it yet. A few weeks ago, AAFC announced it was seeking a marketing firm that could carry out such a national campaign. It won't have any trouble finding one; this is a huge opportunity for one of Canada's many superb agri-marketing companies to throw their hat in the ring, and their knowledge of agriculture. The goal is to help build consumer confidence and pride in Canadians who farm and fish

Research from the Canadian Centre for Food Integrity (CCFI) shows that people want to know about how food is grown in Canada. More to the point, they want to hear about it right from the source: farmers. Those on the land are the most preferred source of food production information, surpassing any other group.

That's a huge vote of confidence.



Strawberry propagator and blueberry grower Dusty Zamecnik participated in the #AgMoreThanEver campaign as a spokesperson on February 11.

and highlight the advantages of buying the food they produce.

Reaction to the campaign's announcement has been, well, muted. Some are concerned that it could confuse consumers, because provinces also promote local food.

I don't share those concerns. The national campaign will likely be a best-of-the-best. Food and agriculture is regional, so whatever the national campaign sets out to do, it will need to coordinate some measure of content with the provinces anyway. In fact, it could easily make the provincial efforts stronger, by reinforcing what they're saying and doing about agriculture and food in their jurisdictions.

This is not the time to fight about territory. The agriculture and food sector is way, way

behind the curve right now.

The CCFI research also showed most Canadians – more than 90 per cent -- know little, if anything about agriculture and about how food is produced. That kind of a statistic promotes anxiety about our food system, not trust. And there are so many good reasons to have trust in Canadian food. That's one of the messages I hope is communicated in the national campaign.

To me, the main thing is that something is finally being done on the national stage to explain farming. Someone's taking the lead. The federal election showed us Ottawa has a long way to go before it gains the confidence of producers. But at least, on the consumer awareness front, it's taking a new step.



April 15: Farm & Food Care Speaker's Conference

JESSICA SILLS

Farm & Food Care Ontario (FFCO) is hosting its annual meeting and speakers' conference on April 15th at Country Heritage Park in Milton.

FFCO's member-only annual business meeting, and election of the 2020-2021 Board of Directors, will run from 9 a.m. to 10:30 a.m. All are welcome to attend the conference that follows, beginning at 11 a.m. Featured speakers include:

- **Mairlyn Smith: Peace, Love and Fibre**

Mairlyn is a popular media personality, award-winning cookbook author, and the only Professional Home Economist in Canada who is also an alumnus of the Second City Comedy Troupe, making her the self-proclaimed funniest P.H.Ec. in the world. Her talk and the title of her latest best seller, Peace, Love and Fibre, is an eclectic ride through the ups and downs of life, finding your inner peace, and the power that healthy eating has on our long-term health all presented with Mairlyn's signature sense of humour.

- **David Coletto: Generational**

David is a leader in online research methodologies and delivers strategic advice and research design expertise to many of Canada's foremost corporations, advocacy groups, and political leaders. David will share insights on how the most food-obsessed generation in history and Canada's largest consumer market, millennials, are forcing food producers and retailers to rethink what and how we eat. He takes his audience on a journey to understand why and how millennials are disrupting markets, forcing us to rethink the role of food in our lives and to assess what the future of Canadian food policy might look like in a millennial-dominated Canada.

The conference will also include highlights of FFCO's 2019 activities and presentation of the Farm & Food Care Ontario Champion Award.

The early bird registration cost is \$90 for members or \$120 for non-members. The early bird deadline is April 1, 2020. To register visit www.farmfoodcareON.org

Jessica Sills is communications coordinator, Farm & Food Care Ontario.

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THE LABOUR FILE

Navigating legal requirements as employers



STEFAN LARRASS



Kenny Forth speaks to a seasonal agricultural worker during broccoli harvest near Lynden, Ontario. Photo by Glenn Lawson

If you employ workers on an Ontario farm, you may at some point find yourself in a situation where you receive a compliance order from a provincial employment standards officer. It may be about an issue such as overtime pay, holiday pay, vacation pay, or other employment standards for which there are agriculture-specific rules and exemptions.

Or perhaps you don't even have a compliance order letter sitting on your desk, but rather you just want to know what your legal requirements are in these areas and get some clarification.

In these instances, Ontario growers are encouraged to take advantage of the resources available through the Labour Issues Coordinating Committee (LICC) which can help growers assess their situation before they resort to getting a lawyer or an HR consultant. The LICC

is a grower-led cooperative of several industry groups including FARMS, the Ontario Fruit and Vegetable Growers' Association, and commodity organizations.

Not all rules are clear cut, and sometimes disputes between a grower and an enforcement officer need to be settled at the Ontario Labour Relations Board or at higher levels of court such as the Ontario Divisional Court or even the Supreme Court of Canada. Court cases not only resolve individual disputes, but they can also serve to set legal precedent for other farms in similar situations in the future. For this reason, LICC will at times intervene in court cases to represent broader industry interests, such as a recent court case brought by Rouge River Farms in response to a Ministry of Labour compliance order, which denied agricultural status

and related legal provisions to major parts of the farm.

The farm's appeal, supported by LICC, was successful in 2019 and now serves as legal precedent to ensure similar farms in the same situation are not treated unfairly as if they were industrial or commercial employers.

If you have questions about your legal rights and obligations as an employer, or you are considering next steps with a compliance situation, Ontario growers are encouraged to reach out to your commodity association office to be put in touch with LICC. That said, LICC can also be directly reached by emailing Stefan Larrass at licc.slarrass@gmail.com, with your question or concern.

Stefan Larrass is policy advisor, Ontario Fruit & Vegetable Growers' Association.

COMING EVENTS 2020

- March 3 Asparagus Farmers of Ontario Grower Day, German Hall, Delhi, ON
- March 3 BC Cherry Association Annual General Meeting, Ramada, Kelowna, BC
- March 3-4 1st Annual Nova Scotia Department of Agriculture Minister's Conference, Halifax Convention Centre, Halifax, NS
- March 5 Ontario Potato Conference, Delta Hotel, Guelph, ON
- March 6 FARMS Annual General Meeting, Delhi, ON
- March 10 Berry Growers of Ontario Strawberry 1.0 Workshop, Springfield Golf and Country Club, Guelph, ON
- March 10 Invasive Pest Information Night, The Hare Wineries, Niagara-on-the-Lake, ON 5-8 pm
Pre-registration: lbell@invasivespeciescentre.ca
- Mar 10-12 Canadian Horticultural Council Annual General Meeting, Westin Ottawa, Ottawa, ON
- Mar 15-21 Canadian Agricultural Safety Week
- March 17 Nova Scotia Fruit Growers' Association Spring Workshop, Fire Hall, Berwick, NS
- March 23 Farm & Food Care Speak Up seminar, Simcoe Research Station, Simcoe, ON
- Mar 24-26 Minor Use Priority Setting Workshop, Hilton Lac-Leamy, Gatineau QC
- March 25 Farm & Food Care Speak Up seminar, Vineland Research & Innovation Centre, Vineland, ON
- Mar Apr 1 Global Berry Congress, Rotterdam, Netherlands
- March 31 Ontario Tender Fruit Growers' District 3 & 4 (Essex, Kent and Lambton) Annual General Meeting, Colsanti's Tropical Gardens, Kingsville, ON
- April 1 Ontario Tender Fruit Growers' District 5 (Haldimand-Norfolk) Annual General Meeting, The Blue Elephant, Simcoe, ON
- Apr 1 - 2 Muck Vegetable Growers' Conference, Bradford, ON
- April 2 Ontario Tender Fruit Growers' District 1 & 2 (Niagara) Annual General Meeting, Hernder Estate Winery, St. Catharines, ON
- April 2 3rd Annual Ontario Craft Wine Conference & Trade Show, Beanfield Centre, Toronto, ON
- April 8 Grape Growers of Ontario Annual General Meeting, 7 pm, Club Roma, St. Catharines, ON
- April 15 Farm & Food Care Annual Conference & Speakers' Program, Country Heritage Park, Milton, ON
- April 24-26 Cuvée Weekend, Scotiabank Conference Centre, Niagara Falls, ON
- April 30 Strawberry and Raspberry IPM Training, W. Galen Weston Centre for Food, Durham College, Whitby Campus, Whitby, ON
- May 2-6 International Strawberry Symposium, Rimini, Italy
- May 7 Strawberry and Raspberry IPM Training, OMAFRA Resource Centre, Simcoe, ON
- May 12 Ontario Garlic Workshop, Guelph, ON




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RETAIL NAVIGATOR

Different strokes for different folks



PETER CHAPMAN

Take a few minutes to think about the different retailers. A simple exercise is to take a piece of paper and put the different retailers across the top, into separate columns. On the side of the page list all of the attributes you can think of that impact your product and the relationship with that retailer. It becomes very clear where they are different.

There are more categories you can add but it is obvious from this table that you need to work on different opportunities with different retailers. You should start with their format and what they are trying to accomplish in the market, and then consider how your business interacts with them. If you are struggling to think of how they are different visit the store. Take note of the messages you see on signage and what they are saying to consumers. Look at the merchandising to see how they are displaying your products and others in the category.

Don't just change the cover page

Trust me, I could tell if a supplier just changed the cover page on their presentation to me. It is frustrating to your customers when you do not take the time to consider what they are trying to work on and be a part of their program to make their store successful. You will sell many more of your products when you figure out how to do it within the program they have for their overall store.

If you consider the information in the chart, your meeting with retailer A should

focus on quality and a pricing program that will allow them to advertise the item a number of times during the year. This is how they are trying to drive traffic into their stores. They want to differentiate with local so you need to support these initiatives and tag them in your social media that shares your story. This is what will resonate with them and help you develop the relationship you need to accomplish your goal, which is to sell products. Your program for the upcoming year should include recipes and a plan for demos.

When you are preparing for a meeting with retailer B you need to focus on value and what opportunities you have for them to drive volume. You also need to address the quality issues you had. What changes have you implemented to ensure it will not happen again? Is it possible for your quality people to talk to their quality people? Work on this so you do not have to deal with it in the future.

Your plan for retailer B should not include recipes or demos because that is not what they are focused on. They might even see that as a waste of money and think of you having extra money to spend with them on your every day price. Do not give them the opportunity to reallocate your marketing dollars.

When you build separate programs you need to assess the spend with each retailer to ensure it is fair and equitable. Total up all the different investments you are making with each retailer and add them to your everyday selling price. Does it make sense for the volume you are doing with each retailer?

One issue that is always a challenge is freight. Some retailers want a delivery every day to their warehouse. For some reason, even on storage crops they think it is 'fresher.' There is a cost to this if you are not delivering full loads every time. Try to illustrate this to them. They will not always agree but you need to show them how much you are investing to provide 12 pallets on six loads as opposed to three

	Retailer A	Retailer B	Retailer C
Pricing	high/low specials	EDLP	in store specials
Advertising	weekly ad	ad but only 8 items	weekly but EDLP
Promotions	theme every week	very few/seasonal	big events
Delivery	warehouse	direct to store	warehouse
Merchandising	flat tables	pallets/bins	refrigeration
Category	quality focus	calue	hard to read

Every day low price (EDLP)

full loads. All of these costs add up.

One size does not fit all

It is more work to create separate programs but in the end you will be rewarded with better relationships and more sales. You will generate the sales differently in different stores and that is what will make you more valuable to them. You do need to be ready for the question about why you are doing something different in another store. As long as you can illustrate how different things support their position, they should be happy.

If you have any questions about creating a unique plan for your customers please give me a call at (902) 489-2900 or send me an email at peter@skufood.com. Next month we will discuss how to understand the investments you need to make.

WHAT'S IN STORE?

Packaging is changing

We know there is a lot of focus on sustainability, the environment and many other topics related to this complicated issue. My preference is to look at the total environmental impact of a product, the packaging and the distribution. That can become very complicated and perhaps it is unrealistic. What I worry about is that industry will have change mandated that is not the right change.

When I was in the store this week this laundry detergent caught my attention. The packaging is very unique and I believe it is the biggest reason the product is on the shelf in the natural food section. A compostable fibre container of laundry detergent is definitely unique, considering there is 80 feet of five-deck shelving in the



regular grocery section with single-use plastic bottles.

My question is would you buy it?

From a quick look in the store you get 66 wash loads compared to 60 wash loads of the next product on the shelf. You also pay \$14.99 vs. \$8.29 or you can leave the natural food section and go to the grocery aisle where Tide original 24-wash load is \$8.99.

What would you buy? More importantly what will consumers buy?

Peter Chapman is a retail consultant, professional speaker and the author of A la Cart-A suppliers' guide to retailer's priorities. Peter is based in Halifax N.S. where he is the principal at GPS Business Solutions and a partner in SKUfood.com, an on line resource for food producers. Peter works with producers and processors to help them navigate through the retail environment with the ultimate goal to get more of their items in the shopping cart.

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POTATO PRODUCTION

Alberta leads seed potato supplies, up 21 per cent



Photo courtesy of Michiel Buijsse, Buijsse Farms, Taber, Alberta.

KAREN DAVIDSON

By end of March, seed potatoes will be en route to their final destinations for #plant2020.

The Grower surveyed seed growers in each of the key

potato-growing provinces the week of February 10.

British Columbia – Doug Gilmore and his son Chad grow 60 acres of seed potatoes in the Pemberton Valley north of Whistler. They have a plant date of late May after the snow

pack recedes. Their seed supply is sold out with the exception of the Chieftain variety. Most of their seed goes to growers in the Lower Mainland.

“When I started farming in the early 1970s, there were 17 seed growers in the Pemberton Valley but we’re down to five

now,” says Gilmore. “Farmers can’t afford to buy land due to skyrocketing real estate prices so close to Whistler and Vancouver. There used to be a thousand acres of seed potatoes in this valley but now there’s only about 300.”

Alberta -- John Ekkel is in a positive mood with 660 acres of seed potatoes sold for 2020. He and his children Jeff, Dustin and Kayla farm near Lacombe. About 60 per cent of their seed goes to the U.S. as far as Arizona. Processing companies are expanding both in the U.S. and Canada, so demand signals are encouraging them to look into growth opportunities.

“We had one of the best harvests in four years,” says Ekkel, referring to 2019. “Quality is excellent.”

They are increasingly growing private varieties for Dutch and American companies. “We know two years in advance what the prices will be. This helps de-risk the farming operation.”

Ontario – Glen Squirrel, Shelburne, Ontario grows 50 acres of seed, supplying local customers. He is sold out on popular varieties such as Chieftain and Yukon Gem. He will top up seed supplies from New Brunswick and Prince Edward Island, reflecting the 40 per cent decline in Ontario seed supplies as reported by Agriculture and Agri-Food Canada.

“Quality is good,” he says. “There’s nothing like a hot, dry year like we had in Ontario last year to make a good quality crop. We did not have the harvesting issues as in some other provinces.”

Quebec – Laurence Côté, Quebec Parmentier, represents growers with 3,000 acres of seed potatoes in the Saguenay

region. “Supplies are tight,” says Côté. “We are experiencing strong demand for reds, yellows and round whites. There are still some russets available such as R. Burbank and Goldrush.”

The good news is that PVY levels are very low. There was virtually no frost damage in 2019, compared to the previous year. There are fewer off-type, misshaped potatoes.

“It was virtually a perfect growing season in the Saguenay in terms of precipitation, and that led to good harvesting conditions. Overall, the mood of growers is very good going into 2020. The seed sector is very organized in Quebec. Equilibrium between supply and demand has been achieved for years.”

New Brunswick - Gailen Allan, located a few miles from the McCain headquarters in Florenceville, New Brunswick, is sold out of seed potatoes from his 145 acres. All of his customers are within a 50-mile radius of the farm. McCain has invested in two new lines, signaling the need for more potatoes and therefore seed.

“We had a great harvest last year and quality is excellent,” says Allan. “A neighbouring grower is currently grading Atlantics to go south, and there are less than one per cent culls.”

The total acres of seed potatoes in New Brunswick are declining due to farmers retiring from the business, but that means opportunities to expand for others willing to dedicate resources to detail. Allan, for example, is taking on the new chipping variety Lamoka and is the exclusive dealer for Tarnick.

Prince Edward Island - Donald Stavert grows 300 acres of seed potatoes near Summerside. Prince Edward Island suffered different effects of September’s Hurricane Dorian depending on location. Some growers were hard hit with six inches of rain in 24 hours while others experienced high winds.

Most of his supply is sold out with exception of Kennebec. He is taking good quality out of storage facilities. Reds are in high demand at 24 cents/lb because the Red River Valley in the U.S. had a poor crop last year.

“I’m getting enquiries from Manitoba,” reports Stavert.

There is diminishing demand for round whites. However, demand exists in the Caribbean for long whites.

Editor’s note: for more analysis, go to page 14.

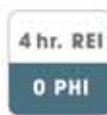


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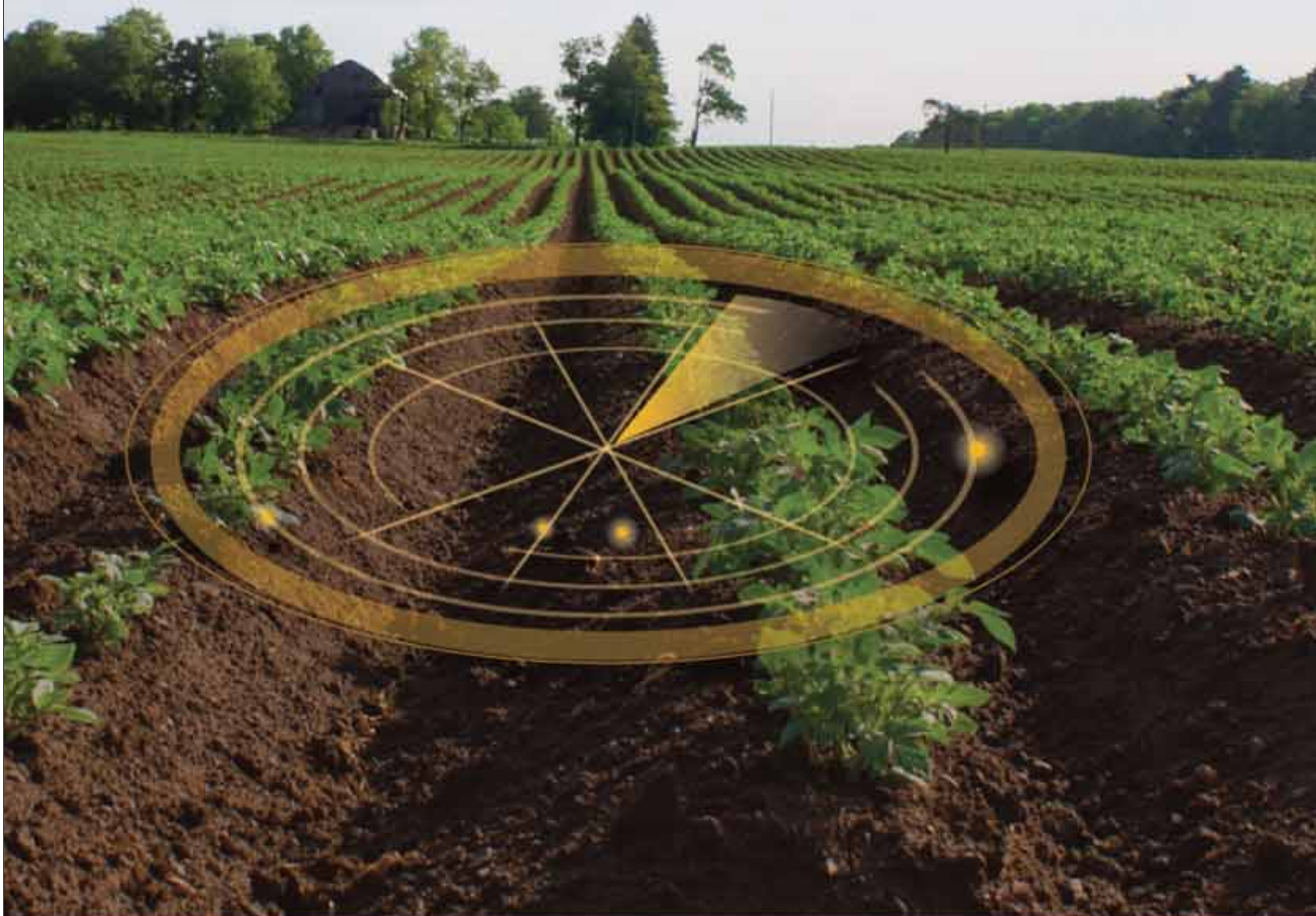
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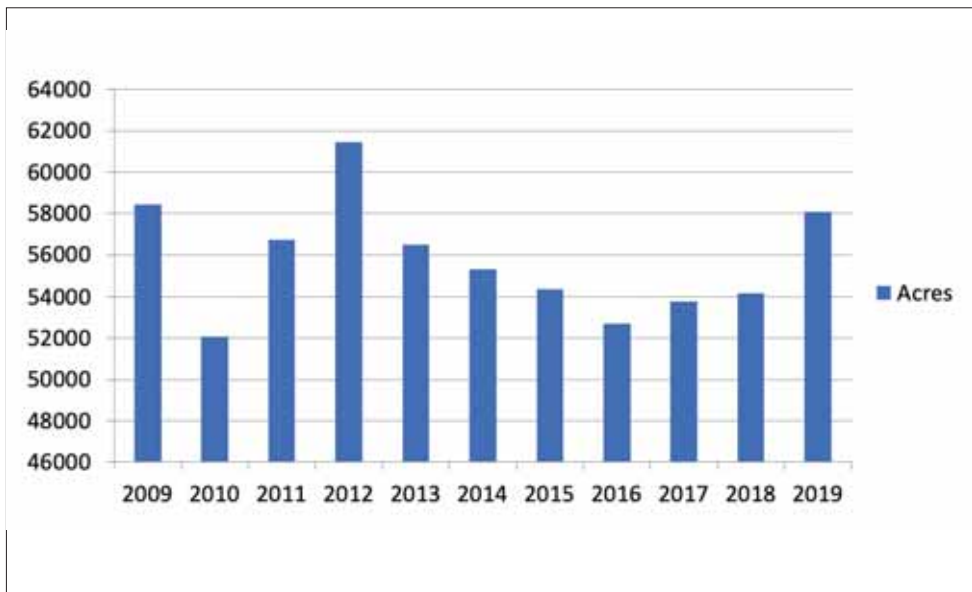
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POTATO PRODUCTION

Seed synopsis 2020

Canadian Seed Acres Certified 2009-2019



Canadian Seed Acres by Variety

Canada	2016	2017	2018	2019
Total Acres	52,721	53,782	54,184	58,060
Russet Burbank	11,538	11,261	11,855	13,258
Goldrush	3,947	4,365	3,833	4,148
HO2000	2,179	2,387	2,338	2,308
Norland	1,855	2,114	2,192	2,141
Ranger Russet	1,708	1,902	1,700	1,850
Shepody	1,766	1,767	1,525	1,734

Source: CFIA

KEVIN MacISAAC

Seed production in Canada is seeing some renewed optimism

as that sector gears up to supply the needs of an expanding processing industry in North America.

Seed acreage, inspected and

passed by the Canadian Food Inspection Agency, has been fairly stable in the previous four years ranging from 52,720 acres in 2016 to 54,184 acres in 2018.

Canadian (Seed) Potato Storage Holdings by Province

February 1, 2020 Infohort: AAFC (000 cwt)

Province	2016-17	2017-18	2018-19	3-yr. Average	2019-20	2020 vs. 3-yr. avg
Prince Edward I	2,041	1,902	1,978	1,974	2,200	+11.5%
New Brunswick	2,015	1,829	1,645	1,830	1,657	-9.4%
Quebec	1,010	1,147	1,253	1,137	1,204	+5.9%
Ontario	122	129	105	119	71	-40.0%
Eastern Canada	5,188	5,007	4,981	5,060	5,132	+1.4%
Manitoba	1,690	1,593	1,241	1,508	1,341	-11.1%
Alberta	3,292	2,264	2,700	2,752	3,325	+20.8%
British Columbia	245	192	193	210	138	-34.3%
Western Canada	5,227	4,049	4,134	4,470	4,804	+7.5%
Total Canada	10,415	9,056	9,116	9,529	9,935	+4.3%

Seed Inventory on February 1, 2020 is 4.3% or 400,000 hundred weight above the 3-yr. average. Alberta leads the increase at +21% above the 3-yr. average, followed by PEI, and Quebec. Seed supply is significantly less in Ontario, British Columbia, Manitoba, and New Brunswick. Seed movement in Western Canada is ahead of schedule.

Responding to increased demand, growers in the spring of 2019 increased acreage to 58,060 acres, with a significant portion of that expansion occurring in the province of Alberta. Regionally, there have been declines in seed acreage, particularly in the province of New Brunswick, where some growers have either exited the business or shifted production into the processing side of the industry.

The most popular seed variety grown in Canada, by a long shot, is Russet Burbank. Dual-purpose usage for both table and French fry production have allowed it to stand the test of time. Rounding out the other top six varieties by rank are: Goldrush, a fresh russet; HO2000, a “mini potato” variety; Norland, a popular red variety; Ranger Russet, a mid-season processing variety; and Shepody, an early processing variety.

Varieties grown for processing do not usually see significant uptake until they are approved by the QSRs (Quick Service Restaurants). The fryers are slowly transitioning from a profile of Russet Burbank, Ranger Russet, Shepody, etc., to one with newer entrant varieties such as Clearwater Russet, Ivory Russet, etc. The dilemma of the seed grower is to be out ahead of industry changes, in adequate time to build up seed stocks that end users might need.

Varietal selection on the fresh side of the industry has seen a significant movement towards yellow European selections, which are higher yielding and provide greater returns than the previous yellow industry standard of Yukon Gold.

Canadian Holdings of Potatoes Intended to be used as Seed on February 1, 2020, are 9.9 million hundred weight, which is 4.3 per cent above the three-yr. average for February

1st, but still below the 2017 level of 10.4 million hundred weight. Alberta leads the increase at 20.8 per cent, followed by Prince Edward Island and Quebec. Seed supply is significantly less in Ontario, British Columbia, Manitoba, and New Brunswick.

When one adds up all the processing plant expansions which have occurred in the United States and Canada from 2014 to the present, their needs total approximately 64,000 acres. To plant those additional acres using an arbitrary seeding rate of 23 cwt./acre, the industry now needs an additional 1,472,000 hundred weight of seed compared to five years ago.

One unknown factor in the availability of this year’s seed block is how much volume could be moved into the fresh pile given the current attractive pricing of table potatoes. Given last fall’s harvest abandonment of some 20,000 acres due to weather-related conditions, the Canadian seed sector was more fortunate in that most of the crop made it into storage before winter set in. However, the Red River Valley and state of Idaho, both large seed growers, experienced some fairly high seed losses, driving industry demand across the continent.

Growers would be well advised to book seed early. In addition, growers should expect that processing companies will encourage their contract growers to purchase seed of early varieties so fry plants can start on new crop spuds as soon as possible in the summer of 2020. Best of luck to all seed growers in 2020.

Kevin MacIsaac is general manager, United Potato Growers of Canada.

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NUTRI ANALYTICS

POTATO PRODUCTION

Gene-editing research underway

KAREN DAVIDSON

Yield10 Bioscience has probably never crossed your radar. To date, its claim to fame has been improving yield and composition traits in camelina, canola, soybeans and corn. However, the research has been promising enough to attract the attention of potato processing giant J.R. Simplot.

The biotech company based in Woburn, Massachusetts signed a research agreement in 2019 with J.R. Simplot to test three novel traits in potatoes. Known as C3003, C3004, and C4001, these traits are being deployed and tested for the first time in potatoes in U.S. trials.

“At Yield10, we believe that potato crops can benefit from traits that may increase yield or stress tolerance,” explains Dr. Oliver Peoples, chief scientific officer. “Emphasizing these traits could potentially enable a higher yield per acre, which would be more economical for the grower.”

Looking beyond yield traits, there could also be new opportunities in composition traits in a variety of potatoes. Improving the nutritional properties such as protein content, for example, could be very beneficial. Traits like these can create small but highly beneficial changes in potato composition that could potentially make them more suitable for either the processing market or to fit changing consumer preferences in the fresh market.

Striving for yield is one thing, but as Canadian growers will attest, getting that potato crop into storage is another challenge altogether under extreme weather conditions. Of equal importance to yield is stress tolerance.

“As we’ve tested some of our traits under varying field conditions, we’ve observed that our yield traits may also be useful under drought conditions,” says Peoples.

At the heart of Yield10’s science

In the last decade there has been a dramatic expansion of new genetic engineering and systems biology tools: genomics data; metabolic engineering; high-throughput analytical tools, including whole organism gene expression analysis and metabolomics, and powerful genome-editing technologies.

Increasing crop yield is a complex two-step carbon optimization problem. Harvested seed is mostly carbon fixed from carbon dioxide in the air by photosynthesis with oxygen coming from water in the soil and smaller amounts of

nitrogen and phosphate both of which are applied as fertilizer. To achieve increased yield, the rate at which crops can fix carbon has to be increased.

Based on Yield10’s experience in optimizing carbon flow in living systems, increasing seed yield will likely require multiple trait genes to increase carbon fixation by photosynthesis at the front end and direct the increased fixed carbon to the seed.

Will gene-edited potatoes need regulatory approval?

The regulatory environment for crop innovation is complex but in general USDA-APHIS has deemed CRISPR genome-edited traits as similar to conventional breeding, meaning they do not need to be regulated. Yield10 is currently developing engineered crops using traditional biotechnology and a series of CRISPR genome-edited traits. If genome-edited traits are successfully deployed in potato crops they may not need to be regulated by USDA-APHIS.

“By using CRISPR for

genome editing, it’s possible that potatoes with beneficial health and sustainability traits could reach the marketplace faster, said Peoples.”

Communications outreach to growers is ongoing says Doug Cole, senior manager of marketing and biotech affairs for J.R. Simplot, based in Boise, Idaho. Whether it’s trade shows, grower conferences or meetings at the Canadian Produce Marketing Association or CropLife Canada, the company is active in face-to-face dialogue.

J.R. Simplot continues testing on Innate potatoes, using gene silencing technology. Innate Generation 2 potatoes feature traits that address several of the major issues facing the potato industry. These include shrink from cold storage, late blight, sugar ends, acrylamide and black spot bruise. Innate trials are scheduled for the U.S. in 2020, but not in Canada.

For more details on the gene-editing science, go to this link: www.yield10bio.com/Innovation



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for SCHUYLER FARMS LTD. of Simcoe who purchased equipment from LINGWOOD FARMS LTD. who were in business for 100 years (Ken & Murray Porteous and Ray Vogel). Consisting of 13 tractors (mostly orchard), wheel loader, fork lifts, gators, orchard & farm equipment, some asparagus equipment, vehicles & miscellaneous. To be held on the farm. Go east of Simcoe on Highway 3 to the village of Renton. Turn North for 2 miles on Cockshutt Rd. Fire # 1385 Cockshutt Rd.

THURSDAY MARCH 26TH, 2020 @ 9:00 am

ONLINE BIDDING WILL START AT 10:00 AM

TRACTORS, FORKLIFT, WHEEL LOADER & GATORS: 2014 JD 5093EN, w/ Zuidberg front 3pth & PTO, cab, air, LHR, 3 remotes, 4wd, 10.5/80-18 frts, 14.9-28 rears, 2778hrs; 2015 JD 5101EN w/ Zuidberg front 3pth & PTO, cab, air, LHR, 4wd, 10.5-18 frts, 14.9-28 rears, 2347hrs; 2014 JD 5100M w/ Zuidberg front 3pth, cab, air, 4wd, loader ready, LHR, 3 remotes, 380/70R24 frts, 480/70R34 rears, 1890hrs; 2010 JD 6430 Premium, cab, air, IVT, autosteer, 4wd, LHR, 3 remotes, 420/85R38 rears, 13.6R28 fronts, 3455hrs; 2008 JD 6430, cab, air, powerquad, 4wd, LHR, 3 remotes, 420/85R30 rears, 320/85R24 fronts, 5248hrs; 2006 JD 6320L w/ JD H310 loader, Mauser cab, air, powerquad, 4wd, LHR, 3 remotes, 6095hrs; 2003 JD 6320L w/ Mauser cab, air, 4wd, powerquad, LHR, 3 remotes, 7374hrs; 2005 JD 5525N w/ front 3pth & PTO, LHR, 4wd, cab, air, 3 remotes, 5776hrs; 2006 JD 5525N, LHR, 4wd, cab, air, 3 remotes, 4742hrs; 3 (three) 2017 Kubota MX5200D tractors w/ front & rear bin carriers (removeable), ROPS, 4wd, 3 remotes, 271hrs, 426hrs & 487hrs; JD 1630, new clutch, front & rear mount forks, 2wd, open, 1 remote; Case 584E forklift, w/ side shift, tilt, doors, 5997hrs; 1997 Case W14B wheel loader, quick attach, new head gasket, aux remotes & joystick, 8959hrs; JD 6x4 Gator, manual dump, diesel, 2470hrs; JD 4x4 gator, manual dump, gas, 3352hrs. **VEHICLES & TRAILERS:** 2011 GMC Cube Van, 90,955kms; 2007 GMC Cube Van, 127,684kms; 2006 Chevy Colorado Z71 pickup, 4x4, 4 door, roll trap toneau, 272,904kms; 2000 GMC 8500 Top Kick straight truck, automatic, 6 cyl Cat engine, w/ removeable racking to hold apple bins, bought new, 141,574kms; 1989 GMC 7000 Top Kick dump truck, 10 speed, diesel, only spring/summer driven, 287,169kms; 1997 GMC 1500 pickup, 4wd, 305 automatic, 346,672kms; GMC & Chevy vans converted to field trucks (no ownerships); 2009 Load Max PPO float trailer, 12 tonne, hydraulic beaver tail, electric brakes; 2002 Homemade trailer, 7000lb, yearly safety, recent tires, recent brakes; 1986 Chevy 30 Travelaire Camper, modified wheelchair accessible, 178,790kms, *Selling on Last High Bid Confirmation*; 2003 Thomas Passenger Bus, 5.9 cummins engine, automatic, air brakes *Selling on Last High Bid Confirmation*. **EQUIPMENT:** 10 (ten) Phil Brown, Brownie Pruning Machines, all w/ hydraulic drive, 18hp B&S motors, all wheel drive, weights & loaded tires; Phil Brown, Brownie Quad Pruning Platform, 4wd, Kubota diesel, Hydrostatic, 1135hrs, nice; 2 (two) Shur Farm model 1550 frost protection, cold air drain units, c/w temperature auto start Honda motors; Home Built Racking for apple bins, 2 years old, fits on Load King float trailer, hydraulic lift on cage; JD CX15 mower, w/ mulching blades, new centre gearbox, new blades; Vortex 15' offset mower, tow behind; Phil Brown hydraulic driven sweeper; 2015 Turbomist 30P sprayer, narrow, PTO driven, stainless, electric valve, Raven control; 3 (three) Turbomist 38P sprayers, 600 gallon tanks, 38" fans, Raven control systems, centrifugal pumps; Phil Brown, self-propelled, 5 bin apple carrier, hydrostat, Deutz diesel; 3 (three) Don Arthur 5 bin apple carriers, holds plastic & wooden bins, two are 3 years old; BBI narrow, 5 tonne fertilizer spreader, can be set for variable rate & GPS; 2 (two) 5 man asparagus picking machines, 3 speeds, 5hp Hondas, roofs, Hahn asparagus 3 row weed sprayer, 200 gallon tank (modified from tobacco use); 2008 FAE 5' forestry mulcher, 540rpm & 1000rpm spline gear box; Bush Hog RT60G rototiller, 5', 3 seasons old; Millcreek 2 row mulch spreader; Land Pride 3P600 seed drill, w/ grass & grain seed boxes, 3 seasons old; Land Pride 5' rotary mower, front & rear chain guards; JD MX10 adjustable offset, 3pth mower, new blades; Perfect 7' flail mower; 3 (three) Votex Kombi 2000 mowers, adjustable from 9.5 to 13.5', modified to be used on front mounts, new blades; BBI 6 tonne fertilizer spreader, banding, broadcast, can be hooked up for variable rate; Phil Brown 6' forklift mast to fit JD 5000 series tractors; Nissan, Clark & Toyota 12' forklift masts modified to fit JD 6000 series tractors; Phil Brown forklift apple bin turner, quick attach, works with wood or plastic bins; Phil Brown tree planter, can be set up with GPS for tree spacing; Bogballe 3pth fertilizer spreader; Yield Max YM2810 picking bags, approx. 35, Friend 3 peck picking bags, approx. 11; Bartlett picking bags, approx. 18; SAF Holland 6' Areway, 3pth aerator; Homemade pruning machine, adjustable width, hydrostatic, 18hp gas, hydraulic steer; FMC 590 engine drive sprayer, 500 gallon, hydraulic ON/OFF valve, raven control, remanufactured Cummins (less than 1000hrs), has bent agitator shaft & disconnected; FMC 593 engine drive sprayer, original JD motor, 500 gallon, hydraulic ON/OFF valve, raven controls; two row herbicide sprayer, w/ 300 gallon tank & pump; 2 (two) 2 row, under tree herbicide, 3pth sprayers, w/ 300 gallon tank & pumps; Custom 300 gallon pump tank w/ Honda motor, used for fire safety, approx. 10 minutes of water wide open; quick attach tree puller, fits JD H310 loader; Road Boss 8', 3pth grader; Brush rake, fits JD H310 loader; 7' 3pth scraper blade, Bush Hog post hole auger w/ 2 augers; 8' tow behind scraper blade, hydraulic up & down; Salford 400, 14' S tyne cultivator w/ rolling harrows; 7' S tyne, 3pth cultivator; Market grain box w/ auger, no gear; MF 1 furrow plow; 6' 3pth scraper blade. **MISCELLANEOUS:** Phil Brown 2 row hydraulic hedger, fits front 3pth or forklift mount; Approx. 14 Hydraulic clippers for pruning machine; 20' storage container; Approx. 13 Greenlea Hydraulic chainsaw, H&H grapple bucket, Model C322ID83GRP, quick attach; 8' snow bucket, fits Case W14B loader; portable diesel tank; gas tank for pickup truck, new hand pump; 10,000lb Rotary lift hoist (new owner to take down); Hydrotec Pressure streamer, 2 (two) 3pth weight boxes; 3pth pallet forks; 2 (two) portable bathrooms, 1 on trailer w/ hand wash station, 1 with inside wash station; 2 (two) Encore Fastener hydraulic staplers, LARGE quantity of e-clips, collated metal clips; 2 (two) staplers for fencing; 6 (six) Honda transfer pumps; 3 (three) Yamaha transfer pumps; Echo PB620 leaf blower; 4 chainsaws; floor jack, drill press; pipe bender; hydraulic press; arc welder; scrap steel; bolt bin; pitch forks, shovels, hoes; eye hooks, hammers, nails, twine, irrigation valves; Approx. 12 bird traps; large quantity of wooden stacking chairs; miscellaneous tires; quantity of tiling. **PLEASE NOTE:** LINGWOOD FARMS have been in the orchard business for over 100 years. 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POTATO PRODUCTION

Coping with pesticide re-evaluations

KAREN DAVIDSON

About 550 growers and industry representatives attended the ever-popular Manitoba Potato Production Days in Brandon to prepare for the 2020 season. The January 29-30 event featured several speakers including Dr. Tracy Shinnners-Carnelley, vice-president, research and quality, Peak of the Market.

She explained that registered pesticides are re-evaluated on a cyclical basis, every 15 years, by the Pest Management Regulatory Agency (PMRA). Modern assessment techniques and current scientific information are brought to the table. A special review may be initiated at any time if there are reasonable grounds to believe that the health or environmental risks are no longer acceptable.

During the last few years, four Group M fungicides have undergone re-evaluation. They are chlorothalonil (brand names Bravo and Echo); mancozeb (brand names Manzate and Dithane); metiram (Polyram) and captan. Potato growers recognize most of these fungicides as the backbone for disease management.

Shinnners-Carnelley lays out significant news for these products.

Chlorothalonil. PMRA published its final re-evaluation decision in May 2018, making substantial changes to use patterns, including potatoes. These changes must be adhered to no later than May 10, 2020. Review all label instructions before use.

Additional measures must be taken to mitigate exposure of mixers/loader/applicators including personal protective equipment (PPE) and engineering controls. Growers must mitigate exposure of post-application workers. This means a maximum of three applications for potatoes. Increased restricted entry intervals (REI) include scouting at three days, rouging at 19 days, handset irrigation at 23 days.

What's new is that a vegetable filter strip of at least 10 metres width must be constructed and maintained between the field edge and adjacent downhill aquatic habitats to reduce risk to aquatic organisms from run-off. This filter strip is different from a spray buffer zone that protects terrestrial and aquatic habitats from spray drift.

The vegetable filter strip is to be composed of grasses and may also include shrubs, trees or other vegetation. More

Chlorothalonil. PMRA published its final re-evaluation decision in May 2018, making substantial changes to use patterns, including potatoes. These changes must be adhered to no later than May 10, 2020.

guidance can be found on the PMRA Environmental Risk Mitigation webpages.

Both vegetable filter strips and spray buffer zones must be observed.

Mancozeb. PMRA re-issued a proposed decision in October 2018. The revised decision proposed cancellation of all uses of mancozeb except for greenhouse tobacco. PMRA has recognized the importance of this fungicide and asked the registrant to work with the industry to prioritize crop uses. A final decision is expected in June 2020.

Metiram. PMRA completed its re-evaluation and PMRA deemed it acceptable with conditions. However, the registrant decided to discontinue this product known as Polyram.

Captan. This is another Group M fungicide which has not traditionally been used on potatoes. It recently completed re-evaluation and remains an option for potatoes. It is registered for a maximum of three applications per season, including ground and aerial application. This may be an option potato growers will want to consider in the future, especially if mancozeb use is limited.

Neonicotinoids. The insecticides imidacloprid, clothianidin and thiamethoxam have been undergoing multiple special reviews over recent years. The focus has been pollinators, aquatic invertebrates and squash bees. The pollinator special review is complete and use on potatoes was maintained. Final decisions on some of the other special reviews are expected in the fall of 2020.

Linuron. In 2012, PMRA published a proposed decision to cancel all uses of linuron (brand name Lorox). PMRA continues to push back the final decision on this herbicide and is currently projecting to publish by the end of 2020.

Chlorpyrifos. The proposed decision to cancel all uses was published in May 2019. The final decision publication date is not yet known.

Lambda cyhalothrin. PMRA's proposed decision to cancel all uses was published in 2017. The final decision is expected March 2020.

PMRA's re-evaluation workplan also indicates that the proposed re-evaluation decisions for both azoxystrobin and difenoconazole should be published soon. These are also common fungicides in potato production, so the industry will need to remain engaged in the re-evaluation process in order to respond accordingly once these proposed decisions are open for consultation

"Keeping up with re-evaluation consultations over the last few years has been challenging for both PMRA and industry," says Shinnners-Carnelley. "We continue to work closely with PMRA to look for improvements and efficiencies in the process. Limited availability of accurate, credible pesticide use data and water monitoring data remain key issues."

The next challenge is to cope with the outcomes of re-evaluation, specifically under the following scenarios:

- The complete loss of active ingredients
- Accurately implementing the label changes according to the correct timeline as they pertain to re-entry intervals, number of applications, spray buffer zones and vegetable buffer strips

According to PMRA, the official label is the one in the pesticide registry.

"It's important to be aware of this if you have an on-farm inventory of pesticides," says Shinnners-Carnelley. "The PCP number on the container can be used to search the PMRA label database to access current labels."

Pesticide compliance monitoring takes place directly by PMRA and indirectly through CanadaGAP audits. Compliance includes all aspects of the pesticide label: personal protective equipment; buffer zones, vegetative filter strips; maximum rates and applications; re-entry and pre-harvest intervals; crop uses.

"We can only expect that compliance monitoring will continue to increase," concludes Shinnners-Carnelley.



Dr. Tracy Shinnners-Carnelley, vice-president, research and quality, Peak of the Market.



Early blight



Late blight



Late blight damage

POTATO PRODUCTION

Rethinking potato foliar fungicide programs

KAREN DAVIDSON

Canada's potato growers are waiting warily for the Pest Management Regulatory Agency's (PMRA) June 2020 decision on mancozeb, the active ingredient in popular fungicides such as Manzate, Penncozeb and Dithane.

"They have been the backbone of potato fungicide programs with up to 10 applications per season," says Darin Gibson, Gaia Consulting Ltd. who offers trial testing services to crop protection companies at Newton, Manitoba. A different mindset will be required if usage is reduced to only three applications per season. And Gibson points out that early blight and late blight fungicide programs will be two different things if all uses of mancozeb are cancelled. Most premium early blight products do not control late blight, and premium late blight products do not control early blight.

Essentially, growers will need to move to products such as Allegro, Revus and Ranman, however they are targeted to late blight only. These products cost \$12 to \$20/acre versus mancozeb products that cost \$7 to \$8/acre.

"This late blight program is more expensive with less protection against early blight," says Gibson. "An additional early blight spray may be needed to compensate. With the recent loss of Polyram and the threat to mancozeb, another group M fungicide, Captan, is now on the radar but most potato growers have not worked with this product."

As an aside, Bravo supplies are limited due to a manufacturing issue where a different formulation is required in Canada. Supplies of Echo may be more abundant.

Some of the premium early blight products are very vulnerable to the development of resistance. One of the strategies to mitigate this risk, says Gibson, is to alternate or tank mix with group M fungicides. Resistance management will be compromised if some of these products are lost. Several fungicides call for group M tank mixes on the label for resistance management. Here are some examples:

- Forum (dimethomorph) - must tank mix with protectant. Label language: "in a tank mix with Polyram DF or Dithane DG Rainshield or Bravo 500, at the recommended product label rate." Note: the registrant is no longer producing Polyram DF.
- Curzate (cymoxanil) - must

mix with mancozeb. Label language: Use Curzate 60 DF fungicide in a tankmix with Manzate DF fungicide or Manzate Pro-Stick fungicide. Do not use Curzate 60 DF fungicide alone. "If mancozeb registration is lost, what happens to products like Curzate? You can't use it alone, and if you don't have mancozeb, you can't use it? These questions haven't been answered," says Gibson.

- Presidio (fluopicolide) – Apply in a tank mix with Bravo

(chlorothalonil)

- Reason - Dithane (mancozeb) or Bravo
- Scala – Bravo

"Starting this season, if you tank mix Presidio, Reason, Scala with Bravo, you have used one of your three allowable chlorothalonil applications," says Gibson.

Some fungicides are pre-mixed with group M fungicides. For example, Gavel is a pre-mix of zoxamide and mancozeb. "If we lose mancozeb, Gavel is affected. If we are limited to

three sprays of mancozeb, if you spray Gavel, you are using one of your mancozeb applications," says Gibson.

Since premium early blight products generally do not protect against late blight, and premium late blight products do not protect against early blight, growers will need more products to protect against both diseases.

"We may be able to alternate conventional fungicides with biofungicides such as Double Nickel or Serenade Max in the



Darin Gibson

future if we lose mancozeb but again, this represents more cost.

The potato sector anticipates a phase-in of any new rules but this isn't guaranteed.

"We can cobble together a program but it will be at higher costs," concludes Gibson.

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CROP PROTECTION

Fungicide resistance: How can it be managed?

KATIE GOLDENHAR

Plant diseases such as late blight of potato and tomato and downy mildew in cucurbits can cause significant yield loss in many crops in Ontario. Crop quality can also be significantly impacted by diseases, such as scab on apples or black scurf on potatoes, which may not always limit yield but affect marketability.

Disease management requires multiple strategies that include physical, cultural, biological and chemical control measures. When integrating management options, fungicides can play a big role in maintaining crop yield and quality, especially in fruit and vegetable crops. With the recent changes of multi-site fungicide use for many horticulture growers, single-site fungicides will likely become more common in disease management programs. In order to maintain the use of these fungicide products in the disease management tool kit, growers need to reduce the selection of resistance by considering these best management practices.

Where possible, use fungicides with different modes of action. Modes of action are designated by the fungicide resistance action committee (FRAC), and active ingredients in fungicides are divided into groups based on the way they work on a pathogen. Knowing what products belong to the same group of active ingredients is necessary when deciding what to use for a management program. To best protect single-site fungicides, use multiple FRAC groups that are active on the targeted disease in one application. This can be done

by using a co-formulated product or by tank mixing. If multiple applications are needed to manage a disease, rotate fungicides with different modes of action. Some active ingredients are broad spectrum meaning they have multiple modes of action on that pathogen. These products can be an excellent addition in tank mixes and rotations to reduce selection pressure on the single mode of action fungicides.

Where possible, limit the number of applications of a fungicide and FRAC group per season. The number of applications per season will depend on the disease, crop and environment, but generally the more frequently a plant disease population is exposed to the same fungicide or FRAC group, the greater the probability of selecting for resistance to that group of fungicides in the pathogen population.

The application of fungicides should be done prior to an infection period, known as preventatively. Many pathogens favour wet and cool weather, and when the pathogen lands on a susceptible crop, this weather will allow the pathogen to infect and cause disease.

Knowing what pathogen likes what conditions (temperature, leaf wetness duration, humidity, etc.) can be key to targeting a fungicide application. Due to unpredictability of weather, growers sometimes may not be able to spray their crops preventatively and may have to use products after an infection takes place. While some fungicides may have some curative activity post-infection, by applying after infection has occurred there is potential for an increased level of selection for any active ingredients that do not have post-infection

activity. The fungicide is also often less effective when applied after pathogen establishment and may lead to pathogen survival.

Always follow the labelled rate of fungicides. A fungicide rate or rate range is developed based on efficacy on the disease through multiple trials. Using the rate on the label is especially important for a fungicide with a single mode of action. While it may seem beneficial in the short term by applying a lower, off label rate, there may be populations that are exposed to the fungicide but survive. These surviving populations may develop resistance quicker.

Several diseases that occur in Ontario that are classified as high risk for developing resistance include cucurbit downy mildew, apple scab, and strawberry anthracnose. These diseases have known resistance to certain fungicides and groups of fungicides so when making fungicide applications on these diseases, consult resources to ensure you are applying an effective product. While resistance may be a reason why a fungicide application fails, there are other factors that can influence its efficacy. Factors could include spray volume, nozzle type, calibration issues, wind, temperature, poor product formulation, misidentified pathogen/disorder, or improper timing of the application. One of these factors may be enough to have a disease outbreak in certain areas of the crop.

The United Nations has declared 2020 as the International Year of Plant Health. Plant pests including diseases cause an estimated 40 per cent crop loss worldwide each year (FAO, 2019). Fungicides can play an



Figure 1. Late blight destruction to untreated potatoes (left) and potatoes treated with fungicides (right). Photo by Mike Celetti.



Figure 2. A lesion caused by apple scab on the surface of an apple. Photo by Mike Celetti.



Figure 3. Downy mildew on pickling cucumbers that were treated with a fungicide that was once effective, the downy mildew population has developed field resistance.

important role in managing diseases that threaten food supply and properly managing resistance risk can keep these tools in the toolkit for crops to come.

For more information, manageresistancenow.ca

contains resources on weed, disease and insect resistance management.

Katie Goldenhar is pathologist – horticulture for the Ontario Ministry of Agriculture, Food and Rural Affairs.

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CROP PROTECTION

Drone testing for crop protection is in early stages

KAREN DAVIDSON

Agassiz British Columbia was ground zero in July 2019 for testing a drone that delivered insecticide to control thrips in a field of leeks. Science fiction? Maybe not, if safety and efficacy can be proven to regulatory authorities.

“It’s very early days for regulators of this tech,” explains Markus Clodius, principal investigator in minor use pesticides for Agriculture and Agri-Food Canada’s Agassiz Research Centre. “It was our first trial, and when we’re all done, the question of whether drones will be economic for growers will still be open.”

Clodius presented his work to the Pacific Agriculture Show in Abbotsford, BC in late January 2020. Currently, spraying pesticides with a drone in Canada is illegal. The long-term goal is to provide information for a formal risk assessment by the Pest Management Regulatory Agency (PMRA).

The question is how does spraying with a drone change the risk profile of pesticide use. In the 2019 experiment, Clodius explains that insecticide applications for controlling thrips in leeks were compared using a drone and a handheld boom sprayer. The registered insecticides were applied at rates suitable for the crop and pest. Identical product rates were used for both sprayers, but with different spray volumes. The leeks were planted in small 2m x 6m plots, 160 plants/plot, with large (10m) buffer zones around them.

The drone was a battery-powered six-rotor unit, outfitted with a 15-litre spray tank and a symmetrical six-nozzle horizontal spray boom, and flown by Precision Crop Tech of Abbotsford, BC. The products tested were Malathion 85E and Delegate WG. Each drone-applied product required a different flight pattern, and since they were pre-programmed flights, accuracy in mapping the plots was critical.

The lessons learned were straightforward.

“Small plots are a big problem for drones,” says Clodius. “The less starting and stopping in flying, the better. Also, really watch the wind.” There was no difference in results between the ground boom and drone in terms of thrips suppression, crop damage or yield.

A formal comparison of spray drift is still in progress.

PMRA is not the only agency with authority over drone-based

sprays, Clodius points out. Transport Canada regulates drones and pilots, and the B.C. Ministry of Environment regulates pesticide applicators, including aerial applicators.

If and when they are approved, the actual adoption of drone-based sprays will still depend on each grower’s needs and circumstances.

The lessons from 2019 will now be applied to two AAFC insecticide residue trials with

aerial drones: one for thrips on leeks in 2020, and a trial with cherry fruit fly sprays in 2021. These results will be submitted to PMRA, as part of a formal request to add drone-based sprays to the product label.

Photo right: Drone testing in leeks, Agassiz, BC.



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CROP PROTECTION

What is causing fruit tree decline?

JONATHAN GRIFFITHS,
JESSICA PROSSER AND
OUALID ELLOUZ

In recent years, fruit trees including apples and stone fruits have been affected by mysterious disorders that are causing significant tree death. Some apple growers have reported up to 40 per cent tree mortality for new (two to eight-year) plantings. In 2019, a two-year-old plot of nectarines lost 42 trees (25 per cent) with another 118 (69 per cent) showing obvious symptoms of decline. The loss of orchards represents serious economic losses for growers, and a serious problem for researchers trying to understand the cause. Apple decline has been reported across Canada, from Nova Scotia to British Columbia, while stone fruit decline seems to be isolated to Ontario for now. It has not been determined if apple and stone fruit decline represent the same disorder. The two diseases

(apple decline and stone fruit decline) are very similar with similar symptoms including rapid and unexplained death of young (two-eight-year) trees and necrosis that begins at the graft union and proceeds up the trunk of the tree. With such a widespread disorder affecting so many trees, why has it been so difficult to find a cause for these diseases?



To determine the cause of a disease, scientists use an approach known as Koch's postulates. These postulates are designed to establish a causative relationship between a microbe and a disease. An important aspect of this approach is that if a micro-organism is causing a disease, it should be present in every case of this disease. This brings us to the major difficulty in diagnosing these problems: variability. In two neighbouring orchards, one might be observing severe tree losses while the other has perfectly healthy trees. In an orchard some neighbouring trees might




“
Our current thinking, which we believe can incorporate all pieces of evidence, is that erratic climatic conditions, potentially rapid and severe temperature fluctuations in sensitive months such as November or April, severely weaken the trees.

~ JONATHAN GRIFFITHS


”







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be different varieties, root stocks, or even species. Weather conditions can change hourly and are rarely consistent year after year, or even site to site. Specifically with these tree fruit disorders, we aren't detecting the same pathogens in every afflicted individual. With all this variability, what are the potential causes suggested for apple and tree fruit decline?

Many different potential causes have been suggested for these tree declines. First, a new apple virus was identified, Apple luteovirus 1, and suggested to be the causal agent of rapid apple decline. Other causes are often suggested including pesticides, insects, fungal pathogens, or winter injury. However, this disorder doesn't seem to fit any one narrative. We only detect Apple luteovirus 1 in approximately half of dead and dying apple trees. The symptoms we have observed don't seem to fit with traditional winter damage. Pesticides and insects can certainly be a major issue, but again they are not consistently detected in diseased orchards. Fungal pathogens seem to be a major contributing factor to this disorder, but do not appear to be the primary causative agent. The only major commonality to these disorders is rapid and unexplained tree decline associated with severe necrosis at the graft union, which then proceeds up the tree.

Is there any grand unifying theory that could account for all of the available evidence, and suggest what the cause of these disorders is? Our current

thinking, which we believe can incorporate all pieces of evidence, is that erratic climatic conditions, potentially rapid and severe temperature fluctuations in sensitive months such as November or April, severely weaken the trees. Temperature fluctuations can induce a graft-incompatibility reaction further weakening the trees, which are then more susceptible to pathogens. All of this culminates in the death of the tree, and could be the cause of tree decline.

This is the hypothesis that we are using to develop further experimentation to either support or refute this idea. We are focusing on two major areas beyond testing for pathogens: examining weather records and correlating them to observed cases of tree decline, and examining the graft union for evidence of incompatibility. These lines of investigation will help us to determine the cause of these disorders and develop methods to promote tree health (adopt alternative rootstocks, strategies to better mitigate winter injury). As always, we strive for more data and bigger data sets if possible. If you are experiencing tree decline and wish to participate in our study, or if you have ideas or observations related to this issue please let us know.

*This project is funded by Agriculture and Agri-Food Canada. Contact: Jonathan Griffiths Research Scientist, Plant Virologist Agriculture and Agri-Food Canada
Jonathan.griffiths@canada.ca*

CROP PROTECTION

41% of minor use projects are for field or greenhouse vegetables

JIM CHAPUT

As growers and stakeholders head to Gatineau, Quebec for the annual Minor Use Priority Setting Workshop on March 24-26, it's worthwhile to look at the current status of projects.

At the start of 2020, approximately 500 active minor use submissions are in the federal regulatory system says Jim Chaput, minor use coordinator, Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). Many have efficacy, tolerance and residue data requirements. A few have occupational exposure or other data requirements to fulfill. Here are useful statistics for a national perspective.

- Approx. 18% of projects are joint with the U.S. IR-4 program
- Approx. 14% are minor uses for field crops
- Approx. 29% are minor uses for field vegetables
- Approx. 12% are minor uses for greenhouse vegetables
- Approx. 21% are minor uses

for fruit crops

- Approx. 11% are minor uses for ornamental and turf
- Approx. 13% are minor uses for miscellaneous crops (ie. ginseng, hemp, mushrooms, hops, etc)
- 75% are minor use projects submitted by AAFC-PMC
- 19% are minor use projects submitted by Ontario (some co-sponsored with PMC)
- 7% are minor use projects submitted by Quebec (some co-sponsored with PMC)
- 4% are minor use projects submitted by British Columbia
- 8% are minor use projects submitted by the Prairies
- less than 1% of minor use projects are submitted by the Maritimes

At the most recent US IR-4 Minor Use Priority-setting meeting where top U.S. priorities were established for 2020 projects, a number of key projects of interest to Canadian producers were selected to go forward as minor use joint AAFC-PMC/IR-4 projects. The final list of new selected joint projects for 2020 pertinent to

fruit, vegetable and specialty crops is as follows:

- Florylpicoxamid (XDE-659) – Alternaria on broccoli
- Florylpicoxamid (XDE-659) – Botrytis on greenhouse basil, GH strawberries
- Florylpicoxamid (XDE-659) – Leaf spot on red (garden) beets
- Florylpicoxamid (XDE-659) – Leaf blight on carrots
- Florylpicoxamid (XDE-659) – Leaf spot on radishes
- Florylpicoxamid (XDE-659) – Leaf blight on dry bulb onions
- Florylpicoxamid (XDE-659) – Leaf blight on green onions
- Florylpicoxamid (XDE-659) – Powdery mildew on greenhouse lettuce, tomatoes, peppers, cucs
- Florylpicoxamid (XDE-659) – mummyberry on highbush blueberries
- Florylpicoxamid (XDE-659) – Powdery mildew on hops

Current and ongoing minor use issues

- o Impact of products under re-evaluation i.e. neonicotinoids, linuron, EBDC's, pyrethroids, chlorothalonil, chlorpyrifos, etc.



- o Lack of clarity with regards to last dates of sale and last dates of use for products subject to phase-out or amended uses
- Resistance management issues especially multiple group resistance amongst Canada fleabane, Amaranthus species, ragweed, lambsquarters, crabgrass, etc.
- New invasive species
- Increased fees for emergency and minor use submissions.
- Pollinator and aquatic habitat protection
- Major changes to the national minor use and biopesticide

priority-setting process, pilot 2019; amendments in 2020.

- Cost of new products and product development
- For more information on Ontario's minor use program visit: www.omafra.gov.on.ca/english/crops/minoruse/about-minoruse.html

Jim Chaput is minor use coordinator, OMAFRA.

Photo by Glenn Lowson



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CROP PROTECTION

Waterhemp: a spreading invasive weed in Ontario and Canada

Figure 1. Amaranthus species seedlings

Photo credits: P. Smith and C. Shropshire



Waterhemp

Green pigweed

Redroot pigweed

Figure 2. Amaranthus species stems

Photo credit: C. Shropshire



Waterhemp

Green pigweed

Redroot pigweed

KRISTEN OBEID¹,
PETER SIKKEMA²,
CHRISTIAN WILLEMS²,
NICOLE LANGDON²,
DAVID WESTERVELD²,
MARIE-JOSÉE SIMARD³,
MARTIN LAFOREST³,
DAVID MIVILLE⁴ and TAMMY JONES⁵

Waterhemp (*Amaranthus tuberculatus* var. *rudis*) is a relatively new weed in Canadian agriculture cropping systems¹. It has been suggested that it was introduced via a combine from the southern United States between the late 1990s and early 2000s in Ontario¹ and similarly in Quebec in 2017.

Waterhemp is a small seeded, summer annual, broadleaf weed with many traits which make it particularly troublesome in agriculture²:

1. Waterhemp can emerge throughout the entire growing season (in Ontario),
2. One female plant can produce up to 4.8 million seeds³ in a non-competitive environment,
3. Waterhemp is dioecious (male and female plants), which results in vast genetic diversity contributing to rapid herbicide resistance evolution due to obligate outcrossing, unlike most other *Amaranthus* species¹, and
4. Waterhemp is extremely difficult to differentiate from other *Amaranthus* species, especially when small. However, there are a few key differences, as illustrated in Figures 1 and 2:

- Waterhemp cotyledons are often more egg-shaped than the long, linear cotyledons of other *Amaranthus* species.
- The first true leaves of waterhemp are generally longer and more lance-shaped.
- Waterhemp seedlings are hairless with leaves that look waxy or glossy.
- Waterhemp stems are hairless.

An *Amaranthus* genetic test has been developed to differentiate between six species (green pigweed, redroot pigweed, palmer amaranth, smooth pigweed, tumble pigweed and waterhemp), and can be used if identification is uncertain. A pigweed species identification guide has also been developed. Contact kristen.obeid@ontario.ca for either resource.

The first case of glyphosate-resistant waterhemp was discovered in Ontario's Lambton county in 2014. This population was the first confirmed glyphosate-resistant waterhemp in Canada. Since then, waterhemp has been found in 11 Ontario counties, seven of which have fields with populations that are four-way resistant to herbicide groups 2, 5, 9 and 14. In 2019, the genetic test which differentiates *Amaranthus* species was instrumental in confirming new waterhemp populations in Ontario (25), Manitoba (7) and Quebec (8). Multiple-resistant waterhemp

has now been confirmed in vegetable fields in Ontario's Elgin and Norfolk (Groups 2, 9 & 14) counties.

Waterhemp has the potential to become one of the most problematic weeds in Canada, as it is in the United States corn belt. It is easily spread to new areas as a contaminant of seed or hay, as a hitchhiker on vehicles or equipment and through natural dispersal by water and wildlife⁴. Once established, waterhemp will thrive in many agricultural production areas due to its prolific seed production, extended emergence pattern, high genetic diversity and its current documented herbicide resistance to Groups 2, 5, 9 and 14 (Ontario and Quebec) and Groups 2 and 9 (Manitoba).

References

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- ⁵Manitoba Ministry of Agriculture, Carmen, MB, Canada

Acknowledgements

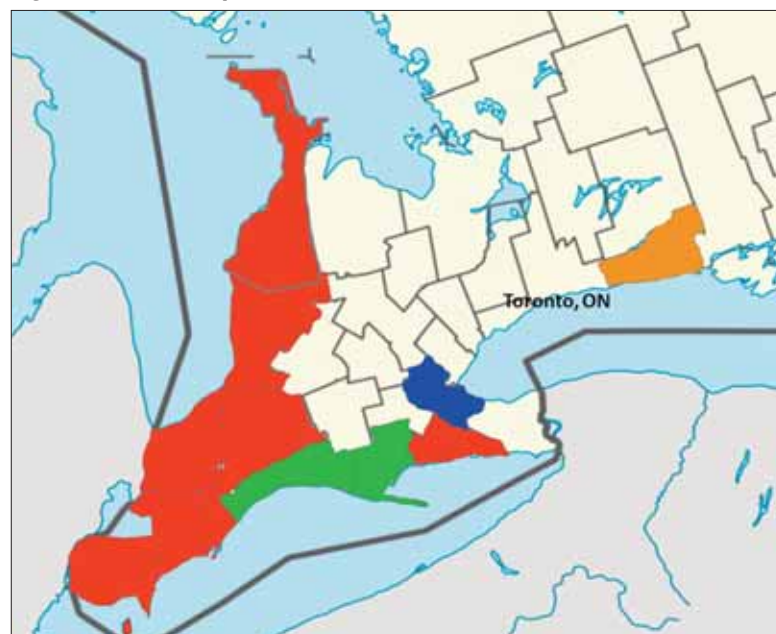
The authors gratefully acknowledge the contribution to this work from agronomists, extension personnel, technicians and students. As well as, previous graduate students L. Benoit, B. Hedges and M. Schryver.

Figure 3. Waterhemp plant

Photo credit: C. Willemse

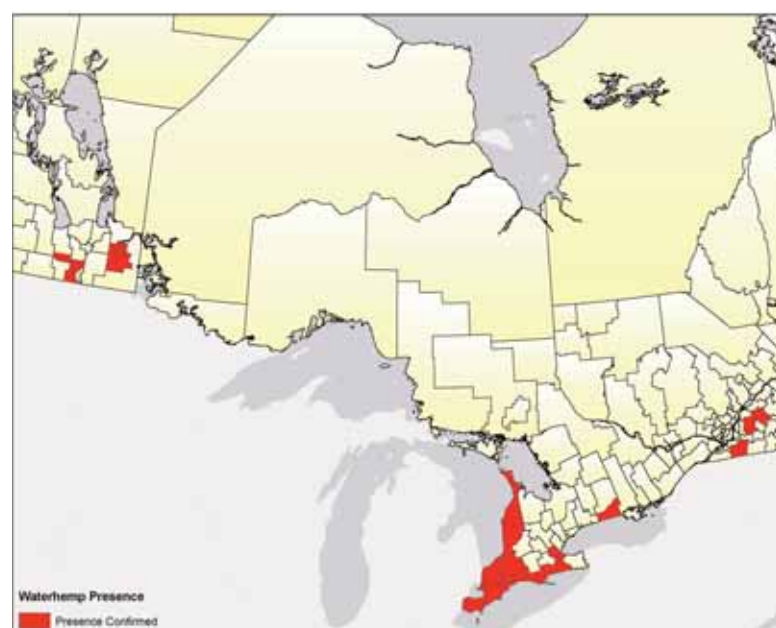


Figure 4. Waterhemp Resistance and Distribution in Ontario



- 2,5,9 & 14
- 2 & 9
- 2,5 & 9
- 2,9 & 14

Figure 5. Waterhemp Distribution in Canada



CROP PROTECTION

A berm alive with pollinators exists side by side with intensive horticulture

DILLON B. MULDOON

While driving up highway 400 for that cottage getaway in the Muskokas, you'll pass by a little slice of Ontario agriculture on some of the darkest soil you've ever seen. But be careful. If you blink, you might miss this beautiful place known as the Holland Marsh.

Located 50 km north of Toronto, the Holland Marsh is known for its intensive production of carrots, onions, and more than 60 other horticultural crops. The Marsh contributes more than one billion dollars to the Ontario economy through the production, processing and shipment of vegetables.

For my Masters of Science project, I'm looking at ways to enhance ecosystem services in the Holland Marsh. Benefits can include water and air purification, carbon sequestration, agricultural pest management and crop pollination. My research specifically focuses on enhancing non-crop areas so that they can provide better habitat for pollinators and natural enemies of crop pests.

Studies show that the enhancement of "naturalized" non-crop areas (e.g., hedgerows, field margins, riparian areas, mowed grass) with vegetative and floral plantings can help support the abundance and diversity of beneficial insects within an intensive agricultural system. The habitat can offer benefits such as pollination of crops to assisting with crop pest control.

Until recently, the Holland Marsh had almost no non-crop habitat. In 2010 the Holland Marsh Drainage System Canal Improvement Project was initiated, and at its completion in July 2016, 19 km of canals had been relocated and dredged, and 10 km of berms (dikes) had been expanded to improve safety and efficiency. This expansion of the berms increased the amount of non-crop habitat in the Holland Marsh. My study investigates how different vegetative enhancements on the canal berms might affect beneficial insect complexes and agricultural pest populations at the Holland Marsh. I'm using both active and passive trapping to assess the

abundance and diversity of natural enemies, pollinators, and insect pest populations in two different vegetative enhancements throughout the growing season.

Although vegetative enhancements can be beneficial, stakeholders were concerned about the possibility that the enhancements could provide a refuge for pests (e.g., insects, weeds, vermin) and that they may not be aesthetically pleasing. To address these concerns, I organized a public and grower outreach day (Berm Day) on July 5, 2019 with help from funding by the Entomological Society of Ontario. The goal was to connect with the public and growers about the importance of enhancing non-crop habitat to support beneficial insects in intensive agricultural systems.

My study has shown that vegetative enhancements support a greater abundance of natural enemies than the natural berm vegetation and increase floral resources for pollinators. The enhancements have not provided a refuge for primary insect pests of the crops grown at the Holland Marsh.

Overall, I connected with local growers, members of the public, master gardeners, conservation authorities, and members of the Ontario Ministry of Agriculture, Food, and Rural Affairs. We opened a dialogue about the project and shared ideas for future research, including management approaches and new seed mixes to improve the aesthetics appeal of the plantings. Everyone who attended left with a package of Ontario Native Seed Mix to plant at home, which was generously provided by Syngenta's Operation Pollinator Multifunctional Landscapes.

Dillon B. Muldoon is a Masters of Science and a graduate research assistant in the Scott-Dupree Agro-Eco Lab, University of Guelph, Ontario.

Photo top right: Dillon Muldoon

Photos by Glenn Lowson



Protecting Canada's blueberry exports

Canada is the world's second largest producer and exporter of fresh highbush blueberries and the top producer of lowbush, or wild, blueberries. In 2018, blueberries were Canada's most valuable fruit export, making up 58 per cent of total fruit exports with a farm gate value of more than \$243 million.

However, exporting blueberries requires that Canada's shipments meet quarantine and pest control standards, and compliance with the importing country's maximum residue limits (MRLs), the maximum amount of the active ingredient remaining on a crop after a pesticide treatment. Luckily for Canadian farmers and exporters, Agriculture and Agri-Food Canada's (AAFC) Pest Management Centre (PMC) is there to help.

As part of its Pest Management Program, PMC

conducts pesticide residue studies to collect data required for the registration of new uses of pesticides and the establishment of MRLs for crops grown in Canada. The PMC also provides its expertise and tools as required to the Market and Industry Services Branch when examining MRLs of Canada's current and future trading partners to ensure that exports are within acceptable MRLs of the importing country.

The PMC evaluates products to control pests — insects, diseases, and weeds — that have been deemed a problem by growers and in need of solutions. Major blueberry pests include the blueberry maggot, a zero tolerance pest that is banned on all lowbush blueberry exports, and mummy berry disease, a regulated fungal pest that is banned on exports to China and Korea.

Thanks to work by PMC,

blueberry growers now have access to products to help control these and other pests. In fact, as of November 2019, PMC has completed 55 blueberry (lowbush, highbush, or both) projects (25 on weeds, 20 on insects, 10 on diseases). The results of this research have been submitted to Health Canada's Pest Management Regulatory Agency for the registration of the evaluated pest control products. These new treatment options are effective and often replace older, obsolete chemistries.

2020 is the International Year of Plant Health. Equipped with expertise and tools, AAFC's PMC continues to support blueberry growers by meeting demand for minor use pesticides and keeping plants healthy so they are successful in Canada's domestic and export markets.



Pest Management Centre:
Jennifer Allen
Agassiz Research and Development Centre
Harrow Research and Development Centre
London Research and Development Centre (Vineland Research Farm)
Kentville Research and Development Centre

Summerland Research and Development Centre
Saint-Jean-sur-Richelieu Research and Development Centre
Marketing and Industry Services Branch: Tyler Konings

Source: Pest Management Centre

Agricultural Information Contact Centre: 1-877-424-1300
ontario.ca/crops

Ontario Berry Grower

Ministry of Agriculture,
Food and Rural Affairs



Five new strawberry varieties to keep an eye on

ERICA PATE

At the North American Strawberry Growers' Association Annual Meeting and Conference in January, strawberry nurseries and breeders introduced new June-bearing and day-neutral strawberry varieties:

Keepsake

Released by the US Department of Agriculture. Kim Lewers, geneticist with the USDA, introduced Keepsake from her program. It is a midseason, short-day strawberry with excellent post-harvest storage. Keepsake is anthracnose-resistant, produces good yields, and is rain-tolerant. These berries are very sweet and juicy with moderate acidity, are firm and tough for harvest, and have a pleasant texture when eaten. They are attractive berries with a good size, gloss, and large calyx.

In trials evaluating strawberry cultivars for post-harvest shelf life, Keepsake had fewer degraded and decayed berries after two weeks in cold storage compared to other cultivars.

AAC Evelyn

Beatrice Amyotte, Small Fruit Germplasm Development, AAFC, introduced a couple new varieties from her program, including AAC Evelyn. This June-bearing variety has a similar season to Mira, very good hardiness and high yields. The berries are very large,



Keepsake. Photo: USDA ARS



AAC Evelyn.

shiny, and elongated, and are very flavourful. AAC Evelyn also has good tolerance to foliar diseases.

AAC Audrey

Audrey is an early-season June-bearing variety, with harvest beginning just after Wendy. This variety has excellent sweetness and flavour, good

hardiness, and very good productivity. The berries are bright red, firm, and are a good size.

AAC Kate

AAC Kate is a late season June-bearing variety with very good hardiness. The berries are very large, with a similar yield



AAC Audrey.



AAC Kate.



AAC Dynamik. Photos above by Production Lareault Inc.

to Jewel, very firm, and are flavourful with a bit of a tang. The berries are bright red.

AAC Dynamik

Dynamik is a day-neutral strawberry bred by Shahrokh Khanizadeh. This variety has good hardiness and good productivity; Dynamik has higher yields than Seascape.

The fruit has a good flavour, and is a good size with an appealing bright, red colour. AAC Dynamik also has good tolerance to foliar diseases.

Erica Pate is fruit crops specialist for Ontario Ministry of Agriculture, Food and Rural Affairs.

Upcoming berry events

Strawberry Production 1.0

Tuesday March 10, 2020, 8:30 am-4:00 pm
Springfield Golf & Country Club,
2054 Gordon St, Guelph

Speakers: Marvin Pritts (Cornell), Pam Fisher (Fisher Berry Crop Consulting), Kevin Schooley (BGO), Kristen Obeid, Rebecca Shortt, Erica Pate (OMAFRA)
Cost: \$75 for Berry Growers of Ontario members
Contact Berry Growers of Ontario at info@ontarioberreries.com or call 905-735-5379 to register.

These IPM workshops are free for those who will be scouting berry crops this year or looking to refresh their IPM knowledge.

Strawberry & Raspberry IPM training (Durham)

Thursday, April 30th, 8:00 am- 3:00 pm.
W. Galen Weston Centre for Food, Durham College,
Whitby Campus
1604 Champlain Ave, Whitby
Workshop leader: Erica Pate
Notes: Lunch on your own. Handouts provided.

Strawberry & Raspberry IPM training (Norfolk)

Thursday, May 7th, 9:30 am-3:30 pm
Simcoe OMAFRA Resource Centre
1283 Blueline Rd.
Simcoe, Ontario
Workshop leader: Erica Pate
Notes: Lunch on your own. Handouts provided.

To register, please contact OMAFRA's Agricultural Information Contact Centre at 1-877-424-1300 or email ag.info.omafra@ontario.ca.

ONTARIO BERRY NEWS

Development of a novel method for quantifying Spotted Wing Drosophila

WENDY McFADDEN-SMITH AND ERICA PATE

At the Ontario Fruit and Vegetable Convention in Niagara Falls, we introduced a project investigating a new spotted wing drosophila (SWD) monitoring tool that we have been developing for the past couple of years. The objective of this project was to develop a PCR (polymerase chain reaction) test to identify SWD in liquid samples. The goal of this test is to provide a tool for growers to be able to monitor SWD themselves, without having to sort through liquid traps full of tiny insects. This is our current monitoring system, which is a time-consuming and labour-intensive task.

SWD is a challenging pest to control, and it is important for growers to know when SWD is active to effectively control this pest. Insecticide applications are not needed unless there is ripe fruit present and SWD has been identified in the area. As the emergence of this fruit fly is different every year and is challenging to predict, monitoring is an important practice every season. Our hope with this project is that growers will be able to easily monitor SWD themselves to be able to make timely, informed decisions, and protect their crops.

Spotted wing drosophila (SWD) was monitored throughout the 2018 and 2019 growing season in different areas in Ontario, with traps initially placed in berry crops and then gradually shifted into stone fruit and then grapes. SWD counts were made using a microscope weekly, and after counting, samples were sent to Ag Food Lab Services, University of Guelph for PCR quantification.

The quantitative PCR (qPCR) methodology was developed by the group of Dr. Shu Chen, University of Guelph, Agriculture and Food Laboratory. This methodology was confirmed to be specific and sensitive and allows for the quantification of SWD in liquid traps. A calibration curve was established and applied to test the field samples that were collected and counted during the growing season. The PCR results matched the physical counts with respect to high vs low counts. However, the correlation between physical SWD counts and PCR estimates were not as accurate as we would like. The formula used to calculate SWD in the PCR test is being refined to relate physical counts to PCR results more precisely.



Another challenge we experienced was the degradation of insect samples during the hottest part of the summer. In November 2019 a trial was started to test liquids other than water in the traps, including mouthwash and ethanol, to see if the quality of the samples improved. This trial is ongoing. Stay tuned for results on the best liquid to use for this test.

Once this test has been refined and is available, growers will be able to send liquid samples to the Agriculture and Food Lab once a week, to determine if SWD is active on their farms. Once SWD has been identified growers will need to begin applying insecticides, if there is ripe fruit present. Once SWD is active it is present for the rest of the season, so growers will not need to continue to monitor, unless there is interest in monitoring population trends.

This tool will provide a monitoring option to berry and tender fruit growers that will reduce the labour and time needed to sort through liquid traps, and contribute to effective SWD control and a healthy crop.

Thank you to the private consultants, OMAFRA staff, and summer students who collected and counted the many samples, the growers for hosting these traps, Justin Renkema's lab (AAFC), and Shu Chen's lab.

This project was funded in part through the Canadian Agricultural Partnership, a federal-provincial-territorial initiative, as well as the Niagara Peninsula Fruit and Vegetable Growers' Association, Ontario Tender Fruit Growers' Association, Ontario Grape and Wine Research Inc., and the Eastern Ontario Berry Growers' Association

Wendy McFadden-Smith is Horticulture IPM specialist. Erica Pate is fruit crop specialist. Both work for the Ontario Ministry of Agriculture, Food and Rural Affairs.



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EQUIPMENT: Highlander Ramsay picking aid, JD engine; JD 6000 Custom Tomato cultivator & liquid side dresser, new pump, 5' centres, showing 1056hrs. One of a Kind, used for cultivating staked tomatoes and for side dressing plastic sweet corn and zucchini; Toyota 25 forklift, LP and gasoline, side shift and rotator, foldable rotator arm attached, air tires, 8,618 hrs; Toyota 15 forklift, LP and gasoline, side shift, solid rubber tires, 5,830 hrs; JD 1700 air seeder, 5' centres; Kongskilde 9 row, 3pth cultivator, 30" spacing; Case 2500, 5 shank soil saver; MF 33 seed drill; Kennco 3 row bed maker, 5' centres; Kennco mulch layer; Somers 16 kW generator, Lister Peters 4cyl diesel, 8213hrs; Cat 23 kW generator, 4cyl diesel, 3156 hrs; George White 300 gallon, pto sprayer; Ferris poly planter; Mechanical Transplanter, model 95, wire setter; 6 (six) Water Wheel Transplanters, w/ 200 gallon tanks; Miscellaneous wheels for water transplanters; 10' laneway sprayer, custom built, pto pump, 200 gallon tank; 10' laneway maker, 3pth; Wilmar fertilizer bin, w/ auger; Air boom for staking tomatoes; 34'; 2 (2) 3pth picking aids, 1 w/ mesh platform, 1 w/ wood; Floating cover roller, 3pth OR Alo mount; 3 row fumigator/bedmaker, 5' centre, 200 gallon tank; 11' 3pth cultivator; 2 (two) 3 row cultivators, w/ JD high clearance 'S' tines, 5' centres, lights; 3pth, 8' blade; 3pth 2 shank ripper; 6 (six) flat top wagons, truck tires & lights.

IRRIGATION EQUIPMENT: 2015 Bauer Rainstar E41 traveller, 1312' hose; Bauer Rainstar E4 traveller, 1246' hose; 11 (eleven) irrigation pumps & motors. All with B4 Berkley pumps, Ames hookups & Murphy timer switches. 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Sold by the pipe times the money***; 7 (seven) 6" suction pipes, w/ check valves. **TOMATO EQUIPMENT:** 2003 AutoLine 3 Lane, 18 Drop Fruit/Vegetable Grader, w/ computer program (may need own registration to use), garbage conveyor & return conveyor, 18 (eighteen) tables, lots of spare parts, new sprockets and chains in spring 2019. Total measurement 11' wide by 93' long, grader width of 5'5". Stainless Steel Vegetable Flume used for tomatoes, electric driven conveyor for bin entry, hydraulic bin submerger; Vegetable washer used for tomatoes; Stainless steel inspection table; AutoLine 3 Lane singulator conveyor belt; Homemade 3 Lane singulator conveyor belt; 18 (eighteen) 10' roller tables. ***Tomato lineup will be sold twice. First individually; Flume, Washer, Inspection table, Singulators and then grader. Sold secondly as a whole assembly line. Sale depends on the buyers and totals*** Do not hesitate to call Chase for more info or to set up a viewing. **MELON EQUIPMENT:** Vegetable Flume used for melons, stainless steel, water pressure to push fruit up conveyor; Vegetable Washer w/ chemical injector; Radius Belt; Cantaloupe grader & sizer, 8 tables, garbage conveyor on top, lights; 8 (eight) 10' roller tables. ***Melon lineup will be sold twice. First individually; Flume, Washer, Belt and then grader. Sold secondly as a whole assembly line. Sale depends on the buyers and totals*** **VEGETABLE EQUIPMENT:** Hydro Cooler, w/ automatic door, water tank underneath w/ free-on pipes throughout, water pumps up to shower product; Vegetable Flume, stainless steel, pump system to push up conveyor; Conveyor w/ plastic belt, plastic ribbing on belt to allow water pass through; 50' 2 way belt, w/ garbage conveyor on top, stainless, deflector conveyors on each end, belts 19" & 10"; NEW 12'x5.25" conveyor belt w/ electric motor; quantity of 10' grading rollers; Roughly 800 Harvest tubs, 44 LB capacity, stackable, 23'x 15", depth of 11.5". **VEHICLES & TRAILERS:** 2004 GMC 2500HD pickup, 6L V8, trailer hitch; 2001 Ford F-250 Lariat pickup, crew cab, 4wd, 7.3L Power Stroke, 400,165km, engine issues; 2000 Chevy 2500 pickup, hitch, 348,773km; 2000 Dodge Ram 3500 passenger van, 12 person, hitch, 148,481km; 2012 GMC Passenger bus, 18 person, 4.8L gas, 135,278km, nice; 2001 International 30S, DT466E, 72 passenger bus, 231,750km; 1998 International 30S, T444E, 72 passenger bus, 222,460km; 2001 Ford E350, 20 passenger bus, 7.3 Power Stroke, 276,476km; 2 (two) 1999 Ford E350, 20 passenger buses, w/ 7.3 Power Stroke engines, 266,976km & 295,775m; 3 (three) 1998 Ford E350, 20 passenger buses, w/ 7.3 Power Stroke engines, 220,053km, 270,176km & 271,251km; 1994 Ford E350, 20 passenger bus, 6L Power Stroke, 2006 Ford E450 cube van, 124,046km; 2001 Ford E450 cube van, 254,745km; 1983 GMC 7000 flatbed truck, 5 speed (water tanks sold separately) 178,699km; 1979 International Van Truck, 6 cylinder IH diesel, 356,608km; 1975 GMC 6500 truck, air brakes, tandem, air axle works, dual fuel tanks, hydraulic box (not working), w/ 2 (two) 1500 gallon tanks, shows 44,141miles. Trailers: 2011 Great Dane 53' reefer trailer, w/ ThermoKing Whisper SB-230 Reefer, 4642hrs; 2003 Utility 53' Reefer trailer, w/ Carrier Reefer, 10,014hrs; 1999 Utility 53' Reefer trailer, w/ Carrier Reefer, 11,949hrs; 45' Storage trailer, w/ Reefer, no safety, has ownership; 2 (two) 45' Storage trailers w/ no ownerships. **MISCELLANEOUS:** 2007 BT LPE200 power jack w/ charger, 2206 hrs; 2008 BT LPE200 power jack, 2460hrs; BT power jack and charger; New 200 gallon water tank, used fuel tank, 140 gallon; greenhouse glass; pressure tank; tank & pump on skid w/ hose & reel; 5 (five) Rubbermaid & Dymo scales & stands (will be sold individually); LARGE quantity of rolls of row cover; ginseng sprayer, w/ 500 gallon tank, 3 row coverage, pto pump; Lincoln furnace; 8 (eight) Various sized water tanks, 1000 to 1770 gallon; Assortment of trickle tape; Assortment of plastic mulch; Large quantity of bag grits for holding down row cover; Large quantity of wire for green plastic 62"; custom truck box fuel tank; 2 plastic layers for green tunnel; large quantity of spare motors; cage holding empty boxes; 13 (thirteen) plastic chemical storage tanks (1000L); 240 good hampers, 35 slightly broken hampers; 7 fridges, mattresses; 4 bunk beds (plywood); 4 chest freezers; stoves; washing machine.

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CROP PROTECTION

New IPM strategies needed in crop protection



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Despite the number of registered active ingredients and end use products climbing in Canada over the past decades, crop protection toolboxes seem to be shrinking for some crops. Re-evaluation decisions by the Pest Management Regulatory Agency (PMRA), resistance development among target pests, and the reliability of product efficacy all contribute to the realistic crop protection picture. The options list is truly short for some crops. For others, although options appear abundant – at least on paper – real world scenarios indicate otherwise.

We do have more registrations than ever before. As of March 31, 2019, the PMRA notes that there are 665 active ingredients in 7707 end use products registered in Canada. This is up from 550 total active ingredients registered in 2004. Not all of these active ingredients and end use products would have agricultural uses. However, agriculture still represents about three-quarters of all pest control product use in Canada by volume of active ingredient sold. Crop protection uses remain the primary market.

A big shift in the registration activity of crop protection products has been the increasing number of biopesticide registrations. Biopesticides include active ingredients that contain or are derived from microorganisms such as bacteria, fungi and viruses. The term also applies to signaling molecules such as insect pheromones, and other

non-conventional active ingredients such as garlic and mineral or essential oils.

Of the roughly 200 or so biopesticide active ingredients currently registered in Canada, many of them have been more recent introductions. Activity reports from the PMRA indicate that more than 130 biopesticides were registered after 2000. The share of biopesticides as a portion of new active ingredient registrations is also rising. From 2010-2019, biopesticides represented 54 per cent of all new active ingredients – 59 new conventional versus 79 new biopesticide registrations. This is up from biopesticides representing 41 per cent of new active ingredients from 2000-2010.

Based on recent activity from the crop protection industry, this trend doesn't appear to be slowing. The annual Food Use Workshop of the United States IR-4 program – the counterpart to the Minor Use Pesticides Program in Canada – acts a barometer to gauge development activity of new crop protection materials. Companies introducing new biopesticides comprised over half of the new product presentations again in 2019. Although registration requirements for biopesticides are more onerous in Canada than south of the border, you can roughly expect this ratio of biopesticide products to translate into new registrations here in Canada too.

Despite biopesticides now representing about 30 per cent of total active ingredients registered in Canada, their use is nowhere near 30 per cent of total crop protection applications. Protected agriculture, such as greenhouse vegetable production, is an exception where biopesticide active ingredients cover much of their crop protection needs. However, field-based edible horticulture has not been able to successfully adopt biopesticides to a large degree, except when required in the organic sector.

To be fair, conventional field growers are trying and incorporating more



A leaf wetness sensor is used in forecasting systems at the Muck Crops Research Station to monitor leaf wetness in the canopy of the crop. When the sensor surface is wet, it completes an electric circuit and gives a numeric value which is recorded on the data logger. The values are used to determine a time period for when the canopy of a crop is wet or dry. And hence, when it is best to spray. A grower may choose to use a biopesticide at a lower risk level than a conventional product. Photo by Glenn Lowson.

“

Despite biopesticides now representing about 30 per cent of total active ingredients registered in Canada, their use is nowhere near 30 per cent of total crop protection applications.

”

biopesticides in their crop protection programs than ever before. One limitation is that biopesticides generally have a suppression label as opposed to control with many conventional products. Field growers are beginning to see value in biopesticides as tools in resistance management, in situations where pest pressure may not warrant a conventional application, to facilitate worker activities with low restricted-entry intervals (REI), and to help with residue mitigation at harvest due to low pre-harvest intervals (PHI). There are certainly merits to incorporating biopesticides into conventional crop protection programs . . . where it makes the most sense. That is the million dollar question most field growers would like to understand.

Agriculture and Agri-Food Canada's Pest Management Centre (AAFC-PMC) does coordinate some research activity into incorporating biopesticides with the Pesticide

Risk Reduction Program (PRRP). Ongoing projects at the PRRP include work on onion maggot, cyclamen mite, carrot weevil, and Phytophthora management in horticulture crops. The need for such research work will only increase with greater availability of biopesticides compared to conventional products.

The U.S. IR-4 program has recognized the need to understand the fit of biopesticides in conventional crop protection programs and the value of user prioritization. A new category of research priority was created in 2018 called integrated solutions. The objective of integrated solutions is to explore conventional and biological crop protection tools in combination for pest management needs. It is a reflection of the increasing role that biological products are having both in conventional and non-conventional production systems. Management of the striped cucumber beetle and cabbage maggot are two such

projects that have been selected under integrated solutions so far.

There is a need to mirror this user-driven process here in Canada with our Minor Use program. Similar to the existing program, growers should be responsible for choosing which crops and pests have priority for research work that integrates both conventional and biopesticide solutions. The needs should consider available tools that are registered for the crop. If research work demonstrates an effective strategy, growers are much more likely to attempt it on their own operations. What we are really talking about – integrating multiple strategies for pest and disease management in crops – is integrated pest management (IPM). With a shrinking effective conventional toolbox in many horticulture crops, a greater role for IPM strategies will be required than ever before.



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CROP PROTECTION

Rootshield biological fungicide registered for Asian water spinach

JIM CHAPUT

The Pest Management Regulatory Agency (PMRA) recently announced the approval of a minor use label expansion registration for Rootshield HC biological fungicide for suppression of *Botrytis* blight caused by *Botrytis cinerea* and root rot caused by *Pythium spp.*, *Rhizoctonia spp.* and *Fusarium spp.* on Asian water spinach in Canada. This product was already labeled for use on a wide variety of crops in Canada for control of several diseases.

This is the first ever minor use on Asian water spinach (also known as tung choy, kankon, rao muong) in Canada and was submitted by Ontario as a result of minor use priorities established by growers and extension personnel.

The following is provided as an abbreviated, general outline

Crop(s)	Target	Rate	Application Information
Asian water spinach (tung choy, kankon, rao muong)	Potting mix or soil drench for root rot (<i>Pythium spp.</i> , <i>Rhizoctonia spp.</i> , <i>Fusarium spp.</i>)	55-110 grams per cubic metre	Suspend RootShield® HC in sufficient water (eg. 30 – 45 g/100 L) to achieve uniform application and apply at the rate of 55 – 110 g per cubic metre (loose) of nursery potting mix, soil or planting beds
	Foliar spray for <i>Botrytis</i> blight (<i>Botrytis cinerea</i>)	3.75 - 10 grams per litre of water	RootShield® HC should be applied preventatively prior to onset of disease. Apply every 7-14 days depending upon disease pressure.

only. Users should be making pest management decisions within a robust integrated disease management program and should consult the complete label before using Rootshield HC biological fungicide.

Do not apply or allow drift of Rootshield HC biological fungicide to other crops or non-target areas. Do not contaminate off-target areas or aquatic habitats when spraying or when cleaning and rinsing

spray equipment or containers. Follow all other precautions, restrictions and directions for use on the Rootshield HC biological fungicide label carefully.

For a copy of the new minor use label contact your local crop specialist, regional supply outlet or visit the PMRA label site.

Jim Chaput is minor use coordinator, Ontario Ministry of Agriculture, Food and Rural Affairs.



Rao muong

Study shows cost of spotted lanternfly

The spotted lanternfly is already costing the state of Pennsylvania \$50 million each year in damages, according to a first-of-its-kind study. However, the researchers warn the cost could balloon further if the pest is not contained. Scientists at Penn State say if the spotted lanternfly is able to escape the quarantine zone in southeast and central Pennsylvania and spread across the state, the annual economic damage could reach \$324 million with a loss of 2,800 jobs.

Under the worst-case scenario, the study found, losses could increase to \$554 million, with a decline of nearly 5,000 jobs.

The lanternfly is native to Asia. It was first discovered in Berks County in 2014 and has since

spread to 14 counties. Jayson Harper, director of the university's Fruit Research and Extension Center in Biglerville, Adams County, said the fly poses a threat to grapes, tree fruits and hardwoods.

"It's important for the legislature to understand the magnitude, the value of the crops that are under risk so we can have a vigorous response to managing the pest," says Harper. Whyy.org reported how researchers estimate implementing best management practices in the quarantine zone would cost around \$28 million.

Source: The Philadelphia Inquirer January 21, 2020



Spotted lanternfly

Ignite SN herbicide label expanded for strawberries in Canada

JIM CHAPUT

The Pest Management Regulatory Agency (PMRA) recently announced the approval of a minor use label expansion registration for Ignite SN herbicide for control of labeled weeds on strawberries in eastern Canada and British Columbia. Ignite SN herbicide was already labeled for use on a number of crops in Canada for control of several weeds.

This minor use project was submitted by Agriculture & Agri-Food Canada (AAFC-

Crop(s)	Target	Rate (L/ha)	Application Information	PHI (days)
Strawberries (day neutral, June-bearing) [EASTERN Canada & BC only]	Labeled weeds	2.7 – 5.0	Application may be made to strawberries in the fall, spring or in-season. Ignite SN Herbicide may be applied as a banded application to row middles only, using a hooded or shielded sprayer. Avoid contact of Ignite SN Herbicide solution, spray, drift or mist with strawberry plants as serious crop injury may result. Repeat treatments may be necessary to control new germination of annual weeds. Do not make more than 2 applications per year.	1

PMC) as a result of minor use priorities established by growers and extension personnel.

The following is provided as an abbreviated, general outline only. Users should be making weed management decisions within a robust integrated weed

management program and should consult the complete label before using Ignite SN herbicide.

Ignite SN herbicide is toxic to aquatic organisms and non-target terrestrial plants. Do not apply this product or allow drift

to other crops or non-target areas. Do not contaminate off-target areas or aquatic habitats when spraying or when cleaning and rinsing spray equipment or containers.

Follow all other precautions, restrictions and directions for

use on the Ignite SN herbicide label carefully.

For a copy of the new minor use label contact your local crop specialist, regional supply outlet or visit the PMRA label site.

Jim Chaput is minor use coordinator, OMAFRA.

OUR EXPERTS ARE HERE TO HELP!



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MENTAL HEALTH

A Workplace Hazard that Responds Well to Light

Long hours alone. Financial concerns. Lack of sleep. Too much rain. Too little rain.

If you've read the above list of issues and have no experience with any of them, you're likely not connected to farming and have picked this article up by mistake.

And the list is actually much longer than that. We're referring to the list of things which are cause for concern to those who work in the agriculture industry.

The numbers bear this out. A recent University of Guelph study found that Canadian farmers dealt with:

- **45% high stress**
- **58% anxiety**
- **35% depression**

“Sadly, there is an alarmingly high rate of mental health issues within the Ag community relating to anxiety, depression and even suicide,”

—Danielle Stewart, member of the WSPS Organizational Health Team and The Board of Directors for the Ontario Workplace Health Coalition.

Danielle adds, “along with being one of the greatest environments to live in and raise a family, managing the farm is hard work, with characteristics that can significantly impact mental health.”

Unfortunately, there is still stigma associated with mental health. Too often people keep it in the dark and don't share what they're going through, which only serves to make things worse.

There are things one can do to address mental health issues. See some examples to the right.

Steps You Can Take

Do as much prep as you can now. Avoid the unexpected. Make sure equipment is in good working order. Can seed, fertilizer and fuel be ordered now? Assess tasks and time requirements. Are there ways to use your time more efficiently? Can you hire extra hands to take on some of the work?

- **Give yourself a break.** It can be a 24/7 role for a farmer, but no one can consistently run that long, that hard. Take breaks to give your body and mind a rest.
- **Accept that some things are beyond your control.** Bad weather is a good example. Stay calm and look at ways to minimize the impact.
- **Connect with others.** Isolation can fuel stress, anxiety and depression. Have contact with others every day. It's especially important to spend time with family. Share how you are feeling with someone you trust — a spouse, a friend or a fellow farmer who understands the challenges.
- **Learn how to cope with stress.** Deep breathing, positive self-talk and meditation are effective ways to cope with stress.

Get support. If you feel overwhelmed, contact your family doctor to access professional help, or look for resources such as the Canadian Mental Health Association (www.cmha.ca), the Centre for Addiction and Mental Health (www.camh.ca) and thinkmentalhealth.ca, a website offering free information and resources. WSPS offers e-courses, free downloads and more at www.wsps.ca.

This project is funded by the Ontario Ministry of Agriculture, Food and Rural Affairs. The views expressed in this publication are the views of WSPS and do not necessarily reflect those of the province.

For free online resources relating to mental health, visit:

lp.wsps.ca/agri-mental-health



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