

Manitoba Researchers Collaborate to Grow the Pork Industry



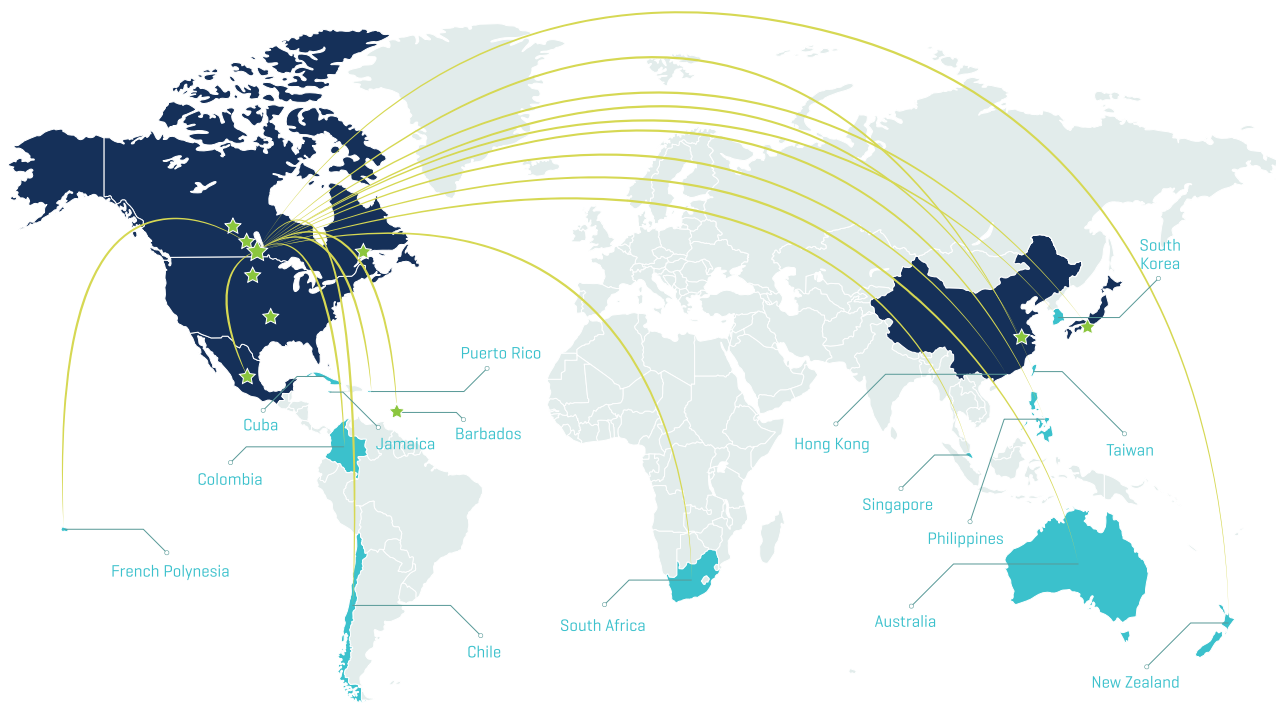
—
*Collaboration in
Research has made
Manitoba a national
and international
leader in pork
production and
management.*



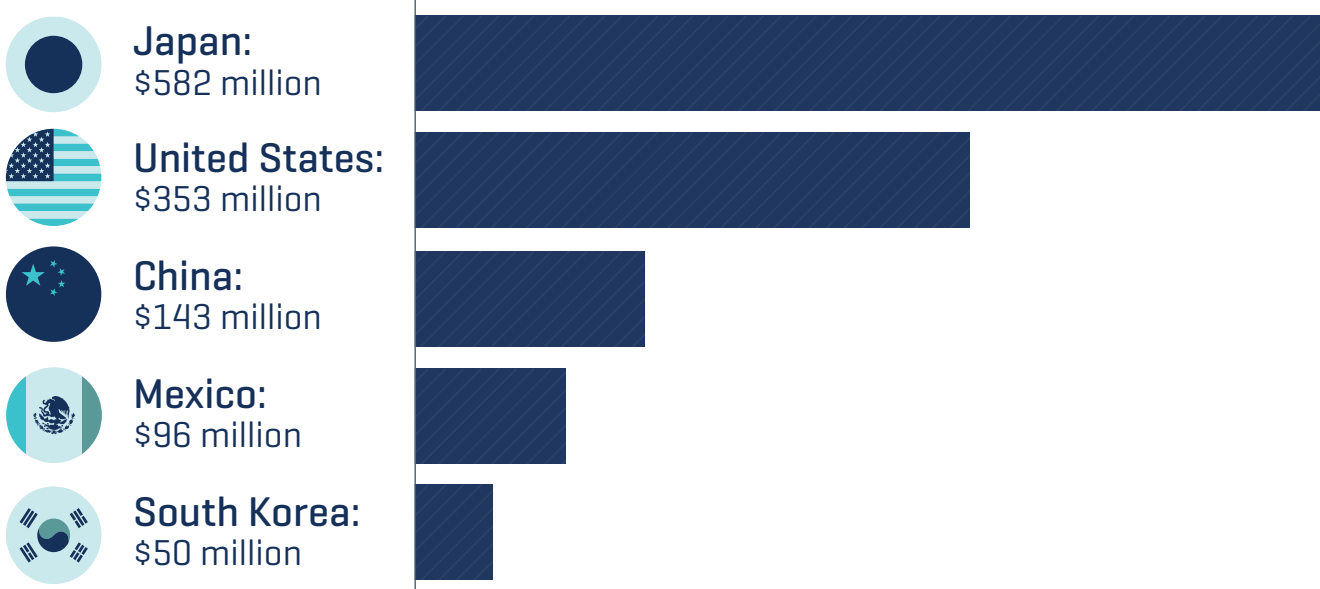
—
*Feeding the world
Creating local jobs
Improving hog care
Improving sustainability
Sharing knowledge
worldwide.*



From Manitoba to the World



Hog and pork exports from Manitoba in 2019:



Global Player

Manitoba produces some of the world's best pork

The pork industry is one of the largest farming industries in Canada. Manitoba leads the country as the top hog producer, marketing 7.7 million pigs in 2019 and accounting for 23.7% of Canada's hog farm cash receipts. The province is a major exporter of pork products, sending over 70% of what is produced to international markets. The top five markets in 2019 were Japan, the United States, China, Mexico, and South Korea. In total, Manitoba's hog and pork exports totaled \$1.3 billion in 2019.

Manitoba is home to several major pork processors, including HyLife and Maple Leaf Foods, that have helped to develop Manitoba's reputation as a high quality pork supplier.

In 2019:

 **7.7 million**
HOGS MARKETED

 **\$1.1 billion**
IN FARM CASH RECEIPTS

 **\$1.7 billion**
IN MEAT AND MEAT PRODUCT SALES

 **\$1.3 billion**
IN EXPORT EARNINGS

 **37**
EXPORT DESTINATIONS

Collaborative research is helping Manitoba's pork industry to compete in the global market

As a leading player in Canada's pork industry, Manitoba has engaged with a network of collaborators to address some of the main challenges and risks facing the industry including:

- 1. Animal welfare:** Consumer expectations and regulatory changes have created the need to convert sow housing layouts away from individual stalls and towards a grouped design, which gives sows the freedom to move around, interact with other pigs, and explore their environment.
- 2. Feeding:** Feed is the single highest cost in the pork production system, compounded by new grouped sow barn environments that create additional challenges in how pigs are fed.
- 3. Manure management:** Researchers are investigating ways to address concerns with manure management including manure storage, treatment, transportation, odour, and manure nutrient balance.
- 4. Biosecurity:** African swine fever has swept through several African countries and spread to central Asia and Europe, and poses an existential threat to the Canadian pork sector if it reaches here.
- 5. Labour shortages:** By 2025, the sector will need over 15,000 workers but about 3,000 of these positions will remain unfilled.¹

¹ https://cahrc-ccrha.ca/sites/default/files/files/Labour-Employment/Swine_reportE.pdf

Better ways to House and Feed Pigs

The care and handling of pigs has changed as the swine industry has evolved

In 2014, the Canadian Code of Practice was updated to allow greater freedom of movement for gestating sows. In response, the National Sow Housing Conversion Project (NSHCP) was formed, spearheading a three-year effort to help producers transition barns to group sow housing.

Manitoba researchers collaborated with experts across Canada, including engineers and behavioural animal scientists to design the new open concept sow housing. To date, thousands of barns have been converted into group sow housing systems.

HyLife converted 3,000 sow farrow to wean gestation crates at the Rosco Farm in Manitoba approximately four years ago, which has served as a prototype of continuous improvement to convert other sow barns in the HyLife production system.

Maple Leaf Foods has already transitioned 50,000 sows [77% of their stock] to an open housed system.



Enhancing the wellness of pigs

Dr. Laurie Connor and her team at the University of Manitoba have led a series of research projects related to sow housing.

The changes in the Canadian Code of Practice requires pigs to have multiple forms of 'enrichment', to enhance their physical and social environments.

Enrichment can be as simple as something for the pigs to chew on, like straw, which has the added benefit of being digestible.

Research shows that pigs who have straw to chew on tend to be less aggressive and show increased growth.

Several pig farms have engaged in extension studies to trial new enrichment strategies, seeing positive benefits in sow behaviour.

 3,000

SOW FARROW-TO-WEAN GESTATION CRATES AT THE ROSCO BARN IN MANITOBA CONVERTED BY HYLIFE.

 50,000

SOWS TRANSITIONED TO AN OPEN HOUSED SYSTEM BY MAPLE LEAF FOODS.

In housing sows together, pig farmers must address how best to feed their pigs, either in a competitive or non-competitive system

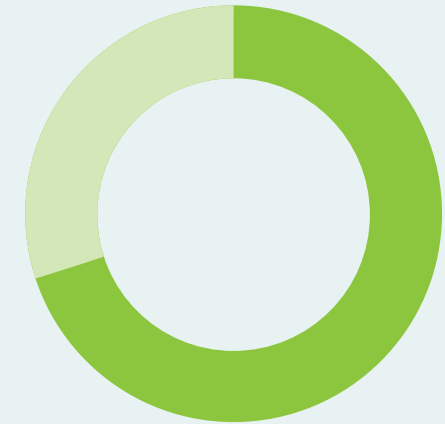
In a Competitive Feeding System

all sows have access to the feed at the same time. While this system has cheaper up-front costs and little training requirements for the sows, dominant sows can steal feed from other sows, leading to uneven feeding.

In a Non-Competitive Feeding System

sows access individual stalls with gates that close behind them. This prevents access by other sows, reducing aggression. A computer reads a tag on the pig and allocates a specific amount of feed. However, some training is required to get the sows to use the feeding system.

Guidelines on how to choose and implement different feeding systems have been developed collaboratively by the University of Manitoba, Manitoba Pork, and the Prairie Swine Centre.



UP TO 70%

OF THE COST TO PRODUCE A PIG COMES FROM FEEDING



Manure Management

Scooping up all the benefits

The average-sized feeder pig produces 10 lbs of manure each day. When scaled up to large farming operations with thousands of pigs, managing manure poses a significant engineering and environmental challenge.

But manure is much more than unwanted waste—it is a valuable and critically utilized resource. Manure is a rich source of nutrients, such as phosphorus and nitrogen. It acts as a natural crop fertilizer that can, in part, replace synthetic ones.

The Manitoba Livestock Manure Management Initiative (MLMMI) was created in 1998 to develop sustainable solutions to manure management. Over \$9 million went into this program, generating 20 years' worth of improvements to the practice. More than 100 projects were funded before the MLMMI was incorporated into the Canadian Agricultural Partnership.

The result: improvements in the handling, application, transportation, treatment, odour, and nutrient management of manure. This includes commercial ready products, new technologies, and information that helps the industry adapt to new legislation and public opinion.

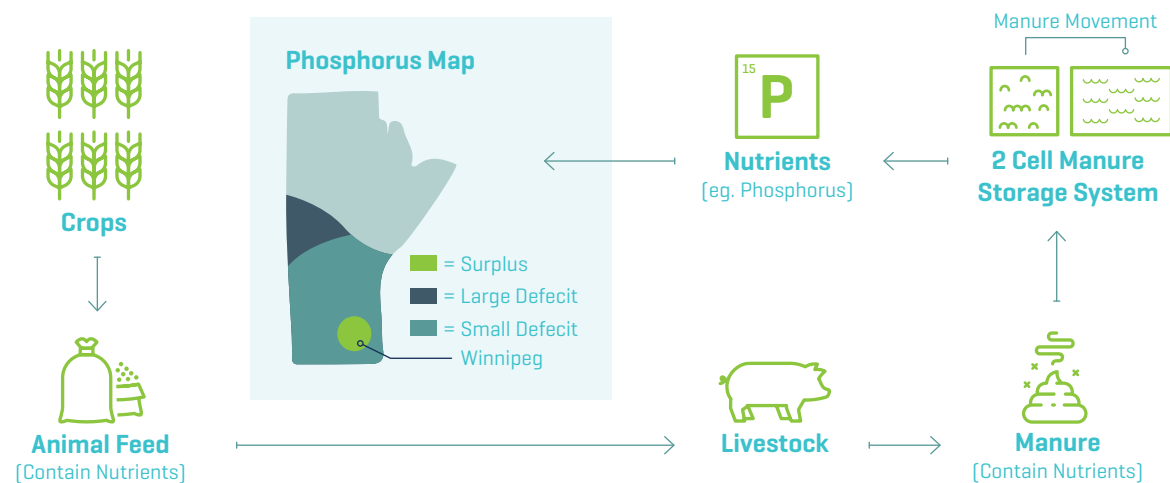
Phosphorus must be just right

The most productive soil has a balanced nutrient profile for its crop: using too little reduces crop yield; using too much wastes money, and the excess nutrients run off into surrounding waters, creating the conditions for algae overgrowth that can choke out otherwise healthy lakes and rivers.

MLMMI research has tackled the issue of phosphorus imbalance, especially deficits, in Manitoba's cropland, creating a phosphorus budget map which identified municipalities that were deficient in phosphorus.

The MLMMI helped to optimize a two-cell manure storage system, achieving a nutrient rich product that can be used to fertilize nutrient deficient fields selectively with phosphorus.

Nutrient Cycle



Biosecurity

Guarding the industry against swine pandemic

Viral outbreaks, contaminated manure, and infected wild boars are only a few of the health threats facing the pork industry. Manitoba pork producers employ strict biosecurity measures to prevent and mitigate the spread of infectious diseases from impacting hog populations. Manitoba plays a vital part in developing new practices and methods to improve the biosecurity and health of pigs.

One of the most alarming potential threats to Manitoba's hog industry is the African Swine Fever (ASF) virus, which has swept across Africa, and multiple Asian and European countries.



In fighting a pandemic, rapid testing is key

Today, African Swine Fever testing is performed on tissue samples within government labs, a time-consuming process.

At the Canadian Food Inspection Agency lab based in Winnipeg researchers are developing a new test that can be done in pig barns using saliva samples.

The technology is now being trialed by pork processing companies, including field testing in international locations such as Vietnam, Australia, New Zealand, Mexico, and the United States.

This advance will help close a critical gap in preventing and mitigating an ASF outbreak in Canada.

Mitigating Animal Health, Supply Chain and Human Financial Impacts

Although humans cannot contract the African Swine Fever, certain strains have a 100% mortality rate among pig populations. If ASF is discovered in Canada, it has the potential to interrupt trade—a crisis that would disrupt 70% of pork production, the proportion that is exported from Canada every year.

ASF Mortality Rate



100%
FOR SOME STRAINS OF ASF

HyLife

Leading Canada in production and innovation

HyLife is a one of the top pork producing companies in Canada. Headquartered in La Broquerie, Manitoba, it also has a major processing facility in the province, located in Neepawa. The company is vertically integrated, producing and processing over 3 million hogs each year, exporting to 20 countries, and supported by 3,500 employees worldwide. HyLife's dedication to sustainability, coupled with innovations and control in all steps of pork production, ensures a premium pork product with a strong reputation globally.

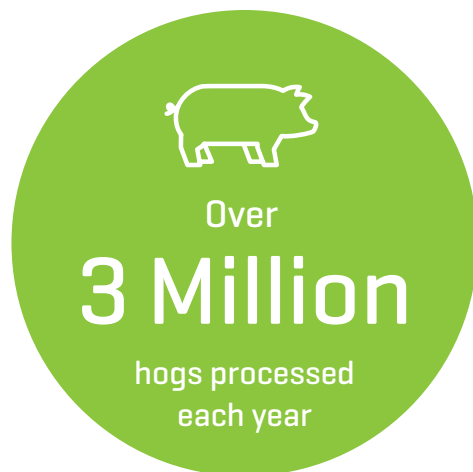
An important new and expanded market opportunity rests in Asian markets, especially in China.

HyLife utilizes the resources of the Food Development Centre (FDC), located in Portage la Prairie, Manitoba, to develop products that are better suited to the Chinese market.



"The next 100 million people eating fresh chilled pork in the world live in China."

— Guy Baudry
CHIEF OPERATING OFFICER, FOODS DIVISION,
HYLIFE

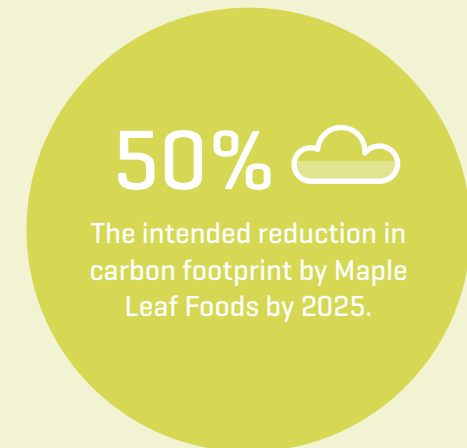


Maple Leaf Foods

A holistic food company

Maple Leaf Foods is one of Canada's flagship food companies. Their roots go back 100 years and today, they are one of Canada's largest food processors. Recently, the company has launched a robust sustainability platform, covering not only the environmental impact of the company but also worker health and safety, animal welfare, and community engagement. Maple Leaf Foods is the first Canadian food company to declare a position to become carbon neutral. By 2025, the company intends to reduce its carbon footprint by 50% from the 2014 level.

While Maple Leaf Foods is best known for meat products such as pork, they have diversified into other markets by embracing meat alternatives. One of these alternatives is plant-based proteins, a rapidly growing market. The approach will help ensure a more balanced food supply—good for the planet—and good for the profitability and sustainability of one of our most important protein food producers.

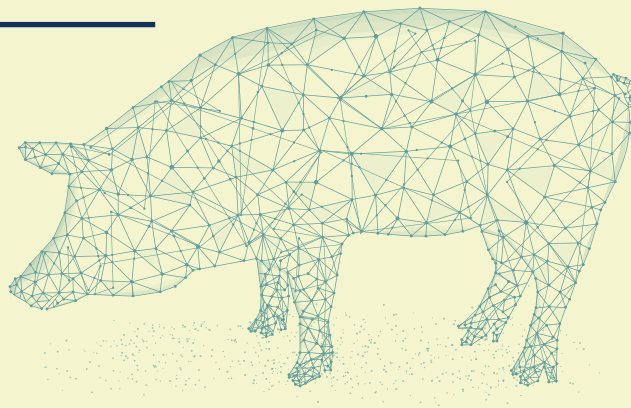


On the Horizon

Innovation continues to pave the way toward a sophisticated pork production system

For every \$1 invested into research, \$4.10 was returned per pig, per year in Canada's pork industry

Manitoba's contribution as part of the Canada-wide collaborative network of pork researchers has helped propel the progress and profits of the pork industry.



Harnessing the power of data to improve decision making. New initiatives underway include:

Artificial Intelligence

AI is a new tool coming to the pork industry, aimed at improving pig welfare, sustainability, and cost efficiency of pork production. Using cameras, microphones, accelerometers and other measures on pigs, artificial intelligence is rapidly tracking pig behaviour and detecting sickness and aggression, which allows farm operators to quickly intervene. This also paves the way for precision pork farming, an approach that optimizes production in a way that considers the contribution of each individual animal.

Pig Microbiome Research

The pork industry is taking cues from human health researchers, as producers look to the gut health and microbiome of pigs. The gut microbiome consists of all the microbes—from bacteria to fungi—that naturally live in the pig's gut. They help break down food and block the growth of pathogens, improving the immune system—and more. As the pork industry works toward understanding the pig microbiome, it guards the industry against health threats such as pandemics, but also positively impacts multiple aspects of pork production.

“The combination of market access to premium markets, cost competitive live production and processing costs, coupled with innovation has made HyLife a globally sustainable system.”

— Guy Baudry
HYLIFE

Pork Research is highly Collaborative

There are two aspects to research:

- 1) Knowledge generation — doing the research and developing solutions, and
- 2) Knowledge transfer — sharing solutions in practical ways so the industry can take full advantage.

In most Canadian pork research projects, you will find a lead and several collaborating institutions involved from other provinces and cities. Pork research involves governments, universities, sector organizations, and industry. This network performs industry-relevant research that benefits the sector, addressing its challenges, and helping to achieve sustainable growth.

Canada's highly collaborative and far-reaching network is key to transferring knowledge across the country and around the world. This knowledge transfer increases the uptake of research findings, ensuring that research creates impacts and stays relevant to the needs of the industry and end users. It also facilitates early adoption of new technologies and practices, ahead of competitors.

Swine Innovation Porc has 3 Swine Research Clusters

\$11.7 million

INTO 14 PROJECTS BY CLUSTER 1
BETWEEN 2010-2013

\$19.7 million

INTO 20 PROJECTS BY CLUSTER 2
BETWEEN 2013-2018

\$18.5 million

GEARED TOWARDS DRIVING INNOVATION AND
SUSTAINABLY INCREASING THE COMPETITIVENESS AND
RESILIENCE OF THE SWINE SECTOR BETWEEN 2018-2023

Canada's network includes:

1. Provincial pork organizations (nine of them), which represent 7,000 pig farms:
 - a. BC Pork
 - b. Alberta Pork
 - c. Sask Pork
 - d. Manitoba Pork
 - e. Ontario Pork
 - f. Les Éleveurs de porcs du Québec
 - g. Porc NB Pork
 - h. PEI Pork
 - i. Pork Nova Scotia
2. Canadian Pork Council (in Ottawa) has board representatives from those nine provincial organizations
3. Swine Innovation Porc (national research coordination body in Quebec) that is responsible for coordinating much of the research conducted by this collaboration network
4. Prairie Swine Centre (Saskatchewan), an inter-provincial research institution connected with the University of Saskatchewan
5. University of Manitoba
6. Industry (e.g., Hylife and Maple Leaf Foods)
7. Government (Agriculture and Agri-Food Canada, Departments of Agriculture from all provinces and territories, and the Canadian Agricultural Partnership)

Manitoba Pork

\$10 million

INVESTED OVER THE
LAST 20 YEARS

RESEARCH MANITOBA

A201 CHOWN BUILDING
753 MCDERMOT AVENUE
WINNIPEG, MB R3E 0T6

T: 204-775-1096

F: 204-786-5401

E: INFO@RESEARCHMB.CA

RESEARCHMANITOBA.CA

THIS REPORT WAS MADE POSSIBLE WITH FUNDING RECEIVED FROM THE GOVERNMENTS OF CANADA AND MANITOBA, THROUGH THE CANADIAN AGRICULTURAL PARTNERSHIP



SOURCES

STATISTICS CANADA

MANITOBA AGRICULTURE AND RESOURCE DEVELOPMENT

MANITOBA PORK. SECTOR PROFILE AND STATISTICS. AVAILABLE AT: [HTTPS://WWW.MANITOBAPORK.COM/ABOUT/SECTOR-PROFILE-STATISTICS](https://www.manitobapork.com/about/sector-profile-statistics). [ACCESSED: 7TH APRIL 2020]

MANITOBA PORK. TRADE & ECONOMICS. AVAILABLE AT: [HTTPS://WWW.MANITOBAPORK.COM/ABOUT/SECTOR-PROFILE-STATISTICS/TRADE-ECONOMICS](https://www.manitobapork.com/about/sector-profile-statistics/trade-economics). [ACCESSED: 29TH OCTOBER 2020]

DEVORE, S. PIG MANURE MANAGEMENT. FARMINENCE [2018]. AVAILABLE AT: [HTTPS://FARMINENCE.COM/PIG-MANURE/](https://farminence.com/pig-manure/). [ACCESSED: 14TH APRIL 2020]

NATIONAL SOW HOUSING CONVERSION PROJECT. WHAT IS THE NSHCP. AVAILABLE AT: [HTTPS://GROUPSOWHOUSING.COM/WHAT-IS-NSHCP/](https://groupsowhousing.com/what-is-nshcp/). [ACCESSED: 20TH JULY 2020]

ROY, C. ET AL. EFFECTS OF ENRICHMENT TYPE, PRESENTATION AND SOCIAL STATUS ON ENRICHMENT USE AND BEHAVIOUR OF SOWS WITH ELECTRONIC SOW FEEDING. ANIMALS 9, 1-17 [2019]

GEDDES, G. CODE - RELATED RESEARCH AN ENRICHING EXPERIENCE NSHCP GROUP SOW HOUSING. HYLIFE - ROSCO BARN. 21057 [2016]. AVAILABLE AT: [HTTPS://GROUPSOWHOUSING.COM/PRODUCER/HYLIFE-ROSCO-BARN/#PLAN](https://groupsowhousing.com/producer/hylife-roscobarn/#plan). [ACCESSED: 14TH AUGUST 2020]

NSHCP. NATIONAL SOW HOUSING CONVERSION NEWSLETTER. 1, 1-8 [2017]

COSTARD, S. ET AL. AFRICAN SWINE FEVER: HOW CAN GLOBAL SPREAD BE PREVENTED? PHILOS. TRANS. R. SOC. B BIOL. SCI. 364, 2683-2696 [2009]

STANDAERT, M. 'UNSTOPPABLE': AFRICAN SWINE FEVER DEATHS TO ECLIPSE RECORD 2019 TOLL. THE GUARDIAN [2020]. AVAILABLE AT: [HTTPS://WWW.THEGUARDIAN.COM/ENVIRONMENT/2020/MAY/27/UNSTOPPABLE-AFRICAN-SWINE-FEVER-DEATHS-TO-ECLIPSE-RECORD-2019-TOLL](https://www.theguardian.com/environment/2020/may/27/unstoppable-african-swine-fever-deaths-to-eclipse-record-2019-toll). [ACCESSED: 23RD JULY 2020]

MAPLE LEAF. SUSTAINABILITY: BETTER PLANET. AVAILABLE AT: [HTTPS://WWW.MAPLELEAFFOODS.COM/SUSTAINABILITY/BETTER-PLANET/](https://www.mapleleaffoods.com/sustainability/better-planet/). [ACCESSED: 28TH AUGUST 2020]

PRAIRIE SWINE CENTRE. CORE VALUES AND BELIEFS. AVAILABLE AT: [HTTPS://WWW.PRAIRIESWINE.COM/CORE-VALUES/](https://www.prairieswine.com/core-values/). [ACCESSED: 26TH JUNE 2020]

AMEIS, DUSTIN AND SOMMERSELL, NECOLE. 2020. RESEARCH MANITOBA. THE SIGNIFICANCE OF COLLABORATIVE RESEARCH IN PROMOTING SUSTAINABLE GROWTH IN MANITOBA'S PORK INDUSTRY. WINNIPEG, MB

PREPARED (2020) BY: DUSTIN AMEIS AND NECOLE SOMMERSELL.

