



Researchers on a helicopter chase down a trio of wild pigs racing through the snow.



A feral boar is captured in the wild.

Wild pigs on the Prairies: USask researchers documenting exponential increase

For more than a decade, Dr. Ryan Brook (PhD) has seen the warning signs and been sounding the alarm about the ecological and agricultural disaster the Prairies are facing from the uncontrolled spread of wild pigs and the damage they do.

By James Shewaga

His warnings have gone largely unheeded, while wild pigs continue rapidly expanding across Western Canada, with no nationally co-ordinated science-based containment strategy in place and limited provincial resources available. For Brook, it's a recipe for disaster.

"What we have seen on the Prairies in the last 10 years is this absolutely exponential increase in the number of wild pigs," said Brook, who joined the University of Saskatchewan (USask) in 2010, and is one of the few researchers in the country actively tracking the unchecked growth of this destructive and elusive invasive species. "Let's be clear, wild pigs on the Canadian Prairies are expanding completely out of control, and you can quote me on that."

With limited resources, Brook and his graduate students and volunteers with the USask-based Canadian Wild Pig Research Project have been charting increased wild pig sightings across the Prairies, with the majority occurring in Saskatchewan where feral pigs have been spotted in 80 per cent of the province's 296 rural municipalities.

"We have this huge database of over 60,000 individual wild pig occurrences across Canada," said Brook, an associate professor in the Department of Animal and Poultry Science in the College of Agriculture and Bioresources at USask. "Sometimes those are repeats of the same pig wandering by trail cameras, so it's not all necessarily individuals, but either way, that is a lot of occurrence data."

"Saskatchewan has 60 per cent of all of our occurrences in our entire data base

and 99 per cent are on the Prairies and 91 per cent are just in Saskatchewan and Manitoba combined. We have a hot spot in East-Central Saskatchewan that isn't that large of an area but it actually probably has the same number of pigs as the rest of Canada combined."

Wild pigs have spread as far as British Columbia and Ontario, and in the past few months, Parks Canada confirmed they were found for the first time in a national park, spotted at Elk Island National Park east of Edmonton. Brook said it is only a matter of time before they invade Prince Albert National Park, and other cherished—and fragile—environment sanctuaries.

"We need to recognize that there are some major strongholds that will never be eradicated, but there are other areas that

are nearly pig-free, or could be made so," said Brook. "My worry about recognizing that we won't fully eradicate them from Canada now is I don't want that to be an excuse not to try and not to address this. We still need to act."

The wild pig problem began innocently enough back in the late 1980s when wild boars from Europe were imported by a few Canadian farmers to raise for meat, with most interbred with domestic swine. Some were set free when the boar meat market cooled off, while others escaped due to inadequate fencing and have continued to spread and breed uncontrolled for decades (averaging litters of six every six months), destroying crops, contaminating watersheds and damaging fragile ecosystems while running amok.

Continued on page 32

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USask signs MOU for Agtech Accelerator

BY SIERRA D'SOUZA BUTTS

LOCAL JOURNALISM INITIATIVE REPORTER

In a sign of the university contributing to the province's agricultural industry, the University of Saskatchewan (USask) recently announced signing a memorandum of understanding with the Agtech Accelerator.

USask's associate director of research excellence and innovation Alix Hayden, talks about how the Agtech Accelerator will benefit the university's role in the innovation ecosystem, and how the program will include its students in this field of work.

"We know that in Saskatchewan we have over 40 per cent of Canada's arable farmland and that there's more than 30 million acres used for crop production each year. Right now we know the environment is right for this innovation ecosystem development," Hayden says.

"We have a government that's supportive of agriculture and agriculture innovation, we have a unique research cluster at the University of Saskatchewan and so, as this project started to evolve we noticed that there were many key players supporting it in the province. It was apparent that this is the right time and place to start with the Agtech Accelerator."

Hayden says the partnership between the organization and the university will focus on exposing students to opportunities in agriculture.

"USask looks forward to providing opportunities for the Agtech Accelerator company that will be working there,

to connect with our innovators and our campus resources. The partnerships is designed to also offer opportunities for our students to be exposed to an aspect of that growing innovation ecosystem, that will provide new ways for them to think about their future careers."

"The accelerator is a program where companies will come to learn how to accelerate the success of their ventures," says Hayden.

"The programs run for four months and some over the summer. While that is happening, there are a lot of opportunities for mentors and networks to be built. People that come to Saskatchewan and investors that will come to Saskatchewan, is all a part of the program. The Agtech Accelerator organization is really dedicated to offering opportunities for students."

"For them to come in and participate in events, to come in and learn more about what different companies programs do, so that students have the chance to meet founders, meet entrepreneurs, meet investors and to see people developing new companies in a technical space like that. We hope they really get inspired about what the future career opportunities that they have, might look like either working in a start-up, working in a technical company or maybe founding a company themselves," she says.

Along with the Agtech Accelerator organization and USask professors and students, different agricultural companies from across the world will also be in-



The Phenotype Acquisition and Measurement Machine (PAMM), a robotic imaging platform developed for field crop phenotyping, collects data on wheat, lentils and canola phenotypes. Photo by Tyrone Keep, USask.

volved in the program.

"This new Agtech Accelerator program that they're offering is different than existing incubator programs because there's an investment fund that every single company that applies to be a part of this program, when they come in they will get \$100,000 of investment right away. That's why it's called an Accelerator, it accelerates the company development."

"It's a program where they go to a place to learn, students will have to apply their knowledge to the work. There's companies from Canada as well as the UK, they will do some things virtually on Zoom, or

they will come to Regina and Saskatoon for some parts of the program and the goal at the end is for them to learn how to make their companies successful so that they can seek more investment."

The main focus for the partnership between USask and Agtech Accelerator is to have Saskatchewan as a world centre for agriculture, says Hayden.

"The goal of this Acceleration program is to make Saskatchewan a global location for agriculture technology, to become recognized that this is the place for agriculture."

Continued on Page 32

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USask signs MOU for Agtech Accelerator

Continued from Page 31

"If investors want to come and put money towards Agtech and if companies want to grow and have access to experts in agriculture, that this is the place to be," says Hayden.

"In that partnership, we have formally agreed that the university will contribute some funding to run the program and bring companies here for that program. That we will help those companies in the program find the researchers that they may need to work with at the university, or find research facilities that they may need to work with that only the university has. There are some resources that we have at the university, that some companies and entrepreneurs can't find anywhere else."

"Also the piece about providing access for our students to be exposed to this and

to learn about entrepreneurship in an agricultural space, because we're a big agricultural university and a big agricultural province."

Hayden emphasizes how important and influential this program will be for students who have an interest in a future in agriculture.

"Young people and our students, may not always think about a start up company, and Agtech could be using drones to fly over a field, it could image things and decide where you should put fertilizer. That's an example, or using robots that go over your field and analyze your soil or do tilling for you. So allowing students to see that stuff, there could be an engineering or a computer science student who never really thought that their discipline that they are learning, can be applied to agriculture. That's the agree-

ment between the Agtech Accelerator and us, we'll help them provide some funding and access to infrastructure and they'll help us expose our researchers and students to all of these new and exciting technologies."

She says the program will benefit Saskatchewan's economic development and its overall agriculture industry.

"I think the economy will definitely benefit from this program. When you can draw global attention for this type of work we end up attracting investment into the province. There's venture capital investors that look at Saskatchewan and say 'wow what is happening there, we didn't know what was happening there, we need to be there and look at how we can become involved,' and that turns into investment. Investment into companies, investment in programs, things like that.

That's definitely a benefit for the province itself," Hayden says.

"For producers, hopefully it helps them worldwide if it has a global impact. It was pointed out recently at an event that any technology that reduces costs for producers is best for producers. The way you reduce cost is by reducing inputs, reducing chemicals required and all of those things have net benefits for the environment," says Hayden.

"Anything that we can do to help producers work more efficiently, to save their money, results also in less fertilizer use or less chemical use, or more efficiency like you can be more efficient if you grow more food in smaller areas. These are all things that are positive for producers and they're positive for food security, for farming in general and better for the environment."

Wild pigs on the Prairies:

USask researchers documenting exponential increase

Continued from page 30

"Crop damage is often the biggest economic impact. The U.S. loses 2.5 billion dollars per year just in crop damage alone due to wild pigs," said Brook, who noted the problem is an economic disaster in the making for Prairie producers, if left unchecked. "No question the potential is to get into the tens of millions just in crop damage alone. Disease is harder to estimate in terms of cost, but we do know that when we had mad cow disease, one farm in Alberta had one case and the whole country shut down. So certainly, if we had African swine fever in one wild pig, it would cost millions upon millions to address it. And it's also harder to put a value on wetlands and clean freshwater and ecosystems in general; they are invaluable."

Growing to sometimes more than 600 pounds, wild pigs are aggressive with razor sharp tusks and have been known to attack humans, including a Texas woman killed in her driveway two years ago. Brook also noted a major recall of spinach in California due to E-coli, connected to wild pigs contaminating a field and creating a health risk.

So what's the solution? Brook advocates for a multi-pronged approach to containment, since "we have missed our window of opportunity" to eradicate the invasive species. In an ideal world, Brook's wild pig-containment toolbox would include baiting, trapping, and the strategic removal of wild pigs using helicopters to capture them. Sport hunting is not part of a viable solution.

"(Helicopter capture) is expensive, but it's highly, highly effective," said Brook. "We net them out of a helicopter and that works great because you can cover huge areas."

However, Brook said the biggest problem is we simply don't know how big of a problem wild pigs have become. Brook's current PhD student Ruth Aschim recently led the first and only scientific survey of wild pig expansion in the country—published in Nature Scientific Reports.

"If Canada is going to get really serious about pigs and try to remove some, or at least control them, then you need data to actually tell you if you are winning or if it is getting worse. We just don't know what the population numbers are," said Brook. "Like a wildfire, the cornerstone

for dealing with invasive species is early detection and rapid and aggressive response, and we missed that window.

"It was easy to ignore them through the '90s and the 2000s, but as we are seeing in 2021, you can ignore wild pigs all you want, until you simply can't ignore them anymore. The problem has exploded over a very short timeline and it is painful that all the predictions that we have been making have become absolutely true, in terms of their expansion."

Brook, who calls the uncontrolled spread of wild pigs "an ecological trainwreck," fears it will take a major economic catastrophe or extensive environmental damage to create the impetus to act.

"I believe that a lot of my work with my research

team has really been about collecting data and preparing for a big crisis, and hopefully it's not a major disease outbreak," said Brook. "That's a real concern. African swine fever is a major, major concern and it would be a massive hit to our economy. I think we are just waiting for a big crisis to happen, whether it is an outbreak, somebody being killed by a pig, or a major increase in highway collisions. It is unfortunate if we only see major effort after a major crisis occurs."

"People often ask me what the path forward is, what we need to do," Brook added. "What we desperately need is leadership and a co-ordinated effort. I am happy to talk about the details of which technique is better at finding pigs and which is better at removing them, and that is important. But the most important thing we need is for all stakeholders to come together on this, recognize it is a problem, and deal with it before it is too late."



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Left: Talented photographer Alvin Nixon of the Wapella area took this photo of a Snowy Owl recently. "There seems to be an abundance of snowy owls in our area this year," he says. "We have had many years when we've spotted none in the whole winter."

WSA offering free workshops, helping farmers plan ag drainage projects in changing climate

The Water Security Agency (WSA), with the support of Natural Resources Canada, is offering free online workshops called AgH2Onward to introduce farmers and ranchers to the Agricultural Water Management program in Saskatchewan, the process and benefits of drainage approvals, and innovative techniques to best manage water on their land.

The free workshops are being offered until April 2022 and include two half-day sessions.

The agriculture industry is the backbone of our provincial economy. Being able to manage water effectively has

made significant contributions to our province and can be an important economic tool for farmers and ranchers.

Today, the agricultural community faces the added challenge of adapting to a changing climate. WSA believes there are important opportunities to respond to that challenge - helping producers plan agricultural drainage projects that are adapted and resilient to weather extremes, such as floods and droughts, while increasing productivity.

Producers can learn more and register at agh2onward.ca. You can also find us on twitter at @AgH2Onward.

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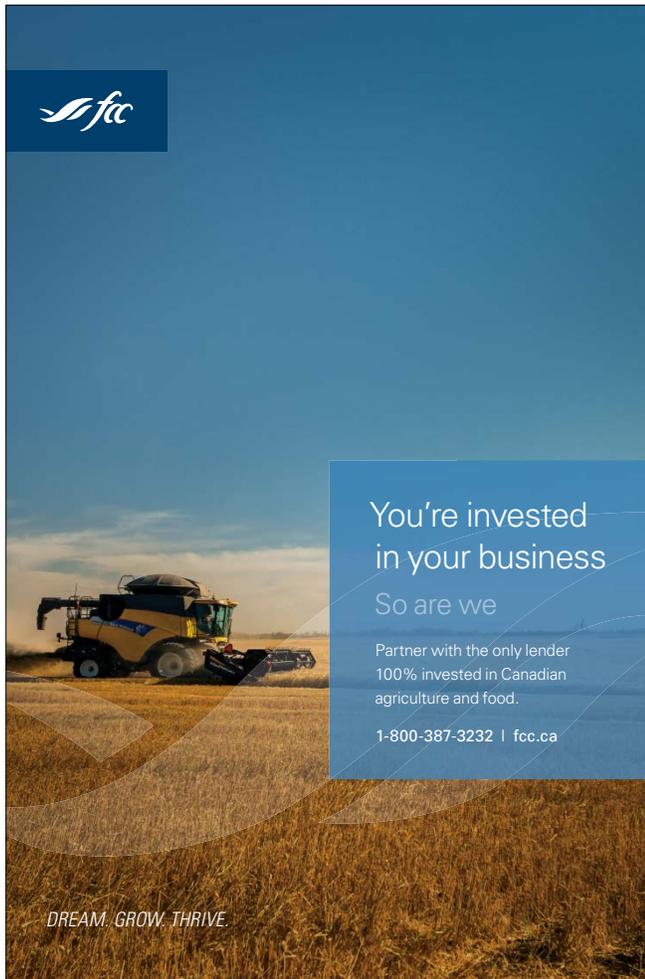


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How gene editing helps farmers and consumers

Health Canada is reportedly likely to treat gene-edited crops differently than genetically-modified crops, or GMOs. That would be the right move.

That means the oversight provided by the Canadian Food Inspection Agency would look very much like what we see for conventionally-bred crops.

This issue is obviously far removed from consumers, but it will certainly affect them.

Genetic modification is different from gene editing. Genetic modification typically involves artificially inserting genes into the genome of a plant or animal. Gene editing can instantly, in a very targeted way, edit parts of a genome by eliminating, correcting or adding sections to a plant's DNA.

Gene editing typically doesn't involve introducing genes from other species, but these techniques allow quite complex control of an organism's genome. With gene editing, many years of research can be saved by doing similar adjustments through conventional breeding.

Biological and anti-GMO enthusiasts will claim both are the same. They simply aren't.

Many countries, including some in Europe, are rewriting regulations for

genetically-modified seeds to reflect what gene editing can do. This biological compromise is different from unnaturally crossing breeds to create a new plant.

This is welcome news for everyone, including consumers who barely understand the ramifications of such a decision.

Gene editing will impact agriculture and make our farms more efficient.

Consumers will benefit from gene editing without realizing it. By making crop production more efficient, yields can increase while using less land, less water and fewer natural resources. Gene editing can make agriculture even more sustainable.

By tweaking the DNA of plants, crops can adapt faster to climate change, a huge boost for a sector highly vulnerable to Mother Nature's wrath. Plants can be designed to resist drought, diseases and pathogens, helping farmers in Canada and other parts of the world where farmers are often impoverished by climate change. Banana production is a good example.

In addition, gene editing can change the nutritional composition of a plant for the better. For plant-based aficionados, protein content in crops can be in-



Sylvain Charlebois

creased to make processing products more efficient and cheaper. Fat content in crops can also be lowered, which would mean less processing for the food we buy.

The food we waste is the one bill we never get but always pay as consumers, and gene editing can help on that front, too. Lettuce, mushrooms and tomatoes would have a longer shelf-life as they could ripen later. Supply-chain woes are shortening the shelf-life of many foods we buy at retail. Gene editing can help.

If you have allergies or intolerances, gene editing can also play a role. For example, non-gluten wheat can make bread and pasta edible for those who suffer from celiac disease. More than three million Canadians say they have at least one food allergy and a million others have food intolerances. Science can make some food less frightening for millions of Canadians. The possibilities are endless.

But gene editing is no

need to appreciate the risks involved with gene editing over time.

The other challenge is transparency. Every day, we're exposed to food products that include genetically modified ingredients without knowing where they are.

Over 75 per cent of food products sold in Canadian grocery stores can contain some genetically-modified ingredients but labels make no mention of it. There's a good chance, for example, that you've eaten genetically-modified salmon without knowing it. That's perfectly legal.

To get consumers to be-

friend technologies that make agriculture more efficient and more beneficial for us all, the least we can do is let consumers appreciate how farmgate practices upstream benefit them.

It's a concern that the majority of consumers don't care about or they don't understand these technologies. For more awareness, identifying genetically-engineered or edited ingredients at retail is the least we can do.

Dr. Sylvain Charlebois is senior director of the agri-food analytics lab and a professor in food distribution and policy at Dalhousie University.

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