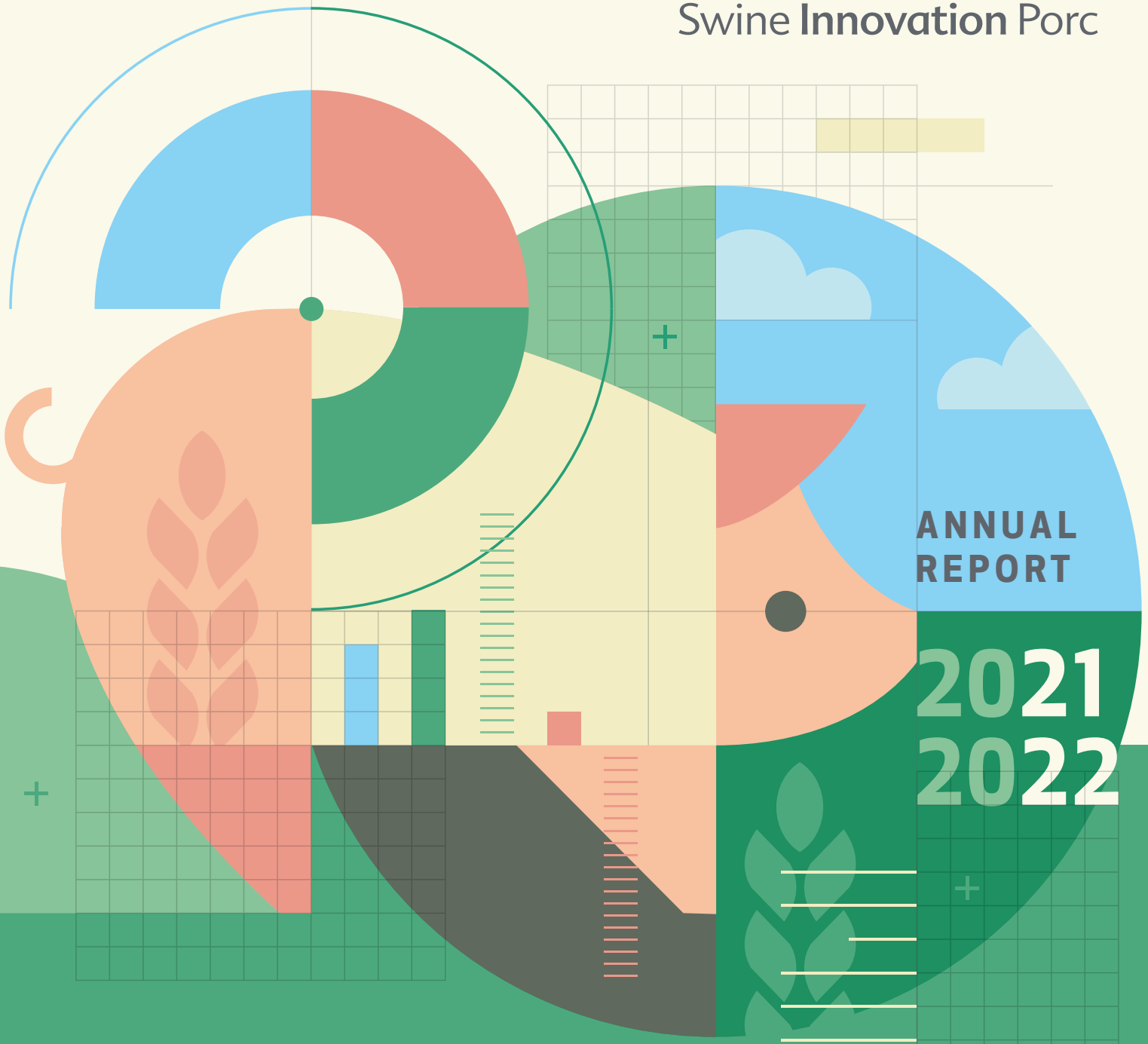
Swine Innovation Porc



ANNUAL REPORT

2021
2022

INNOVATING FOR A STRONGER PORK SECTOR

Swine Innovation Porc

Science into Practice

swineinnovationporc.ca

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Chair of the Science Advisory Body

MESSAGE FROM THE CHAIR 2021-2022

Coming off the second straight year of the COVID-19 global pandemic, the Canadian pork industry continues to face emerging challenges and has responded with innovative thinking and approaches to doing business.

This year, Swine Innovation Porc entered its fourth and final year of Cluster 3, and we are eagerly anticipating some encouraging outcomes for the hog producers our research is designed to serve. Too often, funding for research is funnelled into great projects that require amplification, and by using various communication channels available to us, we hope to improve the knowledge transfer capacities that have served us well in the past but were interrupted on account of COVID-19.

In addition to COVID-related impacts, a changing of the guard, of sorts, has occurred with SIP. Late last year, I came on board as the new Chair, as we said goodbye to Stewart Cressman after his eight years of service. Stewart led this organization proudly and with great skill during his tenure, and I hope to continue down that path of excellence that brings value to our entire sector.

I also recognize the significant contributions of Tim Seeber, who has completed his service as a Board Member and Corporate Secretary. His board position has been filled by Denise Cassidy. The insights, contributions and dedication demonstrated by the entire SIP Board has been an asset to both the organization and industry.

Not only on our Board of Directors, but also within SIP staff, we have experienced some turnover in the past year. Our outgoing General Manager, Abida Ouyed, our outgoing Communications Manager, Leslie Walsh, and our outgoing Research Coordinator, Marie Vachon, have left us to pursue new opportunities, and I wish them all the best.

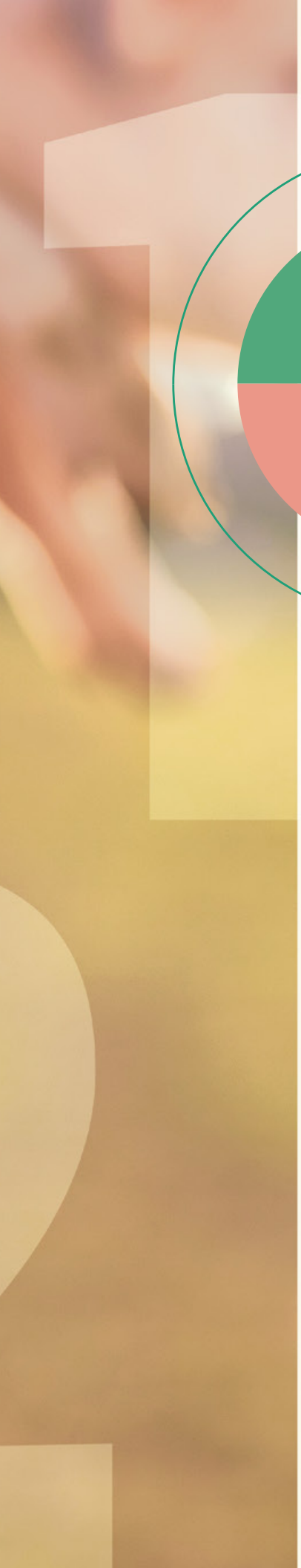
Two-and-a-half cents on every dollar for each pig marketed in Canada supports SIP-directed research, backstopped by additional government support. The price tag for research can be high, but the benefits delivered should be even greater, which is why we have commissioned a return-on-investment (ROI) study to determine how much benefit producers are receiving, thanks to their ongoing financial commitment to our organization. We hope to present positive news on this front in next year's report.

Adaptability has become our primary concern over the past year, as change has forced us into a tight spot. However, in the spirit of scientific inquiry, change and challenging assumptions is fundamental to success. I am confident we will come out of this time period stronger than before, re-oriented in a clearer, more measurable direction that will inform our Cluster 4 activities.

As a farmer myself, this new role has been an exciting and rewarding undertaking. While we are most needed in our barns, we also need to pull up our chairs to the discussion table to help make our voices heard before the research community, establishing positive relationships in the process. Together, we can achieve great things. I look forward to what lies ahead for us!

Yours sincerely,

Arno Schober
Chair



MANAGEMENT REPORT 2021-2022

Swine Innovation Porc has undergone significant operational changes this year. While these changes entailed a period of transition and adjustment, they have also provided the organization with an opportunity to refresh and re-energize its efforts in support of the Canadian pork research community and value chain.

We would like to thank the Board of Directors and SIP team who have provided a steady hand following important organizational staffing changes in 2021-22. The search for a new General Manager was initiated by the Board of Directors in the last quarter of 2022, and this has resulted in the recruitment of Daniel Ramage who will be leading the organization moving forward beginning in August 2022. The SIP team has also taken initiative providing continuity to swine cluster programming and operational activities throughout the year.

During this year's period of change and transition, SIP's Board of Directors, chaired by Arno Schober, has worked diligently to support the coordination of organizational resources and to position the organization for long-term success. Looking forward, under Daniel Ramage's leadership as incoming General Manager, SIP will continue mobilizing efforts to drive collaboration and communication within the pork research community for the benefit of Canadian hog producers.

SIP's effectiveness and resilience is being demonstrated by the organization's ability to navigate this significant change. The organization's advancement will be a focus for our efforts in the year ahead as the SIP team positions itself to meet the industry's needs and priorities for research, especially in response to the upcoming cluster agreement. Our goal is to capture the benefits of innovation for the Canadian pork industry by strengthening collaboration and partnership across the value chain.

RESEARCH AND DEVELOPMENT

SWINE CLUSTER 3 INNOVATING FOR A STRONGER PORK SECTOR

Swine Cluster 3 is a five-year research program (2018-2023) that includes 14 primary R&D projects within five main research areas:

- Animal health
- Animal nutrition
- Animal welfare
- Environment
- Pork quality

The program also includes a significant knowledge transfer component dedicated to communicating results to end users through on-farm demonstration and various communication activities.

Swine Cluster 3 is designed to:

- Accelerate the pace of innovation
- Drive sustainable growth
- Strengthen competitiveness and maximize the resilience of the swine sector

Total budget

$18.5M

$12.7M
Agriculture and Agri-Food Canada

$5.8M
Producers and Industry

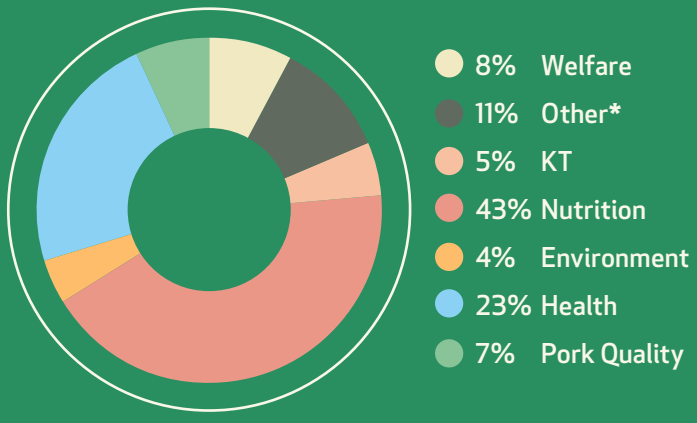
+80
RESEARCHERS

14
PRIMARY PROJECTS

+50
PRIVATE PARTNERS (including provincial pork organizations)

24
RESEARCH ORGANIZATIONS ACROSS CANADA AND AROUND THE WORLD

Allocation of funding



*Includes coordination and fees related to managing the program

SWINE CLUSTER 3
ONGOING PROJECTS 2018-2023

The following projects began in 2018 and the majority of projects will wrap up in 2023. Results will be communicated as they become available, but in the meantime, please visit our website to read fact sheets on each project.

ANIMAL HEALTH

Improved Biosecurity in the Canadian swine Transport Industry – Phase 3
Led by Terry Fonstad, University of Saskatchewan

Improvement of therapeutic and prophylactic measures against porcine reproductive and respiratory syndrome (PRRS) virus through the discovery of antiviral drugs and the use of antimycotoxins
Led by Carl Gagnon, University of Montreal

Pig Gut microbiome project – Characterization of the core gut microbiome associated with pig health and performance: towards fecal diagnostics and microbiome therapy
Led by :
Vahab Farzan, University of Guelph
Andrew Van Kessel, University of Saskatchewan
Ben Willing, University of Alberta

Survivability and infectivity of PED virus in soil
Led by Mario Tenuta, University of Manitoba

ANIMAL NUTRITION

Towards a new feeding approach of neonatal and weanling piglet for optimizing nutritional status, immunity and microbiota and minimizing the use of antibiotics
Led by:
Frédéric Guay, Laval University
Dominic Poulin-Laprade, AAFC (Sherbrooke)

Innovative micronutrient strategies for maximizing piglet's robustness and performance during the pre- and post-weaning periods
Led by Jérôme Lapointe, AAFC (Sherbrooke)

New feeding and management strategies for replacement gilts that will maximize future milk yield
Led by Chantal Farmer, AAFC (Sherbrooke)

Development of novel feed additives to replace antibiotics and promote pig gut health (2 subprojects)

- Biological roles and efficacy of alkaline phosphatases (AP) for improving gut health, growth performance, physiological endpoints and gut microbiome in the weanling pig
  Led by Ming Fan, University of Guelph

- Use of newly selected probiotic bacteria to control enteric infections and improve gut health and performance of piglets
  Led by:
  Joshua Gong, AAFC (Guelph)
  Chengbo Yang, University of Manitoba

Development of innovative strategies to reduce feed costs in the post-weaning period while maintaining optimal performance and health (3 subprojects)

- Examination of the effectiveness of provision of functional amino acids to enhance pig robustness
  Led by:
  Dan Columbus, Prairie Swine Centre
  Vahab Farzan, University of Guelph
  Martin Nyachoti, University of Manitoba
- Strategies for detoxifying vomitoxin (DON) using innovative chemical and biological approaches in post-weaning piglets
  Led by:
  Joshua Gong, AAFC (Guelph)
  Chengbo Yang, University of Manitoba
- Pulse grains and organic acids to control growth performance and health of young pigs
  Led by Ruurd Zijlstra, University of Alberta

Reducing feed cost and the environmental footprint and enhancing global competitiveness of Canadian pork production by increased nutrient utilization of feedstuffs fed to growing-finishing pigs (5 subprojects)

- Nutritive evaluation of Canadian feed crops and their co-products for swine diets.
  Led by Ruurd Zijlstra, University of Alberta
- A comparison of key methodologies used to quantify protein quality in mammals: Ileal digestibility, indicator amino acid oxidation, and in vitro digestibility.
  Led by:
  Dan Columbus, Prairie Swine Centre
  Martin Nyachoti, University of Manitoba
  Kate Shoveller, University of Guelph
- Biological roles and efficacy of novel processive cellulase and exogenous alkaline phosphatase for improving feed utilization efficiency and reducing the environmental footprint in growing-finishing pigs
  Led by Ming Fan, University of Guelph
- Improving nutrient value of soybean meal using characterized novel microbial fermentation
  Led by Julang Li, University of Guelph
- Improve the nutritive value of Canadian feed crops and co-products for swine diets
  Led by:
  Martin Nyachoti, University of Manitoba
  Ruurd Zijlstra, University of Alberta

ANIMAL WELFARE

Effects of long-distance transport on the health and welfare of early weaned pigs
Led by Jennifer Brown, Prairie Swine Centre

Optimizing sow productivity and management: Impact of grouping practices on sow reproductive performance and piglet development and identification of risk factors for sow mortality
Led by Jennifer Brown, Prairie Swine Centre

ENVIRONMENT

Advancing the Canadian swine sector through environmental footprint analyses
Led by Mario Tenuta, University of Manitoba

PORK QUALITY

Classifying Canadian pork based on quality attributes
Led by Manuel Juarez, AAFC (Lacombe)

PROJECTS IN KNOWLEDGE TRANSFER

Enhancing the value of swine cluster research through on-farm demonstration
Led by:
Ken Engele, Prairie Swine Centre
Geneviève Berthiaume, Centre de développement du porc du Québec

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Survey study of small swine producers on their knowledge and application of biosecurity practices for the prevention of disease
Led by Murray Pettitt, Prairie Swine Centre

Porcine epidemic diarrhea virus viability during manure storage in Alberta
Led by:
Javier Bahamon, Alberta Pork

EXPANDING OUR RESEARCH PORTFOLIO

While the Swine Cluster program continues to be a major focus of our activities, we are always striving to find new ways to support projects that will address the industry's needs. The following projects are ongoing and are due to be completed by 2023:

Novel vaccine design as an alternative to antimicrobial use for preventing and controlling the swine and zoonotic agent Streptococcus suis
Led by Marcelo Gottschalk, University of Montreal
Funding provided by AAFC'S AgriScience-Project program and industry partners

Develop tools required to minimize losses to the swine industry in the event of an African swine fever (ASF) outbreak in North America
Led by Aruna Ambagala, Canada Food Inspection Agency
Funding provided by Swine Innovation Porc and partners

RESEARCH HIGHLIGHTS

You will find below highlights from selected projects currently underway within our supported research portfolio. Complete research results from these projects will be published in our 2022-2023 annual report.

ANIMAL NUTRITION

Winning the battle on mycotoxins

Mycotoxins in grain are bad news for pigs. One in particular, Deoxynivalenol (DON), emerges when feed ingredients like wheat, barley, corn and distillers' grains are infected with the crop fungus *Fusarium*. When consumed, DON causes pigs to grow slower and less efficiently.

Chengbo Yang's team at the University of Manitoba, working with collaborators at Agriculture and Agri-Food Canada's Guelph Research and Development Centre, has been exploring alternative ways of combatting DON's harmful effects.

Sodium metabisulfite (SMBS) is a form of salt that is used as a disinfectant, antioxidant and preservative. SMBS can detoxify DON in pig guts, but for it to reach the lower intestine for absorption by the animal, it must first pass through the highly acidic stomach environment, which ends up neutralizing it and rendering it ineffective. One way to protect SMBS against stomach acid is through coating it prior to delivery. In this case, that means using nanofibrous mats, which act as an extremely fine webbing around the SMBS molecules, allowing them to safely pass all the way through to the gut.

Yang's research is currently focused on embedding the nano-coated SMBS molecules within an oil-based substrate of larger microparticles, which could potentially be added into mixed feed for pig consumption. So far, the project has been successful in one trial, but further investigation is required.

PROJECT

STRATEGIES FOR DETOXIFYING VOMITOXIN (DON) USING INNOVATIVE CHEMICAL AND BIOLOGICAL APPROACHES IN POST-WEANING PIGLETS

Led by Chengbo Yang, University of Manitoba

Results expected in 2023

piglets

High-complexity diets prevent diarrhea

Can pigs fed a less-expensive, low-complexity nursery diet stay healthy and grow well? In fact, Dr. Vahab Farzan at the University of Guelph found that pigs fed low-complexity diets for five weeks post-weaning experienced diarrhea more frequently.

Diets that are heavy in carbohydrates like corn and wheat tend to induce diarrhea more than diets containing whey, fish meal and lower levels of plant-based protein. Dr. Farzan's findings show that pigs fed a low-complexity transition diet immediately after weaning may grow slower initially but will compensate for that delayed growth later on, in a less-consistent fashion.

The discussion about whether low-complexity or high-complexity diets are better may come down to a question of cost and disease. While low-complexity diets are cheaper, this research has shown they may cause problems, but the underlying factor that warrants further investigation on-farm is whether pathogens like *Streptococcus suis* or *E. coil* could factor into the diarrhea equation.

Using amino acids in feed to fight disease

Dr. Dan Columbus with Prairie Swine Centre has been looking at the role of amino acids in pig robustness, in four separate investigations – three of which are now complete.

Dr. Columbus' first investigation found that supplementing functional amino acids in nursery diets helps improve the ability for normal birth weight piglets to handle inoculation against Salmonella but not low birth weight piglets. This finding was surprising, as the assumption was that supplementing functional amino acids might have helped low birth weight piglets instead, which was not the case.

Using animal-based sources of protein can help weaners handle a Salmonella challenge, but what about plant-based sources? His second investigation found that supplementing functional amino acids with plant-based diets can also do the job. Animal-based protein improves performance, but it is pricier; however, amino acids did not further improve performance in animal-based diets, suggesting that these are inherently better for pig robustness. This finding could help bridge the gap between costs and effective disease mitigation.

When pigs are infected with Salmonella, intestinal alkaline phosphatase – a healthy gut enzyme – can be harmed. His third investigation has determined that supplementing functional amino acids can help protect this enzyme, controlling inflammation and giving pigs a better chance at fighting off disease.

PROJECT

EXAMINATION OF THE EFFECTIVENESS OF PROVISION OF FUNCTIONAL AMINO ACIDS TO ENHANCE PIG ROBUSTNESS

Led by Dan Columbus, Prairie Swine Centre; Vahab Farzan, University of Guelph; Martin Nyachoti, University of Manitoba

Results expected in 2023

amino acids

Alternative feed ingredients, like faba bean, could provide enhanced nutrition. Photo: University of Alberta

PROJECT

PULSE GRAINS AND ORGANIC ACIDS TO CONTROL GROWTH PERFORMANCE AND HEALTH OF YOUNG PIGS

Led by Ruurd Zijlstra, University of Alberta

Results expected in 2023

Using amino acids in feed to improve gut health

Dr. Martin Nyachoti with the University of Manitoba undertook five separate investigations to measure immune response to supplemented amino acids.

The first two investigations revealed that supplementing Threonine enhanced increased villus height, the number of goblet cells and microbial metabolites in the gut, all of which aid in nutrient absorption.

The third investigation involved supplementing dietary sulfur amino acids – Methionine and Cysteine – to address a lipopolysaccharide challenge. Lipopolysaccharides – sometimes called 'endotoxins' – are responsible for many gut problems, including sepsis, that affect pigs. Testing showed that Methionine failed to benefit immune response, while Cysteine was successful.

In the fourth investigation, Valine was examined to determine its effect on intestinal inflammation for pigs in environments that were more sanitary or less sanitary. In either environment, Valine suppressed inflammation, which is positive.

And in the fifth investigation, a cocktail of amino acids were fed to nursing pigs over a five-week period, determining that this supplementation had a beneficial effect on immune response in weaners by improving protein breakdown and promoting growth.

Characterizing feed ingredients for energy and protein

At the University of Alberta, Dr. Ruurd Zijlstra and Dr. Eduardo Beltranena have been looking at alternative feed ingredients, including faba bean, as sources of enhanced nutrition.

Energy levels and digestibility are the key factors to consider when it comes to growth performance, and by measuring separate strains of faba bean, the researchers were able to determine which types were better than others. They looked at five – some of which contained no tannins, some of which contained medium levels of tannins. These compounds, found in products consumed by both humans and animals, affect mouth feel, creating a bitter sensation. In faba bean varieties, this may affect their attractiveness for pigs and their nutritional value.

What they found is that the variety 'Fabelle,' more than other types, was consumed more readily by pigs and led to the most average daily gain. However, another type, 'Snowbird,' fared best when it came to nutrient digestibility, edging out Fabelle somewhat. When it comes to what would be best to feed pigs at the farm level, the researchers suggest Fabelle had the best overall results, given lower levels of vicine and covicine – compounds that can negatively affect feed intake, specifically.

PPRS anti-viral treatment could be coming

As Porcine Reproductive and Respiratory Syndrome (PRRS) virus continues to take a large toll on the swine industry in terms of animal health and lost revenue, an effective anti-viral treatment for the disease has remained elusive.

Dr. Carl A. Gagnon with the University of Montreal is one researcher pursuing potential solutions to this problem, including the use of *Actinobacillus pleuropneumoniae* ("App") – a pathogen responsible for about 20 per cent of bacterial pneumonia in pigs, causing inflammation of the lungs and, potentially, death.

By studying the co-infection of PRRS and App, which occurs naturally in pigs, it has been demonstrated that heat-resistant App-secreted metabolites have a positive anti-viral effect against the PRRS virus, but, until recently, the specific metabolites responsible were unknown. Gagnon and his co-researchers sought to find out which App metabolites are behind this anti-viral effect, to further isolate and test them.

The researchers began by using mass spectrometry to take a closer look at how a certain PRRS-infected porcine cell line reacts when exposed to App. From previous studies, the researchers knew that low molecular weight App-secreted metabolites were responsible for the desired effect, so they chose specific ones and used targeted spectrometry to measure those. By using untargeted spectrometry, they were able to examine a wider spread of potential culprits.

After analyzing mass spectrometry data, various App metabolites stood out. All of the top-five App-secreted metabolites were adenosine nucleosides, a class of metabolites widely known to have anti-viral properties. Fortunately, many adenosine-based drugs are commonly available to treat other human viruses, with extensive research promoting their use.

PROJECT

IMPROVEMENT OF THERAPEUTIC AND PROPHYLACTIC MEASURES AGAINST PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PRRSV) THROUGH THE DISCOVERY OF ANTIVIRAL DRUGS AND THE USE OF ANTIMYCOTOXINS

Led by Carl A. Gagnon, University of Montreal

Results expected in 2023

The identified metabolites were further analyzed to better understand the concentration at which they are most effective in response to PRRS infection. Three of the five metabolites subject to analysis proved efficient in reducing the growth of PRRS, which is good news, at least in a lab setting.

For application at the farm level, the researchers are uncertain as to how practical it would be, at this time, to begin employing such anti-virals against PPRS, given the required concentration of metabolites. However, confidence remains, given the existence of chemicals similar to products that are already commercially available for treating other human viruses, providing hope that a PRRS anti-viral may be on its way before long.

anti-viral

Study reveals more about PED in manure

When porcine epidemic diarrhea (PED) broke for the first time ever in Alberta, in 2019, the province's fears of its inevitable spread were confirmed. What was not clear – as in many disease outbreak investigations – is the source of how it arrived on-farm.

With PED flaring up in other parts of Canada, and as farmers turn to spreading manure on their crop fields as a way to offset high fertilizer prices, this question has become important to answer. In response, Dr. Qiang Liu with the University of Saskatchewan's Vaccine and Infectious Disease Organization (VIDO) – directed by Javier Bahamon of Alberta Pork – began looking for clues last year, and the findings are now helping to better inform Canada's PED response.

The concern over manure stems from the idea that piglets are highly exposed to manure in the barn, and some of that is ingested. Additionally, when it comes to applying manure to fields, equipment used in the process can be considered fomites – transmission pathways – for the virus.

Using three commercially available pregnant sows from Prairie Swine Centre in Saskatoon, piglets were farrowed and immediately brought into the study. After being fed the lagoon materials, the piglets were observed for diarrhea and mortality over the course of a week, which could potentially indicate PED infection. For a deeper dive, fecal swabs were collected for daily analysis.

Newborn piglets are especially susceptible to PED. Photo: Alberta Pork

Following the trial, none of the piglets showed any abnormal clinical signs, though there was mild diarrhea observed in a few piglets. Diarrhea consistency trended toward the lower end of fecal scoring – toward "soft, pasty like toothpaste, sticks to swabs" – which would not be the case in the event of PED infection, where diarrhea should be seen at the higher, more severe end.

The mild diarrhea was gone after a couple of days, and the piglets completely recovered. Body weight gains were similar among piglets having diarrhea and piglets without diarrhea, further indicating that the diarrhea was not the result of PED but some other factor. Fecal swabs failed to yield any of the virus RNA at a detectable level as well.

In this specific case study, under the conditions in which the lagoon materials were gathered, the researchers concluded that the exposure of these animals to the infected material failed to produce infectivity or clinical signs of PED in the animals themselves.

While the study's supporters are pleased to have gained further insight into PED's lack of infectivity in manure, with consideration given to the time period in which the study took place after the initial outbreaks, the important take-home message for producers is not to rest on their laurels when it comes to proper practices.

Given the limitations of the study, it cannot be absolutely confirmed that PED virus shedding in piglets is impossible when exposed to contaminated manure. Key factors include the length of time following an outbreak and the number of outbreaks in any given geographic area.

PROJECT

SURVIVABILITY AND INFECTIVITY OF PED VIRUS IN SOIL

Led by Javier Bahamon, Alberta Pork

Results expected in 2023

Improving biosecurity in pig transport

Livestock transport presents one of the greatest risks to biosecurity on farms, in assembly yards and in processing facilities. As such, understanding how to better mitigate these risks is a necessary step to prevent the spread of pathogens.

Dr. Terry Fonstad with the University of Saskatchewan has evaluated biosecurity in transport from multiple angles as part of his project, focusing on trailers.

When it comes to cleaning out trailers after unloading pigs, bedding must first be removed prior to washing. Working with Prairie Agricultural Machinery Institute, a battery-powered sweeper and blower unit was tested to pile up used bedding within the trailer for easier removal, avoiding the need to drag a vacuum hose through the trailer, and making it much easier than the conventional method of manual shoveling. Results indicate this method is more efficient and effective than existing forms of bedding removal, providing cleaner trailers to truck wash facilities, which significantly reduces water use and time required.

When cleaner trailers enter truck washes, it opens up the opportunity for automated interior trailer washing. Fonstad also worked with Ontario-based Truck Wash Technologies to design and bench-scale test a system that is capable of automatically and simultaneously washing the exterior and interior of trailers.

Dry-heating or 'baking' trailers post-washing has become an increasingly attractive method of sanitization at facilities where this capability exists. To validate whether this method effectively eliminates pathogens in trailers, and at which temperatures and lengths of time, Fonstad approached VIDO-InterVac to perform field tests, which were unfortunately stalled due to changing priorities, related to COVID-19. However, laboratory findings at VIDO-InterVac suggest that trailer surfaces should be heated to at least 75 degrees-Celsius for at least 20 minutes to ensure pathogen destruction.

PROJECT

IMPROVED BIOSECURITY IN THE CANADIAN SWINE TRANSPORT INDUSTRY – PHASE 3

Led by Terry Fonstad, University of Saskatchewan

Résultats attendus en 2023

With the help of the College of Engineering at the University of Saskatchewan and other stakeholders, Fonstad is also pursuing the development of heat sensors designed to be incorporated into livestock trailers, to further the understanding of pathogen control. This process is ongoing, with several generations of sensors already developed, tested and adapted. In addition, desirable trailer attributes were studied to maximize animal welfare and ease of cleaning, with an ongoing evaluation by Prairie Swine Centre.

While varied, the results of this project overall have received positive support, and the outcomes to date are being readily adopted by industry partners.

transport

PORK QUALITY

New ways to assess pork quality

Canadian pork is appreciated around the world for its high quality. With upwards of 70 per cent of Canadian pork making its way overseas, accurately classifying quality is a necessary step to securing the confidence of several prominent markets, including Japan.

Starting in 2017, Canada Pork – the domestic and global market intelligence and promotional organization for the Canadian pork industry – began investigating how to revamp its pork quality classification system, which was first put in place shortly after Canada Pork was established, in 1991. As international export-reliant competitors such as the U.S., European Union (E.U.), Brazil and Chile all jockey with Canada for pork market share, being able to demonstrate Canadian pork's attributes is crucial.

When it comes to grading pork primals – shoulders, loins, bellies and hams – the main considerations are colour, firmness, marbling and lean-to-fat ratio. Standardized parameters help foreign end-users (buyers) make educated decisions on their purchases, backed by hazard analysis and critical control points (HAACP) protocols in federally inspected meatpacking facilities and national on-farm quality assurance guarantees. The challenge for packers is the effective adoption of a new pork classification system that will integrate neatly with their ongoing daily operations.

Dr. Manuel Juarez with Agriculture and Agri-Food Canada's (AAFC) Lacombe Research and Development Centre has been tasked with researching and commercially testing the viability of an updated pork quality classification system, including cost estimates of different technologies and the development of new tools and approaches, in addition to the modification of existing technologies.

Part of the challenge is the inherent difference between plants of different sizes, in different regions of the country, with different processing capacities. The specifics of how changes to grading would impact carcass line speeds is critical to the adoption of the technologies that would make new ways of grading pork possible.

Some of the technologies being explored include a tool for enhanced subjective evaluation of colour and marbling, including low-cost colourimeters and automated image analysis, along with low-cost spectroscopy devices and imaging technologies to assess marbling. Others yet are focussed on firmness and leanness, with increased attention to the benefits of automation.

While these advances are not yet fully ready to implement, their investigation warrants close consideration in the highly competitive global pork marketplace, in which Canada is poised to lead on the side of export value.

PROJECT

CLASSIFYING CANADIAN PORK BASED ON QUALITY ATTRIBUTES

Led by Manuel Juarez, AAFC (Lacombe)

Results expected in 2023

Pork quality assessment includes colour, firmness, marbling and lean-to-fat ratio. Photo: Canada Pork

R&D FROM 2010 TO 2023: A FEW NUMBERS

Since our beginnings in 2010, Swine Innovation Porc has coordinated three national research and development programs, and supported additional projects that address the industry's emerging issues.

$51M
INVESTMENT

+50
PROJECTS

+100
RESEARCHERS

3
CANADA-WIDE R&D AND KT PROGRAMS

+100
FINANCIAL PARTNERS

+1,450
COMMUNICATION ACTIVITIES

+20,000
EVENT AND CONFERENCE PARTICIPANTS REACHED

Provincial Pork Organizations: Investing in R&D

We are proud to count eight provincial pork producer organizations as members of our organization. Since 2014, these members have been contributing 2.5 cents per market hog to Swine Innovation Porc, which is used to leverage public dollars and multiply investments in R&D that will benefit the industry.

SINCE 2014...

+$4.2M

INVESTED

BY PRODUCER ORGANIZATIONS

$1

FROM PRODUCER ORGANIZATIONS

=

USED TO LEVERAGE AN ADDITIONAL

$8 DOLLARS

FROM OTHER SOURCES OF FUNDING (AAFC + INDUSTRY)

Alberta Pork

BC Pork – Proudly Grown Close to Home

Les Éleveurs de porcs du Québec

Manitoba Pork

Ontario Pork

PEI Pork

Porc NB Pork

Sask Pork

COMMUNICATION & COLLABORATION 2021-2022

As COVID-19 remained a barrier for in-person gatherings for most of the past year, Swine Innovation Porc continued its efforts to reach stakeholders virtually.

However, efforts were scaled back compared to previous years, as personnel changes and other realities within the industry made it difficult for much of the communication and collaboration activities to take place.

Below are some of the highlights in this area from the past year.

POSTER SESSION AT LE PORC SHOW

Swine Innovation Porc once again supported the student poster competition at Le Porc Show, which took place virtually for the second year in a row, in November and December 2021.

The event featured posters from 12 student researchers from across Canada. Cash prizes were awarded to the top-three projects. The virtual posters and videos of oral presentations viewed hundreds of times.

Canada's best-attended pork conference, Le Porc Show, continues to provide a great opportunity to showcase up-and-coming researchers in the industry, and we are confident this partnership will continue.

André Lamontagne, The Quebec Minister of Agriculture, Fisheries and Food

Poster

Poster Session and Student Poster Competition at "Le Porc Show" November and December 2021

RESEARCH ABSTRACTS AT BANFF PORK SEMINAR

Three research projects taking place at the University of Guelph, supported by Swine Innovation Porc, were featured at the Banff Pork Seminar in January 2022:

- Post-weaning diarrhea in newly weaned pigs challenged with enterotoxigenic *E. coli*
- A challenge study to investigate the association between nursery diet complexity and *S. suis* disease
- Soybean meal-based diets, effects on growth performance and health it nursery pigs

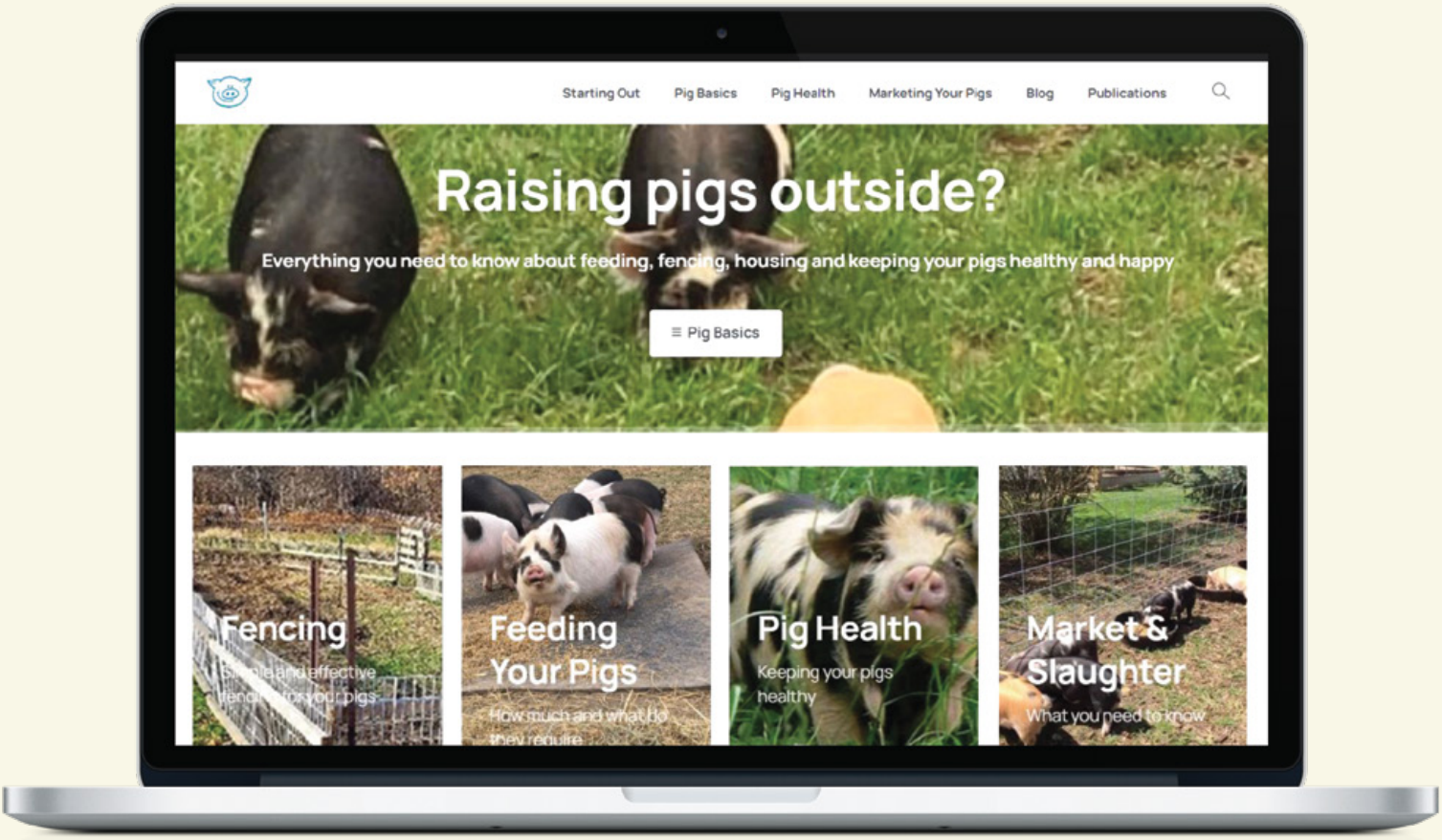
The Banff Pork Seminar returned in-person after one year of being held virtually. Swine Innovation Porc returned this year as a sustaining sponsor. As Canada's oldest pork conference, the Banff Pork Seminar is another premier event within the Canadian pork industry, celebrating its 50th anniversary, in 2022. Our ongoing support of this event will remain strong.

website launched

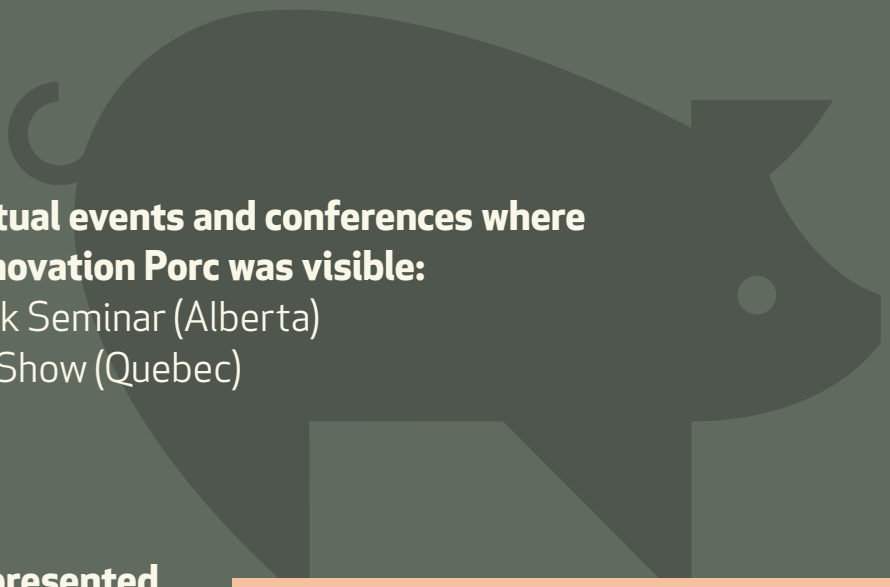
SMALL-SCALE PRODUCER WEBSITE LAUNCHED

Last year, with support from Swine Innovation Porc, Prairie Swine Centre launched a survey of small-scale producers across Canada's main pork-producing regions. As a follow-up to the survey, a new website ***www.smallscalepigfarming.com*** was launched to support small-scale producer engagement.

This new website will be identified as a source of accurate information, allowing small-scale farms to have confidence in the content they choose to seek out.



HIGHLIGHTS OF 2021-2022 COMMUNICATION ACTIVITIES



2 **Major virtual events and conferences where Swine Innovation Porc was visible:**
Banff Pork Seminar (Alberta)
The Porc Show (Quebec)

12 **Posters presented during virtual poster session**

+10 **Canadian news media reports published about supported research**

6 **Featured articles published by Swine Innovation Porc**

SCIENCE ADVISORY BODY 2021-2022

The Science Advisory Body (SAB) is a committee that evaluates the scientific integrity of research proposals submitted to Swine Innovation Porc. Members of the SAB are recognized professionals who are well-known in their fields and represent a diverse range of expertise within swine research. This committee reviews research proposals, offers scientific expertise, gives technical advice and ultimately provides the Board of Directors with their recommendations.

The following individuals are the current members of the Science Advisory Body:

Andrew Van Kessel
SAB Chair
Associate Director - Research
VIDO (Vaccine and Infectious Disease Organization)

Tami Brown-Brandl
Professor
University of Nebraska-Lincoln

Patrick Charagu
Senior Geneticist
Hypor

Michael Ellis
Professor
University of Illinois

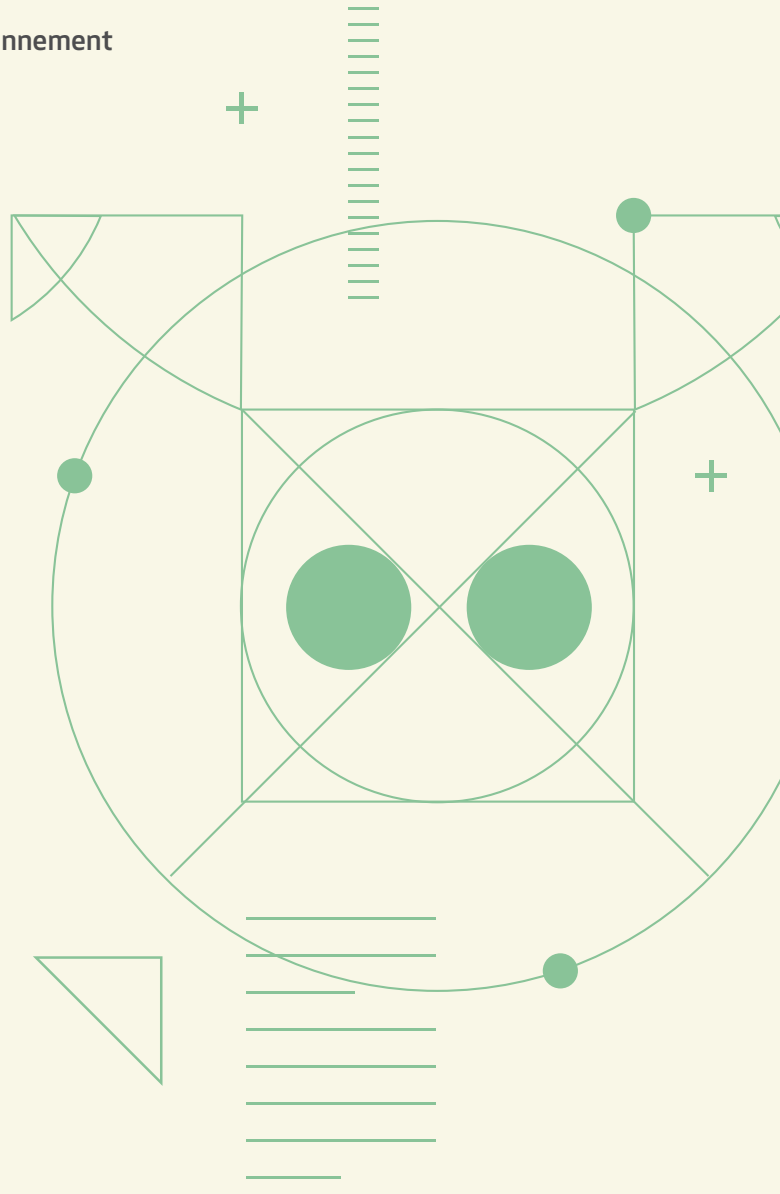
Dan Hurnik
Chair; Professor, Swine Health Management
Atlantic Veterinary College, University of PEI

Nathalie Trottier
Professor
Cornell University

Isabelle Royer
Research Scientist
Quebec Research and Development Centre
Agriculture and Agri-Food Canada

PARTNERS IN RESEARCH

Agassiz Research and Development Centre, AAFC
Alberta Pork
Blue Water Wash
Canada Pork
Canadian Centre for Swine Improvement
Canadian Food Inspection Agency
Centre de développement du porc du Québec
Centre de recherche en sciences animales de Deschambault
CEVA Santé Animale
Guelph Research and Development Centre, AAFC
HyLife
Institut de recherche et de développement en agroenvironnement
Lacombe Research and Development Centre, AAFC
Lallemand Health Solutions
Laval University
Lethbridge Research and Development Centre, AAFC
Luckhart Transport
McGill University
Nutreco
Olymel
Ontario Ministry of Agriculture, Food and Rural Affairs
Prairie Agricultural Machinery Institute
Prairie Swine Centre
Prairie Swine Health Services
Probiotech International
Semican
Shandong University
Sherbrooke Research and Development Centre, AAFC
Sollio Agriculture
St-Hyacinthe Research and Development Centre, AAFC
Transport Genie
University of Alberta
University of California
University of Guelph
University of Manitoba
University of Montreal
University of Saskatchewan
Utrecht University
VIDO (Vaccine and Infectious Disease Organization)
Zinpro



FINANCIAL PARTNERS

Alberta Pork

BC Pork — Proudly Grown Close to Home

Les Éleveurs de porcs du Québec

Manitoba Pork

Ontario Pork

PEI Pork

Porc NB Pork

Sask Pork

Canadian Pork Council
Conseil canadien du porc

Canadian Agricultural Partnership — Innovate. Grow. Prosper.

Partenariat canadien pour l'agriculture — Innover. Croître. Prospérer.

Canada

FINANCIAL PARTNERS

FINANCIAL PARTNERS

ORGANIZATIONS COLLABORATING IN CERTAIN PROJECTS

Agri-Marché
Avivagen
Blue Water Wash
Canada Pork
Centre de recherche en infectiologie porcine et avicole - Scholarship
Centre de recherche en sciences animales de Deschambault
Conestoga Meat Packers
Elanco
Government of Saskatchewan
Greensnow Biological
HyLife
ICOR Technology
Illumina
Industrial Vacuum Equipment Corporation
Luckhart Transport
Prevtec Microbia
Southwest Ontario Veterinary Services
Synergy Swine Inc.
Transport Genie
University of Montreal - Diagnostic Services, Faculty of Veterinary Medicine
University of Montreal - Scholarship
Western Swine Testing Association

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