Proceedings
of the

22nd LONDON SWINE CONFERENCE

March 5-6, 2024

www.londonswineconference.ca

PROCEEDINGS

of the

LONDON SWINE CONFERENCE

Edited by

J.H. Smith

March 5-6, 2024

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Welcome to the 2024 London Swine Conference!

French writer and politician, Victor Hugo once said "change your opinions, keep to your principles; change your leaves, keep intact your roots". This annual event was started in 2001 by Ontario Pork, the University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs and has continued to evolve with our dynamic swine industry. Over its long history, the London Swine Conference has aimed to provide a program that delivers a blend of technical and practical information that can be applied now or in the future for the betterment of our businesses.

Change is a difficult thing for most of us to manage. ne thing I have learned is that while it can be frightening, change also opens doors and allows in new opportunities to learn. We're fortunate in the swine industry to be supported by a wide range of experts who are dedicated to helping us reach that next level. As a committee, we have brought together a talented group of international speakers for this year's London Swine Conference, and I hope you're as excited as I am about the opportunity to learn from them.

Over the next two days, we'll discuss the market outlook, new technologies, health challenges, explore different farm practices and plan for the future of your business. I urge you to participate in our main sessions as well as a wide range of workshops — both are a chance to learn from informative speakers as well as from each other. Take advantage of the peer-to-peer learning in these sessions and during networking breaks. For more peer-to-peer learning, be sure to visit the hospitality suite at the end of an information-packed day.

I would like to thank the London Swine Conference committee. It is a pleasure working with all of you and the quality of this conference speaks volumes to your expertise and dedication. Thank you as well, to all of those attending the conference, and for the work you do to help grow high-quality, great-tasting and safe food for the world.

Greg Simpson
Steering Committee, 2024 London Swine Conference

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Program Development

We greatly appreciate the ideas and input from the industry participants who attended the program development meeting on May 18th, 2023, or sent ideas and suggestions directly to the planning committee.

thank you!

LSC
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Thank you to all our sponsors and participants for investing in the future of our industry by supporting the London Swine Conference.
We look forward to seeing you again in 2025!
- The London Swine Conference Organizing Committee

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Day 1: Main Sessions

THE GOOD STORY OF LIVESTOCK

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Sustainability, Global Warming, Climate Change, Efficiency, Wall Street, Carbon Credits, & Greenhouse Gases: What do they have in common?

They are just words, but they are being used to communicate all around us today. What are you communicating to those around you? Are you the one telling your personal story? Are you allowing someone else to talk about what you do to feed the world?

Farmers have two of the most important jobs that exist today:

1. Nourishing the world
2. Sustaining our planet by capturing emissions

We attend many conferences and shows, like this one today, to learn how we can become better versed in nutrition, production, genetic selection, reproductive decisions, and how to manage or attract our labour force. How much time do we spend at these conferences talking about gaining new consumers? We decrease the supply of pork by increasing the demand for pork, thus driving more opportunities for our families to enjoy the same way of life that many of us have been able to enjoy. This is creating our future instead of producing a product and expecting it to sell to someone we likely don't even know. This does not fit with the overall goal of sustainability. What is the real definition of sustainability? According to Webster's:

- Capable of being sustained.
- Of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged. sustainable techniques.

When we think about the story we tell, we tend to spend even less time talking about sequestering gases from our environment. Much of the discussion in this area is focused on excretion and not retention of these gases. Farmers can capture, recycle, and sell these credits to those that do not have the ability to do so. The sale of carbon credits is an opportunity that is directly in front of us today in this space, and some livestock producers have started taking advantage of this. As we have focused our time on being better at producing livestock in a more efficient manner, we have also reduced our footprint. This is a message that we need to get closer to the consumer.

How have we changed our message as we have become more sustainable? There is a powerful message to add to the carbon capture area of our industry and couple that with the innovation that occurs at the farm level. When you wake up in the morning to go care for your animals, are you thinking about the person that will consume what you produce? Most are not, and I am going to encourage you to do so. Many consumers don't think about farmers either, but why wouldn't you change that? What do you want your customers to know about you and your family? Do you want them to know that you are one of 300,000

people that work in Canadian Agriculture who supply 100% of the nourishment they will receive today? You are not just producing pork; you are providing nutrients to people that don't have the ability to do it themselves. While you are producing nutrients, you are also doing your part to reduce your environmental footprint through your farming practices. Producing food is a noble cause often downplayed by those around you. Without you, there is no sustainability, there are no carbon credits to be sold, and there is no one planning the future. It is time to start talking about your farm, your impact, and your industry. The average meal travels 3,000 km to reach your plate in Canada. Did you know that almost 100% of the ingredients used in the feed for pork production start within 200 km of where we are sitting? Do your friends know that much of the pork consumed here is produced here? What other industry can make those statements? Dr. Pearse Lyons used to say, "When you have purpose and passion, you have a why and when you have a why, you have a how." Why do you do what you do? How are you going to tell others about pork? You have a powerful story to tell – go tell it to anyone that will listen.

HORSES, ZEBRAS AND HOOFBEATS! NEW AND RE-EMERGING DISEASES IN THE SWINE SECTOR AND FINDING TOOLS TO MANAGE THEM

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INTRODUCTION

Veterinarians are taught that when we hear hoofbeats, think of horses not zebras! This is sage advice to help maintain a diagnostic process based on probabilities. Vets and stock people will continually hone observation and pattern recognition skills. We all question what we see, question what we feel and experience and in fact continue to question until a diagnostic conclusion is made. This status quo type of approach works most of the time, but not all of the time! If I come across a nursery pig that has died suddenly with organs that have tiny hemorrhages or slightly enlarged lymph nodes, I will be requesting tests to confirm a *Streptococcus suis* infection. This would be the most likely outcome of the diagnostic process 99% of the time. However, sometimes, there ARE zebras that have hoofbeats that really sound just like horse hoofbeats! On our list of other diagnoses to consider are African Swine Fever (ASF) and several other viral or bacterial infections. The outcome of missing a diagnosis of ASF, a reportable Foreign Animal Disease, could be catastrophic for the Canadian swine industry. In this article, I will summarize some of the emerging "zebras" that could be found on farms, and that collectively we should be watching for.

Streptococcus equi subspecies zooepidemicus (Strep zoo)

This opportunistic bacterial infection has been slowly emerging as a new disease to Canada, now having been found on 5 farms in Western Canada since 2019. Strep zoo has been identified in Europe, Asia and the USA. Farms should suspect Strep zoo if they see rapid onset of very sick animals, abortions and high mortality in older growing animals and mature breeding stock. Healthy appearing animals first thing in the morning can be dead in the afternoon! While infection is generally quite responsive to antibiotic treatment, the herd immunity does not seem to build quickly on a farm, and losses will continue indefinitely. Attempts to use autogenous vaccines to prepare replacement animals for dealing with immune challenges have failed. All farms that have been infected to date will ultimately end up depopulating. The epidemiologic approach to determine sources of primary infection continues, however there is mounting evidence that stock people can become asymptomatic carriers and subsequently infect pigs.

Porcine Sapovirus Diarrhea

Added to the assortment of viruses and bacteria that cause neonatal diarrheas, Sapovirus has been identified on several farms across the country and is reported to be present in 66% of piglet diarrhea cases at diagnostic labs in Western Canada. We also will find Sapovirus in pigs that do not exhibit diarrhea, so there is much to learn about this disease. Sapovirus diarrhea can look like many other diarrheas including Rotavirus and coccidiosis diarrhea, being pale yellow and quite watery. Sapo typically affects pigs 10-14 days of age which often

grow slower and become slightly hairy. No commercial vaccines are available, but we can have autogenous vaccine manufactured using mRNA technology for this viral diarrhea. Early indications from farms using the mRNA vaccine appear quite promising.

Circovirus (PCV2/PCV3)

PCV2 is not a new disease, having first been diagnosed in Canada in the mid-90's and virtually every pig born in Canada is now vaccinated for PCV2. We are starting to see more farms where virus continues to circulate, and mild clinical signs appear despite being vaccinated. We do know that subtypes PCV2d and mixed infections (PCV2a/b/d) have emerged and perhaps current vaccines may not be fully protective. On the other hand, PCV3 (same family but different virus altogether) is also found on many farms but does not always act like a pathogen. Most farms do not recognize clinical signs (in this case, mummified piglets, weak piglets, reproductive failures) while being positive to PCV3. The prevalence of PCV3 appears to be increasing and farms that are identifying viremic pigs are finding higher levels of virus present as well. Again, much to learn!

Senecavirus A Virus

This virus causes mild lameness and occasional piglet diarrhea. In some affected herds, PWM has reportedly increased to 30-70% for a short period, but SVA has relatively low mortality in other stages of production. SVA is a very big deal because it is a vesicular disease (blister type lesions) that appear very similar to reportable diseases like Foot and Mouth Disease and Swine Vesicular Disease. Blisters appear 2-6 days after infection and resolve within 7-14 days. So far it has mainly been found in cull sow assembly yards, where it creates significant problems for exporting animals to the USA for slaughter. There are reports of more recent farm infections in Quebec that are concerning for the swine sector. Obviously, one cannot transport animals exhibiting lesions of a FAD, nor healing lesions. Vets and producers must be ever vigilant in watching for vesicles in their herds and contact CFIA if you find them. To date, there are no commercial vaccines available however various research groups have been able to show effective protection with experimental vaccines.

Astrovirus Type 3 and Astrovirus Type 4

Astrovirus Type 3 has been identified in the USA from both sows and young pigs exhibiting neurologic signs consistent with Central Nervous System lesions. These include hind limb weakness progressing to 4 leg paralysis, rapid breathing and convulsions. While very rare, and not diagnosed in Canada, this is another virus to watch out for.

Astrovirus Type 4 has been linked to viral respiratory diseases in pigs. Studies are underway to demonstrate causation in respiratory cases, however, AV4 has been found in viral pneumonia lesions. Coughing, sneezing and laboured breathing are common respiratory signs on some farms, and AV4 should be a consideration, particularly if the usual culprits like Mycoplasma and Influenzas are ruled out.

Tracheitis

Here is an interesting syndrome that has been identified in Eastern Canada for several years while there have not been any documented cases in Western Canada. Characterized by a "honking" cough in 10-50% of young growing pigs. Most pigs recover with antibiotic and

anti-inflammatory treatment leaving a 1-3% mortality rate. On postmortem exam, the tracheal lining is thickened with deep red hemorrhagic lesions. Veterinarians and researchers have not been able to determine a consistent pathological cause.

CONCLUSION

This article is by no means exclusive and many other swine diseases exist in other regions and countries that we will keep on our radars. One of the limitations to early identification of an emerging disease is our research and diagnostic laboratories testing technology. We can only test for what we "know" in that a diagnostic lab has a menu of pathogen tests available on request with (hopefully) positive or negative outcomes to guide our diagnostic conclusions. If clinical signs are observed in a farm, and the "typical" causative pathogens are tested for and are negative, how do we explain the clinical signs? Consideration to sample type, sample handling, sample contamination or testing technology limitations can impact our ability to identify pathogens. In many instances, we also rely on histologic evaluation of tissues to determine if what we observe at the macroscopic level (what we see in the barn, on post mortem examinations) is consistent with microscopic evaluation as well. New technologies, like next-generation sequencing, may facilitate much earlier identification of new, novel of unsuspected pathogens, but these are not readily available to the swine sector. One also needs to be careful using a PCR positive result to conclude the diagnosis. "PCR Diseases", those that we can find a positive PCR test result, but don't always indicate a true conclusive diagnosis. For example, poor management can often explain clinical signs or bad performance outcomes, but a PCR positive result may be the easier path to draw a conclusion and be used to guide a health plan in the short term!

The very nature of biology and the structure of our industry and society will continue to present farms with new pathogens. When we hear hoofbeats, we should first think horses, but we cannot forget zebras exist!

SOURCES CITED:

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Swine Health Information Center: https://www.swinehealth.org/

RISK MANAGEMENT – WHAT DOES IT MEAN AND WHY?

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The evolution of the modern family farm operation has changed dramatically over the past 20 years. Through a combination of internal growth and external consolidation, today's farming operations are bigger and more capital intensive than ever before. The adoption of technology has added to this growth and productivity. This has occurred at each level from labour right through to the end production. As today's modern commercial farming operation grows, so too does the capital involved in operating a successful business and with that comes the inerrant increase in risks. Production, albeit likely the most important, is just one of the risks today's commercial farm business owners must deal with. They are also responsible for many other risk factors such as labour, biosecurity, transportation, storage and input purchases. When all these risks are accounted for, the business owner still faces the risk of marketing their hard-earned production. Next to production, marketing is one of the largest risks a farm owner faces. A sound marketing strategy could mean the difference between a profitable year or a losing year. To help mitigate marketing risks, business owners can *Hedge* both inputs and outputs in an attempt to reduce their market price risk, stabilize returns, and lock in profits.

The goal of my presentation is to highlight the importance of a proper risk management plan and show how critical marketing and risk management has become in today's farming business.

My talk will focus on what does "Hedging" mean and why commercial farm businesses "Hedge". I will explore what a "Marketing Strategy" should entail and discuss each step of that marketing plan. I will then highlight specific areas of "risk" and provide ideas on how to mitigate them.

PROCESSING CAPACITY

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Is Ontario a good spot to raise hogs? Is Ontario a good spot to process hogs? What are the factors that have led to our current situation with limited shackle capacity?

Looking back 10 years ago to 2014, our situation in the Ontario sector has changed significantly! In my presentation we will do a rewind to 2014 and review this crazy year for our industry and jump forward to 2024 as we emerge from a tough 2023 for our sector. We will cover the dynamics that have influenced the markets over the last 12 months as well as an outlook for the coming year and next 10 years for our Ontario industry. We will review our current processing picture for Ontario hogs, as well as some new emerging processor desires such as Group Sow Housing (GSH) and California Prop 12/Massachusetts Question 3 compliance.

RECRUITING AND RETAINING A GREAT TEAM

Kristen Cumming
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OVERVIEW

This session is ideal for supervisors and managers who want to make a great match when hiring and provide the foundations for long term, productive retention. The audience will come away with a four-part model that they can apply to all elements of the employee experience.

CONTENT

Dennis C. Kinlaw's seminal work *Coaching for Commitment* provides organizational leaders with a four-part model to structure the employer - employee relationship with a view to high commitment, productivity, and retention.

Clarity

1. Employees require clarity about organizational direction, goals, and objectives and need to understand their role and accountability within that

a. In the recruitment process, managers are challenged to ensure that position descriptions accurate define role and accountability and provide adequate clarity to structure job interviews and assessments in order to determine candidates' suitability

b. Throughout the employee experience, managers must ensure that employees are clear about how they matter within the organization and how their role evolves as the business environment shifts and changes

Competence

2. Employees must have the knowledge, skills, resources, and time to perform work, they must be adequately challenged, and supported to grow and develop within their work

a. In the recruitment process, managers must discern what knowledge, skills and abilities they require and which they can develop in role, they must consider how they will onboard new employees to ensure they are safe to meet the expectations of their role and engaged to govern their own learning

b. Throughout the employee experience, organizations can improve engagement and productivity by investing in employee development to ensure that the talent pipeline is full and employees are bringing increasing value to their roles

Influence

3. Employees with a sense of ownership and autonomy are more engaged and committed in their roles

a. In the recruitment process, hiring managers must assess the degree to which employees demonstrate engagement and influence in prior roles and in the screening process

b. Throughout the employee experience, influence captures the value represented by discretionary decision making within the prescribed limits of the role. Managers who create space for employees to have a sense of ownership and influence will distribute decision making and autonomy to the degree that they can.

Appreciation

4. Appreciation captures the degree to which managers take account of effort. This recognizes the individual's context and circumstances, and the sense of belonging that the organization creates for employees. It includes feedback on performance and recognition that give employees clarity about how their contributions advance the organization's mission.

BIO

Kristen Cumming's career is focused on improving the connection between people and their work. She has spent the past 20 years as an educator, trainer and consultant specializing in learning, leadership, retention and high performance teams. Her experience is complemented by a Bachelor of Arts degree in Economics and a Master of Education degree in Workplace and Adult Learning. She is a product of an Albertan farm family and continues to work in agriculture in Canada and the US.

Day 1: Workshop Sessions

MANAGING HEALTH TO IMPROVE PERFORMANCE

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Health management plays a key role in being profitable as a swine producer. Aspects of health management that ensure good reproductive performance, consistent pig numbers at all stages of production as well as good growth contribute to steady, more predictable outcomes and ultimately profitability.

There are a number of economically important swine diseases. Many pig diseases are controlled by a combination of minimizing disease challenge and maximizing individual and herd immunity.

When faced with any of these swine diseases there are different considerations for action. The first would be living with an endemic disease; generally these pathogens are ones that survive in the environment and would be difficult to eliminate and are often thought to be very prevalent (e.g. Strep suis). Second would be to consider elimination of certain diseases; these would be pathogens that tend to have significant impact in an outbreak situation and prolonged impact if left in a herd (ie. PRRSv). Third would be the prevention of pathogens entering into the herd in the first place (i.e. Biosecurity).

We are living in an ever-changing world, we attempt to get smarter with how we manage and control certain pathogens, however, the pathogens are also getting smarter. We'd like to take the opportunity to share with you some updated modifications of tools and strategies to better control these economically important diseases.

Of particular interest is the use of Strep suis autogenous vaccinations and how proper sampling techniques combined with advances in identifying virulent strains and innovation in manufacturing have seen vast improvements in outcomes.

We would also like to share some modifications to our typical PRRSv elimination strategy to be successful in kicking out the virus while preserving sow herd parity structure to the best of our ability.

When thinking of herd biosecurity, it serves us well to put some serious thought into how gilt replacements are entered and how pigs are marketed or culled with regards to transportation.

Achieving and maintaining healthier pigs is one of the most important impacts on long term viability within our industry.

THE POWER OF POOP – GETTING THE MOST OUT OF MANURE

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SUMMARY

Handling manure is a cost associated with the livestock portion of the farm business. Good manure management in crop production helps to minimize that cost.

Manure adds a layer of complexity to fertilizer management, but it also provides benefits to crops that commercial fertilizer on its own cannot provide. Using 4-R nutrient management strategies that consider manure source (liquid/solid), right timing and rate of application, as well as the right place/placement of manure, will provide the highest value of manure nutrients for the crops on your farm.

This presentation will provide an overview of strategies that will help maximize the nutrient value of manure on your farm. Starting in the barn, we will consider how diet, manure additives and other factors impact the composition of manure entering the storage. Storage size, design and management will further affect manure nutrients before they are land applied. Management of manure application to cropland will determine the value of the nutrients and potential cost savings for fertilizer as well as environmental risks associated with nutrient losses. This presentation will balance logistical or economic considerations that can result in compromising maximum economic value of manure for other benefits. For example, timing of application to reducing soil damage from compaction on wet or heavy-textured soils, or application timing where manure can be applied to fields further from the storage. Finally, some of the soil health benefits provided from using manure and/or organic amendments.

MANURE STORAGE MANAGEMENT

With average hog manure composition around 97% water and with land application costs at a cent and a half per gallon, water significantly impacts the economics of manure. Keeping extra water out of manure maintains higher nutrient concentrations and reduces time and cost of field application.

Manure value can be improved by keeping water out of the storage by:

- Covering the storage
- Re-diverting rainwater (i.e. eavestroughs)
- Re-directing water around the farmstead
- Separating solids / recycling water (e.g., flush systems)

There is a large variation in manure composition between livestock types. Within species, nutrient composition is influenced by many factors including diet/ration, bedding and storage and weather (precipitation and temperature). Soluble nutrients are highest in the liquid (urine) portion of manure while insoluble nutrients are primarily found in solids (feces). Figure 1 illustrates the distribution of nitrogen, phosphorus and potassium between the feces and urine. Manure value could be maximized in an ideal situation where livestock urine would be kept separate from feces. Bacterial urease from feces promotes the breakdown of urea in urine to ammonia and makes it more vulnerable to volatilization both in storage and during application.

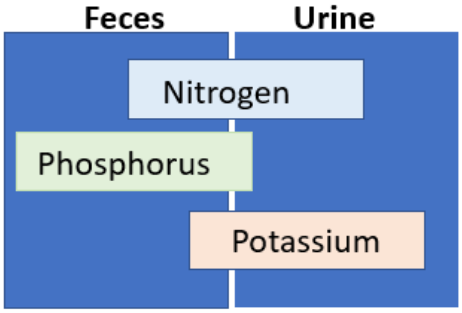

Figure 1: Distribution of nutrients between feces and urine
Source NRCS

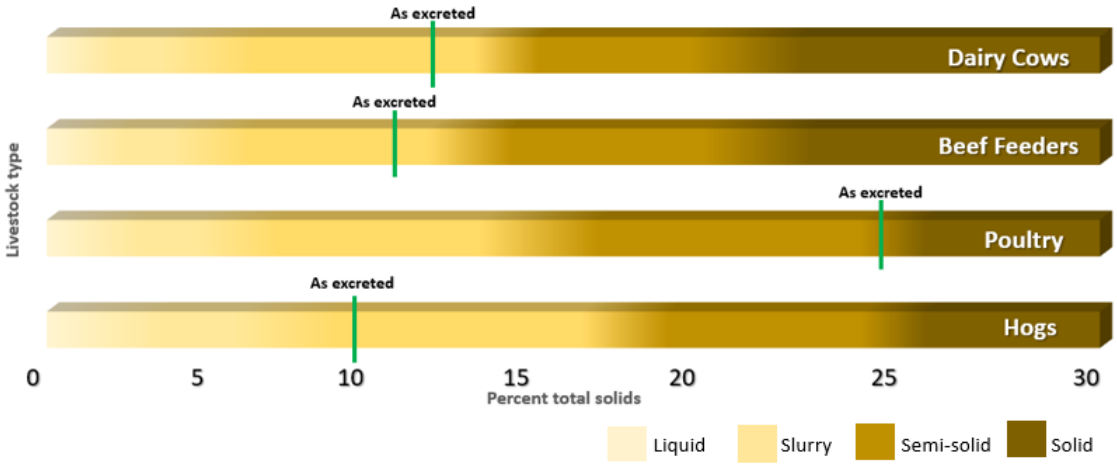

Figure 2: Handling characteristics of manure by solids for various livestock species
Source MWPS – Manure Characteristics

MANURE SAMPLING AND ANALYSIS INTERPRETATION

It's difficult to economically manage what you don't test.

When is the best time to take a manure analysis? When taking a manure sample what should be analyzed? What do the results of the various tests tell us about nutrient availability in the manure?

- Dry matter
- Total nitrogen and Ammonium nitrogen
- Total phosphorus
- Total potassium

- Micronutrients (sulphur, calcium, zinc, magnesium, manganese, boron)
- pH
- Carbon-to-nitrogen (C:N) ratio
- Total salts and sodium
- Organic matter

Table 1: How does swine manure on your farm compare?

Category/ DM Range	***Average DM (%)***	***Total N (%)***	***Total NH_4-N (ppm)***	***Total P (%)***	***Total K (%)***	***# Samples***
Composite	3.4	0.38	2490	0.11	0.19	3983
10-18% DM	12.4	0.80	4597	0.33	0.34	105
6-10% DM	7.5	0.65	3878	0.23	0.30	500
4-6% DM	4.9	0.52	3272	0.16	0.26	615
2-4% DM	2.9	0.36	2432	0.10	0.20	1291
0-2% DM	1.2	0.21	1592	0.04	0.12	1472
Nursery	2.37	0.26	1653	0.07	0.17	25
Farrowing sows	1.99	0.24	1591	0.07	0.12	562
Weaners	2.87	0.30	2000	0.11	0.22	187
Finishers	5.93	0.52	3195	0.15	0.28	921
Farrow to finish	3.67	0.41	2824	0.105	0.21	151
Dry sows/boars	2.56	0.26	1712	0.09	0.14	229

WHERE DOES MANURE FIT IN CROP NUTRIENT PLANNING?

Considerations:

- What is the soil fertility status of the cropped fields?
- How much nutrient is being removed over the period of a rotation?
- Where in the rotation is manure added?
- Where in the rotation is commercial fertilizer added?
- At the end of a rotation, how much change is there in soil fertility status?
- When is it more economical to sell or trade manure?

TIMING OF APPLICATION TO MAXIMIZE NUTRIENT AVAILABILITY

Liquid and solid manure composition affects nutrient - but especially nitrogen – availability. Timing of application will affect how much nitrogen is available to a subsequent crop of corn or wheat. What are the factors that influence availability of all nutrients, but especially nitrogen? What impacts nutrient losses and when are those losses a concern?

Some of the strategies for determining proper nitrogen rates of commercial fertilizer for corn or cereal crops can also be used when utilizing manure with commercial nitrogen.

- Timing of application
- Incorporation
- Placement
- Nitrogen credits
- Use of nitrogen inhibitors
- Weather

Finisher Hog Manure Example

Note: P=P205, K=K20

Cost of Fertilizer	N 28%	MAP	P 60%	lb of N	lb of P	lb of K
per metric tonne (delivered) -->	$ 470.00	$ 1,100.00	$ 710.00	$0.7614	$0.7985	$0.5368

Manure test	Finisher Hog					
	N	P	K	$ of N/gal	$ of P/gal	$ of K/gal
lbs per 1000 gallons -->	32.4	27.5	30.3	$0.0247	$0.0220	$0.0163

minus the application cost --> $20.00 per 1000 gallons (hauling & app)

Application rate --> 4000 gal/ac

lb of N	lb of P	lb of K
130	110	121

MANURE NUTRIENT VALUES

$0.0629 / gallon
$151.83 / acre (spring)
25.92 lbs loss of N (20%) in spring
$132.09 / acre (fall)
51.84 lbs loss of N (40%) in fall

Note: only includes first year values for NPK, excludes multi-year, organic matter and micro-nutrient values

Farrowing Sows Example

Note: P=P205, K=K20

Cost of Fertilizer	N 28%	MAP	P 60%	lb of N	lb of P	lb of K
er metric tonne (delivered) -->	$ 470.00	$ 1,100.00	$ 710.00	$0.7614	$0.7985	$0.5368

Manure test	Finisher Hog					
	N	P	K	$ of N/gal	$ of P/gal	$ of K/gal
lbs per 1000 gallons -->	16.2	12.9	13	$0.0123	$0.0103	$0.0070

minus the application cost --> $20.00 per 1000 gallons (hauling & app)

Application rate --> 4000 gal/ac

lb of N	lb of P	lb of K
65	52	52

MANURE NUTRIENT VALUES

$0.0296 / gallon
$28.58 / acre (spring)
12.96 lbs loss of N (20%) in spring
$18.71 / acre (fall)
25.92 lbs loss of N (40%) in fall

Note: only includes first year values for NPK, excludes multi-year, organic matter and micro-nutrient values

Compiled using AgriSuite manure calculator www.agrisuite.omafra.gov.on.ca and manure sample database. http://www.ontario.ca/page/available-nutrients-and-value-manure-various-livestock-types

NEW TECHNOLOGY

What are some of the new features in manure handling that may improve the economics and/or logistics of manure handling?

- Strategies to improve 4R (time and place)
- Strategies for reducing GHG emissions
- Strategies for moving manure (i.e., from high fertility fields to low fertility fields)
- Application equipment (i.e., frac tanks, pipelines, toolbars, robotics etc.)

MANURE AND SOIL HEALTH

- Soil health = adding carbon. Where does manure fit?
- Solid manure vs liquid manure
- Microbial diversity – (adding diversity vs feeding diversity)
- Synergy with liquid manure and cover crops

FEEDING THE FERRARI: PRACTICAL TRANSITION FEEDING FOR THE HYPER-PROLIFIC SOW

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ABSTRACT

There are many approaches to transition feeding for the sow. In North America, a common feeding strategy during the transition period is to provide a fixed amount of gestation diet with a constant nutrient composition until the sows are moved to the farrowing facility and then a fixed amount of lactation diet is provided until farrowing. Thereafter, daily feed allowance is typically increased via a step-up program until feed is provided *ad libitum* or semi *ad libitum.* Such a feeding strategy is convenient from sow flow and feed management perspectives, but does not adequately match the changing nutrient and energy requirements of the sow with dietary supply. Refining the transition feeding program does not necessarily require extensive renovations, precision feeding equipment and additional feed lines, or major alterations to sow flow. In this paper, we will discuss alternative feeding approaches during the transition period for the hyper-prolific sow as well as practical implementation strategies for a variety of farm scenarios.

INTRODUCTION

The 'transition' period is defined as the last 5 to 7 days of gestation and the first 3 to 5 days of lactation, and encompasses substantial changes in the physiology and nutrient requirements of the sow (Theil et al., 2022). However, based on animal flow and feed management logistics, differing definitions of the transition period may be implemented in specific systems. During the transition period, the nutrient and energy requirements of the sow both increase substantially to support exponential fetal growth, mammary development, and colostrum and milk production. For example, during the peri-partum period, energy and amino acid requirements increase by approximately 60 and 150 %, respectively, for milk production alone (NRC, 2012; Tokach et al., 2019). More specifically and compared to day 104 of gestation, energy and amino acid (lysine) requirements increase by over 200 and 300%, respectively, by peak lactation (Feyera and Theil, 2017). Therefore, energy and amino acid requirements increase in differing proportions, whereby greater emphasis should be placed on providing additional amino acids during the transition period.

In North America, a common feeding strategy during the transition period is to provide a fixed amount of gestation diet with a constant nutrient composition (low in energy and protein) until the sows are moved to the farrowing facility and then a fixed amount of lactation diet (high in energy and protein) is provided until farrowing. Thereafter, daily feed allowance is typically increased via a step-up program until feed is provided *ad libitum* or semi *ad libitum.* In this scenario, the 'transition' is highly dependent on animal flow and the day of gestation that sows are moved into the farrowing facility. Moreover, the approach to the step-up program after farrowing could vary substantially among farms. Overall, the

simple switch between dry and nurse sow diets in the transition period corresponding to sow movement in the facility reduces the likelihood of mistakes, and doesn't require advanced (expensive) feed delivery equipment or multiple feed bins and feed lines. In this paper, we will discuss alternative feeding approaches during the transition period for the hyper-prolific sow as well as practical implementation strategies for a variety of farm scenarios.

Bump Feeding

Bump feeding is a relatively popular feeding strategy for increasing nutrient and energy intakes of sows during late gestation (e.g., after gestation day 85) and is relatively easy to implement on-farm with either a standard drop-feed system or electronic sow feeders. In Ontario, over half of producers have implemented some variation of a bump feeding strategy; in the United States only about 10% of producers continue to utilize bump feeding. Generally, in this scenario, sows are offered a larger amount (usually an additional ~1 kg) of the same dry sow diet that was also used in the earlier phases of gestation. However, it is important to note that since amino acid requirements increase to a greater extent than do energy requirements during the transition period, it is not possible to meet both energy and amino acid requirements by providing an additional allocation of the same diet. Consequently, bump feeding has provided varying results in the scientific literature with some researchers detecting very minor differences for litter birth weight, variation in piglet body weight at birth, or subsequent lactation performance but relatively consistent increases in gilt and sow body weight gain during late gestation (e.g., Gonçalves et al., 2016; Mallmann et al., 2018, 2019a; Araújo et al., 2020). For example, in gilts, bump feeding (27 to 83 % above control) increased body weight and condition score with minor impact on reproductive performance (0.5 fewer piglets born alive, and greater stillborn percentage in a single gestation cycle; Mallmann et al., 2019a) but reduced the proportion of light-weight piglets at birth (Mallmann et al., 2019b). Other researchers have observed improvements in piglet body weight at birth when bump feeding gilts and parity 2 sows specifically (e.g., Shelton et al., 2009; Soto et al., 2011), while reduced sow mortality due to lameness and prolapses was associated with bump feeding on farms in the Midwestern United States (Paiva et al., 2023). Moreover, Cloutier et al. (2023) noted no benefit of bump feeding across two reproductive cycles. In some cases, feed intake during lactation was reduced for gilts that received a bump feeding program during late gestation (Shelton et al., 2009; Mallmann et al., 2019a) but in others, bump feeding minimized backfat loss in lactation and improved lactation feed intake and milk output (based on litter gain during the first three days of lactation; Ampode et al., 2023). Therefore, when using a bump feeding strategy, sow body condition should be carefully monitored to ensure that excessive body fat accumulation does not occur.

In scenarios where the turnaround time between emptying and loading the farrowing room is constrained, focusing efforts on adapting the feeding program during the last few days of gestation could still provide benefits to the sow. Farrowing is an energy-demanding process, thus providing additional energy to the sow immediately prior to farrowing is a strategy to reduce farrowing duration and improve offspring survivability (Nielsen et al., 2021). Indeed, providing additional calories via cane sugar (250 g) 18 hours after farrowing induction tended to reduce farrowing duration, farrowing assistance, and stillborn rates (Oliveira et al.,

2020). In addition, piglets from the supplemented sows had greater colostrum intake and greater body weight gain in the first 24 hours after birth (Oliveira et al., 2020). Moreover, greater energy supply (feed intake) in the last week of gestation can reduce farrowing duration, stillbirth rates, and required farrowing assistance (Feyera et al., 2021), though both excessive feed intake and constipation (e.g., due to low feed intake and/or low dietary fiber contents) may cause physical blockage of the birth canal leading to negative farrowing outcomes. Conversely, increasing the frequency of meals (i.e. four daily meals of 0.67 kg versus a single meal of 2.7 kg) upon moving sows to farrowing crates on day 113 of gestation reduced piglet pre-weaning mortality (Gourley et al., 2020). Indeed, it has been shown that farrowing duration is strongly affected by time since the last meal whereby farrowing duration was 4 hours if onset occurred within 3 hours of the last meal but farrowing duration increased to 9 hours due to energy depletion if farrowing started 8 hours after the last meal (Feyera et al., 2018). Thus, it has been suggested that sows should receive at least three meals daily in the days leading up to farrowing.

Overall, it appears that the response to bump feeding depends on the original plane of nutrition, the amount of extra feed provided, and parity. The inconsistent response to bump feeding in the scientific literature highlights the importance of matching the feeding program (nutrient and energy supply) to the underlying biology of the sow during the transition period. Therefore, alternative methods for transition feeding should be considered.

Top-dressing

The simplest and non-technical way to alter the nutrient profile of a feeding program is to top-dress. That is, providing an additional ingredient or supplement on top of the standard ration that is already being provided to the sow. Top-dressing can be completed by hand or by using a dosing system in an electronic feeder. In the latter example, the second electronic feeder hopper can be filled by hand, since only a small amount of the top-dress will be delivered to each sow each day, or a second feed line could be installed to automate the process.

The additional ingredient used for the top-dress can vary based on the farm objectives. An obvious recommendation is to provide a good source of protein (amino acids) and to a lesser extent, energy (e.g., soybean meal). In this case, only relatively small amounts of the protein source need to be added, but care should still be taken to ensure that sows do not become over-conditioned. For example, adding a cup (~200-250 g) of soybean meal to the daily ration offered to sows in late gestation would provide an additional five grams of digestible lysine and 400 kcal of net energy, which is sufficient to meet estimated amino acid (lysine) requirements, without providing excess amounts of energy (less than 10% additional energy; NRC, 2012). The amount and type of top-dress necessary will depend on the original dry sow feeding program, the parity of the sow, and the performance level of the herd, so it is best to make feeding program adaptations in small increments while assessing changes in sow body condition.

Phase Feeding

Depending on sow flow and feeding system, phase feeding is another option for altering the nutrient and energy supply at different rates to sows during the transition period. This strategy is still practically constrained by the number of different diet 'phases' that can be implemented on farm, most commonly limited to two different diets which allows to feed by stage of gestation (e.g., early vs late gestation) or parity [young females (gilt, parity 1) vs older females (parity 2+)] but not both (young versus older females in early gestation plus young versus older females in late gestation). One advantage of phase feeding over bump feeding is the opportunity to adjust either daily energy or amino acid intake. An increase in energy intake in late gestation has demonstrated benefits and detriments (i.e. increased sow body weight and stillborn rate) while greater amino acid intake can reduce piglet pre-wean mortality with no evidence of negative impacts on the sow or offspring (Gonçalves et al., 2016). Others showed that stillborn rates in sows were reduced by 2.3 percentage points when 18.5 g/d (versus 11 g/d) of standardized ileal digestible lysine was offered from day 90 to 110 of gestation (Thomas et al., 2018). Over two reproductive cycles, phase feeding amino acid supply by stage of gestation improved piglet body weight at weaning and shortened days to market weight by 3 days in gilt litters and 1 day in piglets from the subsequent reproductive cycle (Bruhn, 2020). Finally, older sows (if phase-feeding by parity) or sows in early gestation (if phase-feeding by stage of gestation) have lower amino acid requirements thus, the phase feeding approach has the added benefit of reducing nitrogen (and phosphorus) losses into the manure by minimizing the oversupply of nutrients when the requirements are low. Therefore, phase feeding to more closely match estimated amino acid (lysine) requirements, at the very least, will reduce nutrient losses, but may also have added benefits for the sow and offspring.

Precision Feeding

If the farm is set up with electronic sow feeders capable of blending diets in dry sow (and nurse sow) housing, it is possible to further refine the transition feeding program. In such a scenario, a minimum of two feed lines are required that supply diets to meet the lowest (i.e. upper parity sows in early gestation) and highest (i.e. gilts in late gestation) nutrient and energy requirements for animals in the population. These basal diets can then be blended in any combination to meet the estimated nutrient and energy requirements of any individual sow. Feeding curves can be created for individual animals based on predicted or historic performance (e.g., litter size and weight, parity) and can be applied on a daily basis (e.g., so that animals receive a different diet blend each day) or on a phase basis (e.g., different diet blends during specific stages of gestation and/or for specific parities). For example, a simple blend of dry sow and nurse sow diets between day 104 of gestation and day 4 of lactation to meet estimated daily energy and lysine requirements for gilts and sows reduced maternal energy mobilization prior to farrowing and improved piglet birth weight for multiparous sows, but had minimal carryover effects on lactation performance (i.e. litter growth rate; Gregory and Huber, 2023). As demonstrated by the aforementioned example, it is possible to generate a precision feeding program using the dry and nurse sow diets that are already present on farm. Conversely, offering unique daily blends of two feeds for the entire gestation period across three subsequent reproductive cycles improved sow average daily gain, minimized maternal protein mobilization prior to farrowing, and reduced nitrogen

losses to the environment and feed usage in the subsequent lactation period without any negative impacts on litter growth or sow removal rates (Stewart et al., 2021). In addition, gilts that receive precision feeding programs during gestation have been shown to wean more piglets after the subsequent lactation period, with fewer effects on sow performance in the subsequent reproductive cycle (Cloutier et al., 2023). Moreover, offspring from sows that received the precision feeding program in gestation had improved growth performance during the nursery phase and reached market weight three days (average) earlier, while carcass and meat quality at slaughter were generally not affected by maternal feeding program (Hansen et al., 2021).

Overall, there appears to be only modest improvements in sow performance when using precision feeding approaches in (late) gestation, though research in precision feeding is in its infancy compared to other transition feeding strategies. Thus, if a farm is equipped with feeding technologies capable of precision feeding, producers can work directly with a nutritionist to design, implement, and assess a precision feeding program.

Lactation

Lactation feeding focuses on supplying sufficient nutrients and energy to maximize milk yield while limiting use of sow body stores to compensate for diet deficiencies to meet milk output demands. Anecdotal evidence suggests that an unintended consequence of selection for the current high-producing sow is a reduced sow appetite; this is particularly problematic when sow intake in the first week after farrowing is typically insufficient to meet milk output demands. Sow lactation feed intake has measurable influences on litter performance and breeding success where sows with low intake in the first week, low intake throughout lactation, or sows with a major drop in feed intake (> 1.6 kg for at least 2 days) weaned lighter litters and were more likely to be culled for anestrus in the subsequent cycle (Koketsu et al., 1996a). However, controversy abounds on feeding strategies to ramp-up sow intake in the first days after farrowing without risk of major intake drop. Older data (Koketsu et al., 1996b) reported greater risk of sows 'crashing' if daily feed volume was increased too quickly after farrowing. Other work demonstrated no benefit but also no detriment to litter performance when ad libitum feed access was given shortly before farrowing (4-5 days) or immediately after farrowing compared to sows with ad libitum feed access from day 4 after farrowing (Neill, 1996). More recent data (Columbus, 2020) suggests limited benefit to total sow lactation feed intake or piglet gain when feed was limited at 50% and 75% on day 1 and 2, respectively after farrowing compared to *ad libitum* feed access.

From a nutrient standpoint, 50-55 g/d intake of standardized ileal digestible lysine optimized litter gain and milk output and minimized sow body weight loss (Hojgaard et al., 2019; Strathe et al., 2020). A daily lysine intake of 76 g/d improved litter gain in one of 2 studies; however, benefits in piglet gain were offset by increased feed cost and substantial increases in manure nitrogen excretion such that feed cost/kg gain was similarly increased (Spinler et al., 2023).

Similar to gestation, a single diet in lactation limits the ability to adjust dietary nutrients based on actual nutrient demand and changes in feed intake capacity. Where electronic feeding systems allow precision blending of low and high nutrient diets in lactation, adjusting lysine supply to meet milk output demands (i.e. piglet body weight gain) improved

wean weight and total sow lactation protein intake, and limited periods of protein and energy deficiencies compared to a single diet (Pederson et al., 2016). Based on litter growth and sow daily intake, a precision feeding system adjusted the daily blend of high and low amino acid and mineral diets with minor differences in litter growth or sow body weight loss but 9-27% greater nutrient excretion and 11% greater total feed cost (Gauthier, et al. 2022). As pressure to reduce environmental footprint and improve overall swine production sustainability increases, sow feeding strategies that ensure optimal sow health, piglet performance, and minimize nutrient excretion become increasingly important.

CONCLUSION

The nutrient and energy requirements of sows during the transition period are dynamic. In order to more closely match the nutrient and energy needs of the sow, specialized transition feeding programs can be implemented. The wide variety of transition feeding strategies (i.e. bump feeding, top-dressing, phase feeding, and precision feeding) provides flexibility for implementation depending on the sow flow, personnel availability, and feed management logistics on individual farms. When applying changes to the transition feeding program, be sure to evaluate effects on the sow and offspring (e.g., body condition, piglet survivability and body weight at weaning) to assess the effectiveness of the program. When in doubt, contact a swine nutritionist for more information.

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WORK SMARTER, NOT HARDER: ADOPTION OF NEW TECHNOLOGY
1. AUTOMATED MEASUREMENT OF SOW BODY CONDITION

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Abstract

The sow's body condition is probably the most important factor in achieving excellent results with your sow herd. Yet the condition of sows is rarely used to achieve good results. It is often assumed that the condition of the sow is good to very good by visually assessing the sows. The cause of this probably lies in the fact that determining the condition of your sows is a labor-intensive process. Add to this the fact that there is little knowledge to convert the measured values into good feeding advice and you have quite a challenge. Yet all this can be done quite easily by automating this process.

By automating the measurement of body condition, it can easily be digitally recorded weekly. This significantly simplifies the processing of the data and makes it possible to calculate and apply the feeding plans accordingly.

This applies not only to your sows but also to your life in the GDU.

The application of an intelligent software system makes it possible to calculate the sow's feeding plans not only based on recent data, but also based on expected needs and circumstances.

It will be clear that this complex process not only requires thorough software knowledge, but also the necessary computing power. Such processes are preferably performed in the cloud, where computing power is not a limitation and AI-like solutions can be easily deployed.

Introduction

Only by thinking outside the realm of traditional ideas, farmers can achieve their goals. Now and in the future. Automation and big data increasingly dominate the future of the agricultural sector. Ultimately the goal is to link data available on production, feeding, and breeding. This allows farmers to make the right decisions and work (even more) efficiently. Bringing us closer to a sustainable, profitable, and enjoyable future for the agricultural sector.

New technology can be hardware or software, or a combination of both.

The more intelligent the solution needs to be, the more computing power is needed to deliver value. This requires both scalable computing power and abundant knowledge of running such a complex system. A good example of this is what Lely is offering in the dairy farming industry.

The development and running of collecting the data and presenting the outcome of that have been outsourced so that the farmer can focus on his core task, optimal care of his animals through an animal-friendly, efficient, and sustainable system.

Is this any different in sow farms that are confronted with the increasing digitalization of the environment.

Well-structured digitalization can solve the knowledge drainage caused by the decreasing labor supply. But it also offers new opportunities to utilize the latent value of your sow herd.

Sow Body Condition Management

All living creatures need food to survive; sows are no exception to that. To stay alive, the daily amount of energy consumed must be replenished by consuming feed. We also call this maintenance feed. Production, in this case, the production of piglets, requires extra energy.

This is in addition to the amount of feed required for maintenance.

The production of the modern sow is so high that there is little room for correction. All available time is needed to maintain and/ or achieve the desired body condition. There is no room for errors as they cost you dearly.

Measuring The Body Condition of a Sow

There are various methods to measure the condition of a sow. And there may be even more opinions on how often this should be done. Let's start with the last one. How often should you measure the condition? You can easily answer that yourself. How quickly do you think a sow's condition can change?

If the condition can change within a week, then you should perform weekly checks if the weight development of your sows is still going according to plan. If you think a sow's condition does not change overnight, you can measure it at longer intervals. Also consider the feed composition, because this also can change per delivery.

Then the question "How do you measure the condition of a sow?" As mentioned, there are several methods to do this:

- caliper
- backfat measurements
- weighing
- good old eyeballing.

To start with the last one, eyeballing – eyeballing is the most unreliable method there is. That's because your brain is unable to objectively determine weight. The result is that you think you are doing well, but the reality is different.

Caliper – good method but needs both labour and knowledge. Both are increasingly less available at farms and the data obtained must be processed manually if you want to be able to use it at another time.

Backfat measurements – also a good method but labor and knowledge are again the limiting factors. The data has already been digitized to some extent but still requires a lot of manual work to be of real value.

Because it is so much work to perform this measurement properly, it is often decided to do this only 2-3 times per gestation. This is not because 2-3 measurements are sufficient to get a good picture, but because this is often the maximum amount of labour available for these measurements.

Weighing – autonomous weighing is the only method in which the factors of labor and knowledge no longer play a role. The scale collects data on a 24/7 basis, fully automatic, and stores the data for further processing.

Processing The Data

As you have read above, collecting data every week is only possible with an integrated scale. But that is only the 1st step in the process.

If the weights are available, they must be linked to the sows. There is a wide variety of sows on every farm. Not only concerning parity but also concerning the phase of their pregnancy. Add to this the enormous differences in feed conversion between sows and you understand that this is quite a complex process.

Then there are also re-covers and other things that need to be taken into account.

As a final step, the calculated feed plans must be entered into the feeding system. Sows that are not in optimal condition need an adjusted feed plan. These adjusted feeding plans are entered remotely so that no demands are placed on the farm's available labour.

Feed Composition

The composition of the feed is something for the nutritionist. He has the right knowledge to make the most suitable feed composition.

But the needs of sows depend greatly on which cycle they are in. For example, sows in cycles 1, 2, and 3 generally require a higher content of lysine to achieve the desired growth. As a rule, older sows do not need this more expensive protein-rich feed. If you only offer 1 type of feed, you have the choice of either giving too high-protein (expensive) feed to the older sows or not allowing the young sows to grow sufficiently. It is often decided to offer a less protein-rich feed. The young sows then lag behind in development, with all the consequences that entails. You can overcome this by offering two types of feed. By using both types of feed intelligently, you can literally offer every animal the best option. By measuring growth weekly, the right mix can be offered to each sow fully automatically. Any well-designed feed system can easily be upgraded to dispense two feeds.

Sow Mortality

Sow mortality has been increasing rapidly in recent years. It is now one of the main causes of sow losses. The average sow mortality rate is now over 15%, with companies up to 25%. What we see is that on farms with well-managed sow body condition, the mortality percentage decreases considerably, also in the longer term. All genetic companies endorse this, so one can assume that good body condition enables the sow to better cope with the difficult task of raising large litters of piglets. The sow is better able to use her body reserves at times when she cannot consume enough food. All this without her overexploiting her body.

There's Even More

Not only is the mortality rate decreasing, but the number of live-born piglets is increasing and the litters are becoming more uniform. Sow fertility increases and the sow has more energy to complete the farrowing successfully. The number of sows you have to sleeve is decreasing, as is the number of stillborn piglets. Several things will improve if you optimally manage the condition of your sows.

Gilt Development

Gilts form the basis of your production. This is where it all starts. So perhaps having your gilts in optimal condition is even more important than the rest of your sows.

Unfortunately, you often see that gilts only come into focus with their first cast. This means that valuable time is lost in properly preparing the gilts for their difficult task, with many parities supplying large, uniform litters without any problems. By actively managing the gilts based on their weight and their body condition, you can prevent many problems and prepare the gilt for her task. Add to this good, fully automated heat detection and you have an excellent concept for preparing your gilts in the best possible way for excellent production.

Conclusions

Nobody doubts the need for good body condition for sows and gilts. It is the basis for good production. Unfortunately, that's all it is. It is assumed that the condition is good without verifying it. This is because determining the body condition requires a lot of work and knowledge. At least if you use the caliper or back fat measuring for that. Eyeballing is unfortunately completely unsuitable for determining the condition.

The only method that works completely autonomously, requires hardly any knowledge, and applies to both sows and gilts, is weighing using an integrated scale. The benefits are numerous, including lower sow mortality, larger uniform litters, and much more.

A sow farmer who is very busy with his production cannot do without it.

WORK SMARTER, NOT HARDER: ADOPTION OF NEW TECHNOLOGY
2. "RON THE ROBOT"

Dave DeVries
Zeldenrust Farm Ltd.
Wellington County Pork Producer

Background

- 350 sows farrow to finish
- Completed a new build in 2018 to include loose sow housing, farrowing, nursery and grower rooms
- We've been reliant on our exceptional employee, "Ron the Robot" since 2016.

Meet Ron

- "Clever Cleaner" Robotic Pressure Washer
- www.envirologic.se
- www.trimech.ca
- Battery Powered
- Customizable programing to suit each area that you want to wash – the programming was initially time intensive but the more time spent doing a thorough job, the better the robot is set to work in the long run
- Used weekly in finishing, growers, nursery and farrowing rooms
- Does not do 100% of the washing but completes the dirtiest part

Why does a robotic pressure washer work for us?

- Improved efficiency / use of time in barn
  - Less man hours behind the pressure washing wand frees up time for other management (e.g. animal health)
- Improved personal health
- With the size of our operation, there is not enough work to hire a full-time employee

Maintenance Considerations

- Like all equipment, repairs and maintenance are an expected process in keeping Ron running smoothly.
- Some items we have had to respond to over the past several years of owning Ron:
    - Regular replacement of o-rings
    - Replaced motor and gear box that rotates arm with nozzle twice. (because a set of o-rings was not changed when they should have been)
    - Replacement of main batteries. 2 x 12 volt deep cycle automotive type.
    - Program memory backup battery. (had it go dead once, and lost all programs that were saved.)

WORK SMARTER, NOT HARDER: ADOPTION OF NEW TECHNOLOGY
3. ONTARIO SWINE RESEARCH CENTRE

Dave Vandenberg
Manager, Arkell Livestock Research Station
University of Guelph, Guelph ON

This presentation will be giving an overview of the Ontario Swine Research Centre primarily focusing on technologies incorporated into the build to improve operations and help collect data and control systems to facilitate research.

More specifically the presentation is highlighting technologies to support:

- Biosecurity including a U-V passthrough box, disinfection fogging booth , shower-in for both main barn and acclimatization.
- Security, including cameras, intercoms, and controlled access.
- Feeding distribution with automatic sensing, feed delivery and blending capabilities.
- Increased efficiencies in ventilation with dynamic multistep technology and machine learning for heat control.
- Sow and piglet comfort in farrowing crates with variable control heat mats and high-pressure cooling system.
- Data collection from all control systems within facility including environmental, monitoring, and feeding systems.

HERDSMANSHIP IN THE EYE OF THE BEHOLDER – UNITING THE VIEWS OF PRODUCTION AND MANAGEMENT

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ABSTRACT

A discussion on recognizing, communicating, and aligning the views of production staff and management to achieve a common goal.

Overview

The structure of modern swine operations is evolving. The traditional business plan was comprised of the owner – the farmer – surrounded by family members running all aspects of the pig farm, including livestock care, field work, maintenance, bookwork etc. But today, the infrastructure is trending away from a grassroots owner/operator format to a more complex system. Contract relationships are commonplace with a professional agreement in place between the livestock holders and barn owners. This two-way business deal is often supervised by a third party: a production manager or management team. Other farms offer additional supportive services such as vaccination, breeding, and barn or farrowing room washing. Add in the nutritionist and veterinarian, and there are a lot of moving parts to consolidate into a smooth flow of operation!

How can we effectively unite the varying dispositions and personal goals into a cooperative force that maximizes the upside potential of the pig business?

This presentation addresses the challenges of managing pigs through two distinct perspectives – the producer (manager in the barn) and the production management team (representative of ownership).

The "eye of the beholder" is a euphemism for a matter of personal opinion. Regardless of our role in a pig barn, we all have our own set of ideals based on a background of experiences. This can be a powerful arsenal of talent at our disposal. Even though we may feel overwhelmed with conflict management or ambiguous expectations, there are creative ways to optimize the goodwill and skillset of everyone involved into a united vision for the success of the business. Everyone has the personal responsibility to offer their best contribution within their sphere of influence.

A PRODUCTION TEAM MEMBER'S PERSPECTIVE

Defining Virtue: System Focus.

Inherent Weakness: Long-sighted, Inability to see the trees for the forest.

Inherent Strength: Big picture-oriented, Understands the nuances of managing a multi-faceted production flow.

Attitude is King

If the sun was always shining, the pig price was strong, and health was superb at all times, this discussion point would be unnecessary. There is nothing more meaningful than to see producers "roll up their sleeves" in the face of daunting circumstances. The "can do" attitude is best precedent to optimal performance when times are tough. Conversely, a persistent negative attitude will suppress performance potential even when circumstances are temperate.

Sharing Information

Nobody appreciates feeling isolated. Managers are wise to organize routine gatherings where ideas, information, and performance statistics are freely shared in an informal, friendly environment. Consistent reporting with system averages cross-compared with individual farm performance brings clarity to a farmer's competence. If it is handled with respect and dignity, it can be highly effective to share individual farm performance, thereby stimulating healthy competition in the ranks.

Big Picture Reporting

Sometimes we can't see the forest for the trees; especially if we are focused on a single production facility. How is the collective operation faring on a year-over-year basis? There is a compelling message that enlightens the business head when graphs of annual trends are shared. The highs and the lows all tell an important part of our corporate stories, accompanied with valuable lessons learned.

Conflict Management

Conflict is part of the human experience. If we can successfully avoid feelings of intimidation in the face of disagreements, we might discover that the dissenting voice has a balancing effect on a proposition. The trouble starts when selfish interests are tinged with anger and aggressively defended. Compromise means making a sacrifice to reach an agreement. Sometimes, that "giving up" might need to come from your side of the negotiating table. Learn how to differentiate between a stubborn notion and a non-negotiable ideal.

Practical Application

We must never carry the vibe that we are working in an ivory tower. Periodic visits with an established timeline may emanate the feeling that we don't want to get our hands dirty. It is important that we show up with coveralls and boots and offer to be involved with various tasks such as moving or treating pigs. Offer practical ideas that bring "aha moments" routinely into the imaginations of our producers. How about building a thermos-zone for

your sick pigs? How about adding a manual hi-lo thermometer to monitor the efficacy of your electronic controllers?

A PRODUCER'S PERSPECTIVE

Defining Virtue: Barn Focus.

Inherent Weakness: Short-sighted, Inability to see the forest for the trees.

Inherent Strength: Detail-oriented, Understands the nuances of day-to-day pig care.

Mental Engagement

Bodily presence in the barn is not enough. A producer must be mentally engaged when he is in the barn. Planting season and harvest time are two examples of annual events that can sidetrack one's focus. We have discovered that the quality of time – not the exact amount of time – spent in the barn is the biggest driver of effective management of livestock.

24 Hour Care

A producer must push back against any sentiment to procrastinate. Whether it's a newly farrowed litter of piglets or a brand-new group of pigs placed in a nursery or finishing barn, the actions invested into the first 24 hours are critical to the lifetime wellbeing of the pig. Bad decisions invested early in the life of a pig in a barn are residual in nature. Ventilation anomalies can result in tail-biting. Accumulated stresses can lead to the onset of health challenges down the road. It is important to plan ahead for maximum inputs during this critical time.

Animal Welfare vs. Pig Care

There is a difference in the connotation of these two widely used terms. Welfare carries insinuations of checklists that satisfy the basic requirements of quality control documents. Animal care, on the other hand, raises herdsmanship to the highest level of professional attention. Caregivers monitor animal behaviour, mood swings, or subtle nuances of discomfort or pain. A seasoned farmer with consistently low mortality rates in his finishing barn commented: "I treat a pig today that is going to get sick tomorrow."

Sick Pen Management

The status of this specialized pen starts as a hospital. However, as we engage in compelling recovery programs, we expect full convalescence. Within days, a pen designated to be a space for a restful experience for challenged pigs can become a place of prominent bullying. Recovered pigs don't seem to have the sympathetic capacity to remember how it felt to be in pain or morbidly ill. They become antagonists that aggravate pen-mates. When is the right time to rework the sick pens? When should a producer leave a compromised pig in the mainstream pens and when should they be removed altogether?

Biosecurity

There is an abundance of air-borne pathogens that are outside of our control. When a neighbouring farm erupts with wild field PRRS virus, the risk of cross-infection is

compounded. However, we must focus on managing what is within our control. There is a renewed emphasis on the importance of keeping outside bugs from entering our hog facilities through the implementation of biosecurity standards for foot traffic, vehicles, pharmaceutical and semen deliveries, and other vectors of disease. Elaborate policies that are laminated and hanging on the wall are not enough. Each barn worker must intrinsically understand their critical role in protecting the cleanliness and health of the herd.

SUMMARY

The collective wisdom and innovation of the producer group is foundational to performance strength on the farm. Everyone has a perspective to contribute, but this sense of understanding must be tempered with a spirit of **humble teachability.** The moment that we think we know it all is the moment we begin to move in a retrograde direction. A wise producer seizes on each opportunity to consult with other professionals whenever there are opportunities for interaction. Fresh eyes offer novel ideas. Experienced production team members listen thoughtfully to the insights of farmers who observe the day-in-day-out circumstances in the barn. The reciprocal exchange of ideas strengthens our ability to become better in our pig farming careers.

BREAKING DOWN THE PIG – WHAT GOES WHERE?

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ABSTRACT

The Canadian pork industry has enjoyed considerable growth over the last three to four decades, due in large part to a focus on developing export opportunities for Canadian pork products by improvements in swine genetics, by farmers who take pride in food production, and a solutions-based processing culture combined with outstanding meat quality and workmanship to meet the needs of the most demanding markets.

Thirty years ago (1990), the Canadian pork industry exported approximately 26% of its production, representing just over 266,000 tonnes, mostly to the United States (75%) and Japan (11%).

Today, Canada is the world's third largest exporter of pork behind the EU and USA. Canada exports approximately 65% of its pork production, higher than any other market, including Chile (45%), Brazil (32%), the United States of America (25%), or the UK (19%).

The Canadian industry has cultivated a range of diverse market destination opportunities for pork products. In 2023 the top five largest markets for Canadian pork exports were the United States (428,000 tonnes), China (239,000 tonnes), Japan (185,000 tonnes), Mexico (172,000 tonnes), and the Philippines (108,000 tonnes). South Korea and Colombia are also important market destinations for Canadian pork by volume.

Significant disruption in trade to any of these markets could trigger a huge economic impact on the Canadian pork industry.

CANADA PORK

In Canada and around the world, Canada Pork seeks to establish a global consumer preference for Canadian pork by leveraging the Canadian on-farm food safety and quality assurance systems, as well as Canada's world-renowned food inspection system, and the superior workmanship and specifications that define the value proposition that Canadian pork brings to the world's table.

In addition, Canada Pork programs and services enhance the competitive position of Canadian produced pork by building product knowledge in all markets of importance through education, information, and value-added programs and services.

BRANDING CANADA – VERIFIED CANADIAN PORK GLOBAL BRANDING STRATEGY

Officially launched in 2015, the Verified Canadian Pork brand represents the very best combination of attributes that Canada can put in the box based on on-farm food safety,

traceability and responsible animal care, coupled with Canada's world-class in-plant food safety and quality assurance systems.

The VCP brand has been identified by Canada Pork as one of the key strategic initiatives in differentiating Canadian Pork on the world marketplace with successful launches in Canada, Japan, China, South Korea, Mexico, and elsewhere.

As a result, the on-farm food safety and quality assurance systems that Canadian farmers have followed for years combined with reliable, safe processing systems based on HACCP and a world class food inspection system are promoted directly consumers in Canada and around the world.

CONCLUSION

Competition is fierce as countries look to expand their share of the export and domestic marketplace. Continued investment is crucial in the development and promotion of a Branding Canada approach across all markets and consumer segments to earn consumer trust and build brand equity in Canadian pork products. Effective market development programs and services coupled with robust, accurate and timely market information is required to maximise marketing and promotion opportunities for Canadian companies.

ALTERNATE FEED INGREDIENTS AND COST OF PRODUCTION

The CFM DE LANGE Lecture

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ABSTRACT

Feed is the single most expensive input for commercial pork production, with a direct impact on profit margins. Thus, it is critical to explore ways of mitigating feed cost. One approach to doing so is to expand the ingredient options that could be used to formulate effective swine diets, which is the reason for the increased interest in the use of co-products as alternate feedstuffs for swine diets. Generally, however, co-products from the agri-food industry contain high concentrations of dietary fiber and some anti-nutritional factors, which may hinder their full utilization in swine feeds. To effectively utilize co-products in swine diets, it is critical to accurately characterize them in terms of their chemical composition and nutritive value for swine. Such information is important in formulating diets that not only supply the nutrients needed to support optimum performance of the animals but also that closely match an animal's nutrient needs. Utilizing diet formulation strategies that better reflect the energy and nutrient contents available to the pig offers an effective means of incorporating alternative feedstuffs into swine diets. In terms of energy supply, the net energy system should be used whereas standardized ileal digestible values and standardized total tract digestible values are recommended for amino acids and phosphorus, respectively. The determination and use of these coefficients are critical to the optimal utilization of co-products in formulating effective swine diets, as is the strategic use of feed additives and processing procedures that may enhance energy and nutrient availability in such feedstuffs.

INTRODUCTION

Feed is the single most expensive input in commercial pork production, accounting for 65-75% of the total production costs. Various factors, including supply chain disruptions, poor crop harvests due to changing growing conditions, and increasing demand for feed grains from the biofuel sector have continued to challenge availability of competitively priced traditional ingredients for swine diets (Woyengo et al., 2014). Energy, amino acids (AA), and phosphorous (P) are the major determinants of the cost of feeding pigs. It therefore makes economic sense to characterize feedstuffs based on truly available energy (i.e., net energy (NE)], standardized ileal digestible (SID) AA and standardized total tract digestible (STTD) P and possibly price ingredients on such basis. In Canada, canola meal, flaxseed meal, faba beans, wheat co-products, and field peas are some of the major locally available ingredients and are regarded as co-products/alternative feed ingredients for use in swine diets. Also, there are emerging co-products such as camelina cake and hemp hulls and novel ingredients such as hybrid rye although much more information about these ingredients is still needed. With the increasing demand for plant-based protein for human consumption, the availability

of co-products from this sector is expected to increase as well thus offering opportunity for use in swine diets. Feed cost is and will continue to remain a critical factor determining the profitability of the livestock industry. Thus, enhancing the utilization of co-products in formulating swine diets offers an effective strategy for controlling feed costs. This will require that such feedstuffs are well investigated in terms of their nutritive value, risks associated with their use (e.g. mycotoxins, anti-nutritional factors), and potential economic benefits when formulated correctly into diets. The role of technology and processing procedures in enhancing the feeding value of these feedstuffs for swine is equally an important aspect to understand to effectively utilize alternate feedstuffs in swine nutrition.

DIET FORMULATION STRATEGIES

A primary goal in formulating swine diets is not only to supply nutrients needed for optimal performance but also to ensure that dietary supply of such nutrients closely matches animal needs. This is important because nutrients are not only expensive but excessive excretion of some nutrients may cause environmental pollution. Over the years, several diet formulation strategies have been proposed for energy and nutrient supply in swine diets.

With respect to dietary energy supply, digestible (DE) and metabolizable energy (ME) systems have been widely used in swine diet formulation. Although these systems worked well when using high quality ingredients such as corn and soybean meal, it is now clear that they are not suitable for formulating effective diets with co-products that generally tend to contain high concentrations of dietary fibre. Energy values of diets high in protein and fibre are often overestimated with the DE or ME system (Noblet et al., 1994), resulting in less dietary NE content, because the DE and ME systems do not consider the energy lost as heat increment. Therefore, the NE system more precisely predicts the amount of energy used and retained in the pig for fibrous feedstuffs when compared to the DE and ME systems. Consequently, there has been a lot of interest in the determination of the NE contents of various feed ingredients for swine. Indeed, NRC (2012) has recommended that swine diets should be formulated on an NE system. With respect to AA and P supply, the SID and STTD systems are recommended for more accurately matching supply with requirements for achieving more uniform and predictable animal performance (NRC, 2012). These systems have gained more acceptance as several studies have demonstrated that they are additive in a mixture of feed ingredients thus allowing formulation of effective diets based on a wide range of ingredients. For instance, performance was reduced when pigs were fed diets containing 25% DDGS and formulated on a DE and apparent ileal digestible AA basis (Thacker, 2006; Figure 1). However, when diets were formulated on a SID basis, performance and lean meat yield were unaffected by 20% DDGS inclusion (Stein, 2007; Figure 2).

CHARACTERISTICS OF ALTERNATE FEEDSTUFFS

The majority of alternate feedstuffs are co-products of the agri-food industry, including co-products of the biofuel industry (e.g., dried distillers grain and solubles and expeller cakes), oil extraction industry (e.g., canola meal), and co-products of the plant-based protein industry (e.g., pea hulls and hemp meal). Some crops that have not been traditional feedstuffs for swine feeds in Canada such as pulse crops (e.g., faba beans) and cereals such

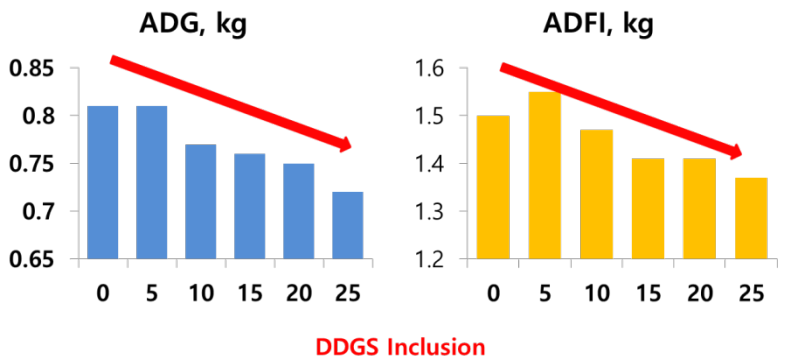

Figure 1. Including increasing amounts of wheat DDGS in diets formulated on a DE and AID amino acid basis reduced performance of growing-finishing pigs (Thacker, 2006).

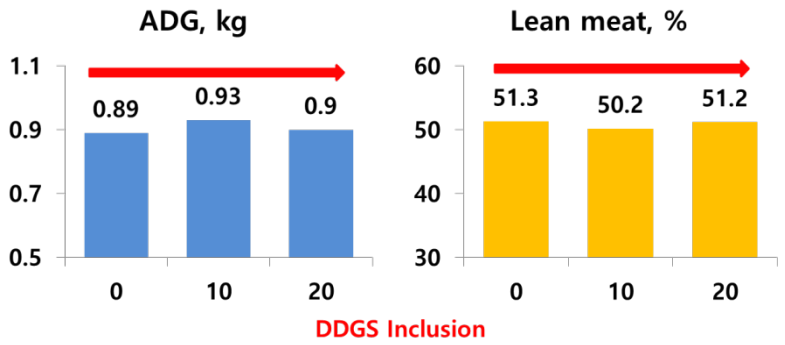

Figure 2. With an appropriate diet formulation strategy, higher amounts of wheat DDGS can be fed to growing-finishing pigs with negative effects on performance (Stein, 2007).

as hybrid rye also have potential to be served as energy and nutrient sources for swine. In the past, there has been a concerted effort in Canada to characterize the nutritive value of a wide range of alternate feed ingredients, with a particular emphasis on their energy, amino acids, and phosphorus contents. Results of some of these studies are summarized in Tables 1 and 2, and clearly show that many of these feedstuffs can be used in swine diets, thus offering a potential means to mitigate feed cost.

Further work has shown that application of technology (e.g., enzyme supplements) and processing techniques, the nutritive value of these alternate feedstuffs can be enhanced significantly (Figure 3; Mejicanos et al., 2018). As stated above, a characteristic feature of many of the alternate feedstuffs is that they are rich in fibre content, which may adversely affect their nutritive value for swine (Agyekum et al., 2015; Ndou et al., 2017). However, with appropriate enzyme supplementation, pigs can extract more energy and nutrients from diets formulated with alternate feedstuffs (Omogbenigun et al., 2004). Processing techniques, including particle size reduction, dehulling, extrusion and fermentation have also been shown to enhance the nutritive value of feed ingredients for swine, leading to improved performance.

Table 1. Chemical composition and energy values of corn distillers dried grains with solubles (cDDGS), canola meal (CM), flaxseed meal (FSM), hemp hulls (HH), dry extruded soybean meal (DESBM), camelina cake (CC), and zero-tannin faba bean (ZT)

Item, %	cDDGS[1]	CM[2]	FSM[3]	HH[4]	DESBM[5]	CC[6]	ZT[7]
CP	27.4	37.5	34.2	21.6	42.6	34.7	28.5
Fat	8.9	3.2	10.6	19.4	9.5	13.3	1.30
NDF	30.5	22.6	41.6	50.7	14.9	40.4	16.0
Ca	0.08	0.69	0.41	0.14	0.28	0.31	0.14
P	0.60	1.08	0.83	0.58	0.66	0.81	0.42
Lysine	0.90	2.07	1.39	0.64	2.61	1.69	1.85
Methionine	0.57	0.71	0.65	0.27	0.53	0.46	0.22
Threonine	0.99	1.55	1.28	0.46	1.82	1.42	0.97
Energy							
DE, kcal/kg	3,620	3,039	3,510	3,186	3,197	3,755	3,276
ME, kcal/kg	3,434	2,849	3,370	2,987	3,128	3,465	3,658
NE, kcal/kg	2,384	2,103	2,430	2,204	2,370	2,383	-

[1]Adapted from NRC (2012); [2]Values are from Woyengo et al. (2010), Trindade Neto et al. (2012), Heo et al. (2014), and Kim et al. (2018a); [3]Values are from Eastwood et al. (2009), Kim et al. (2017b), and Koo et al. (2020); [4]Values are from Kim and Nyachoti (2017) and Kim et al. (2018b); [5]Values are from Woodworth et al. (2001), Opapeju et al. (2006), and Velayudhan et al. (2015); [6]Values are from Kahindi et al. (2014), Adhikari et al. (2016), Woyengo et al. (2016), Kim et al. (2017a), and Smit and Beltranena (2017); [7]Values are from and Kiarie et al. (2013).

Table 2. Standardized total tract digestibility (STTD) of phosphorus and standardized ileal digestibility (SID) of amino acids in corn distillers dried grains with solubles (cDDGS), canola meal (CM), flaxseed meal (FSM), hemp hulls (HH), dry extruded soybean meal (DESBM), camelina cake (CC), and zero-tannin faba bean (ZT)

Digestibility, %	cDDGS[1]	CM[2]	FSM[3]	HH[4]	DESBM[5]	CC[6]	ZT[7]
Phosphorus							
STTD of P	65.0	35.4	43.2	22.0	48.5	56.0	36.0*
Amino acids							
SID of Lys	67.8	82.1	49.5	-	88.2	57.9	87.1
SID of Met	90.2	86.4	64.5	-	82.8	53.4	83.4
SID of Thr	84.0	79.3	64.8	-	84.8	52.5	85.8
SID of Val	85.6	78.5	65.6	-	87.1	58.8	85.1

[1]Adapted from NRC (2012) and Kiarie et al. (2013); [2]Values are from Trindade Neto et al. (2012) and Mejicanos et al. (2018); [3]Values are from Kim et al. (2017b) and Koo et al. (2020); [4]Values are from Kim et al. (2018b); [5]Values are from Opapeju et al. (2006) and Lee and Nyachoti (2021); [6]Values are from Kahindi et al. (2014) and Adhikari et al. (2016); [7]Values are from NRC (2012) and Kiarie et al. (2013).

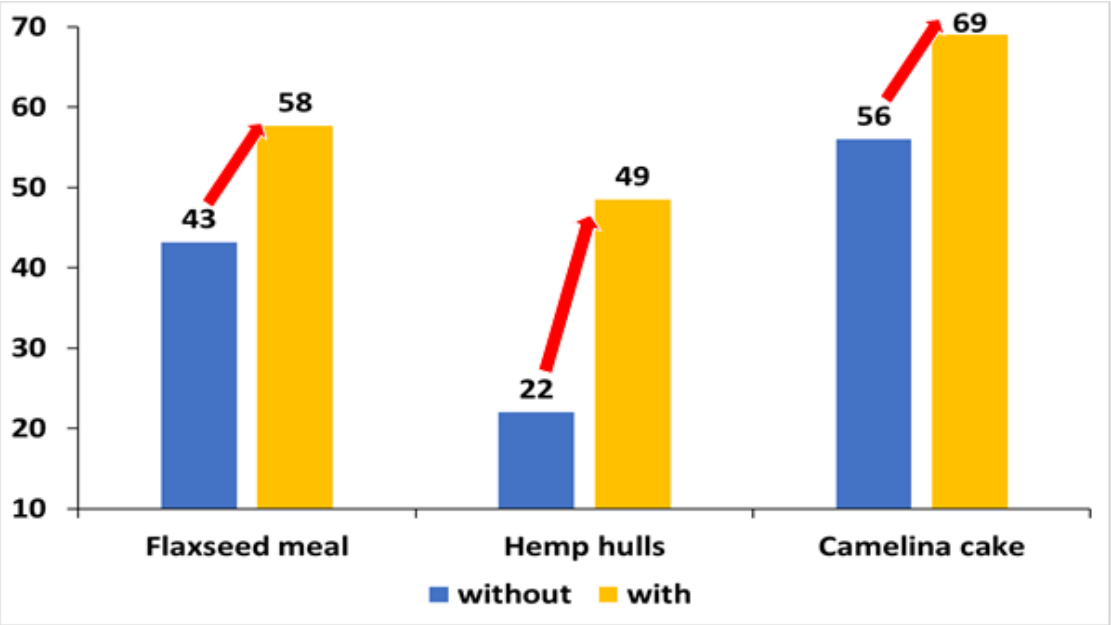

Figure 3. Standardized total tract digestibility of phosphorus (%) in pigs fed flaxseed meal, hemp hulls, and camelina cake without or with phytase supplementation (Adhikari et al., 2016; Kim et al., 2017b, Kim et al., 2018b).

CONCLUSIONS

Feed represents a major cost factor in commercial pork production. With the increasing scarcity of ingredients that have traditionally been used to formulate swine diets due to competing uses and other external factors that impact the supply chain, feed cost will likely remain an important concern to the swine industry. Alternate feed ingredients, which include co-products of the agri-food industry and novel ingredients, have a potential role in mitigating feed cost due to their lower price per unit of net energy or digestible amino acids. However, for effective and accurate utilization of these ingredients, it is critical to understand their energy and nutrient contents that are available to the pig. With respect to dietary energy, amino acids, and phosphorus supply, it is recommended to use the net energy, standardize ileal digestible, and total tract digestible values, respectively. Thus, it is critical that alternate ingredients are fully characterized in terms of their nutritive value and how this can be enhanced to support their effective utilization in formulating swine diets, thus contributing to industry resilience.

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BREEDING SUCCESS – THE DO'S AND DON'TS OF A.I.

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ABSTRACT

Artificial Insemination (AI) in the swine industry has been mainstream for many years. Roughly 30 years ago less than 5% of sows were bred AI in North America, and within merely 4-5 years over 95% of sows were bred via AI. This presentation will focus on approaches to the proper implementation of conventional AI, with direct and practical teachings on what to do and what to avoid. The primary themes will be animal behaviour in nature and how we can mimic this knowledge in a barn setting, internal reproductive body parts and hormones, heat detection, breeding procedures and programs, and the economic relevance of why these interrelated points disproportionately and directly affect the potential profitability of every sow operation.

BACKGROUND AND ASSUMPTIONS

We need to understand that reproduction is a privilege, not a right! In addition, reproduction is both energy inefficient and time inefficient.

In North America, over the past 7 years several record keeping companies (PigKnows, PigChamp, MetaFarms, etc.) have shown that farrowing rates have levelled off and stagnated at 81% to 85%. Thus, if sow farms aspire to be above average – what can they do to be 5^{+}% better; what needs to be done to help get an additional 1 in 20 sows to conceive?

PART 1: ANIMAL BEHAVIOUR

Before we discuss AI in a sow barn, we need to appreciate and understand the natural behaviour that pigs exhibit in the wild. Thus, we will start with 2 questions:

- What does the word "artificial" in artificial insemination mean?
- If what we do is "artificial" insemination, what is real?

The dictionary definitions of artificial are "imitation and simulated" and "produced by humans". Thus, we need to think about and understand the natural or normal behaviours of pigs in nature. Understanding these natural activities and behaviours of females versus males is key to developing and implementing a systematically successful breeding program in any sow herd. Also, we need to remember that a barn is an artificial environment for pigs; overall it is a very beneficial artificial environment, but it is artificial nonetheless. In addition, we need to understand and appreciate that the pig's number one sense is smell (followed by sight, hearing, and touch).

Female Behaviour in Nature

In nature, females live in small groups of usually 3-7 (boars live separately). As with most animals in nature, pigs are usually most active at dawn and dusk. In nature, virtually all matings take place during dawn or dusk: roughly 2/3 at dawn plus 1/3 at dusk. After long rest periods, the muscles are rested, and the hormones are fully charged; these 2 facts dramatically increase the likelihood of successful conception.

In nature, when the female comes into her heat cycle, the gilt or sow goes to find the boar. When she arrives near the boar, she will "lock-up" in his presence. As her muscles lock up in a process that is similar to isometric exercising, it is important to note that this is the biggest physical workout of her life (next to farrowing). These locked muscles occur so that she can support an animal twice her weight for ~15 minutes. When the natural mating is completed, these muscles will have filled with lactic acid; this lactic acid is the same phenomenon that occurs in our muscles when they are worked hard. Thus, her muscles will be sore, and she will need a rest for her body to neutralize and purge out the lactic acid. A rest will not only help her muscles recover, the rest will also allow for the various hormones to be recharged too.

Male Behaviour in Nature

Boars are independent and territorial; territory is established by smell domination. Part of their intrinsic desire for smell domination is to establish a boar nest, where the boar can feel secure and can comfortably sleep in an area that exclusively smells like them. Other ways to establish smell domination is by defecating and urinating throughout their territory. In addition, a boar must be ready for a challenge from another boar; as a result, boars have large adrenal glands that allow them to go from sleeping to frothing at the mouth within 20 seconds. This sudden spike in blood flow will increase their body odour and smelly breath too; when challenged, this will allow the boar to further increase his smell domination.

At dawn, when a gilt or sow approaches a sleeping boar in his nest, the boar will suddenly wake up and prepare for the worst (i.e.: another boar coming to challenge him for his territory). With the female immersed in the smell of the boar nest, and the sight of the boar, she will start to lock up. As the boar approaches the 'intruder', he will breathe in her face. As the sow is locked up, the boar will then rub his snout on the mammary tissue and lift the end of her abdominal region. This abdominal region is where the uterine horns are, and this rubbing will elicit an additional oxytocin response and increase the blood flow to the uterus. As the boar gets behind the stationary and locked up female, he will mount her; with the weight of his body and his front legs both adding additional stimulation. The duration of most natural matings is between 10-18 minutes (depending on: age, body condition, traction of floor or ground, time of day, season of the year, etc.).

Copying Natural Mating Behaviour from Nature into a Sow Barn:

<u>Do's</u>

Once we have a solid understanding of the natural reproduction behaviours of both gilts/sows and boars, we can apply this knowledge to our artificial insemination breeding programs in sow barns. As mentioned earlier, all average farrowing rate results should be targeting at least 1 additional sow farrowing per 20 sows bred {i.e.: 5^{+}%}.

Here are key general AI breeding protocols. Note that the following list has four points that are all rated as "1" each – as each point is foundational and fundamental to obtaining and maintaining above average conception rate results:

1. **Good heat checking boars!**
   a. A good heat boar must be smelly (ideally foamy too), talkative, with good physical structure.
   b. Ideally, the boar is fully mature (1+ year old).
   c. Ideally, the boar does not live directly beside another boar(s).
   d. The boar is fed enough but stays trim.
   e. In addition, in most cases it is good that the boar is able to do a natural mating once every 5-10 days, specifically at the end of AI breeding session.
   f. Furthermore, in sow barns where the boar is brought to the breeding area, it is a good practice to also use at least one additional follow-up boar ~10 minutes after the first boar has been moved ahead. This additional heat detection boar will reactivate the uterine horns' contractions; thus, this second (and third) heat detection boar will help to advance sperm cells further up the uterine horns.
   g. Big picture and longer term: Ensure that your sow barn has enough boars: a good rule of thumb is to have 4-6 heat detection boars per 1,000 sows. Ideally, there is a good age spread between them too. In order have a good heat detection boar succession plan, it is wise to be regularly bringing in a new boar every few months.

   <u>In summary</u>: a good heat detection boar is a mature boar that is trim and gets to participate in a natural mating once a week. This selection and upbringing will develop and maintain a good heat detection boar with a strong libido.

2. **Back Pressure!**
   a. As we attempt to mimic nature as much as possible, it cannot be understated how important back pressure is to a certain percentage of females that need to have weight on their back during the AI breeding process.
   b. It is ideal to have back pressure continue for 5-6 minutes after the semen tube has been emptied. This continued stimulation will encourage the uterine horns to continue their peristaltic rhythmic contractions longer; this will help get the sperm cells to their safe area (the oviduct, see below).

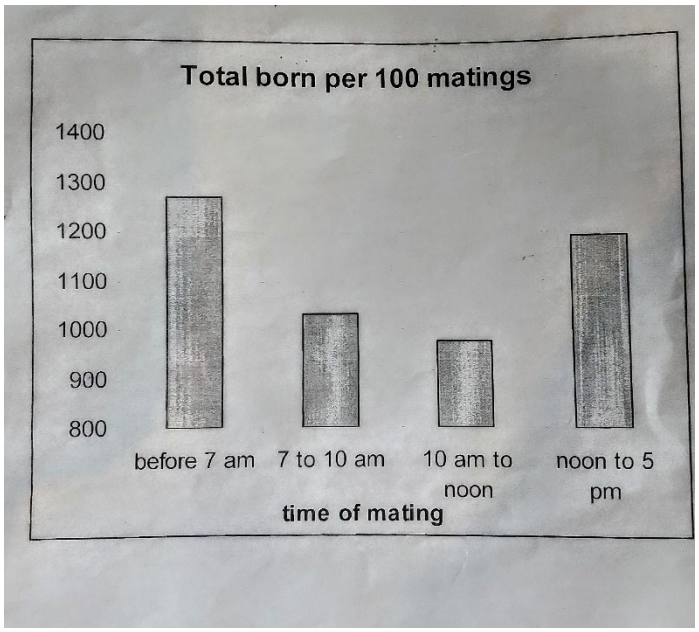
3. **Time of day breeding.**
   a. Artificial insemination should occur immediately after a long rest.
      i. For the vast majority of sow operations, this should be done first thing in the morning.
      ii. When breeding a sow first thing after she wakes up, her body will be fully rested and fully charged hormonally.
   b. If a schedule does not allow for breeding shortly after the sow wakes up in the morning, the next best time to breed is either at dusk, or after a long nap (usually late afternoon). A rest will allow the muscles to be recharged and the hormones replenished.

4. **Take your time!**
    a. As mentioned earlier, successful reproduction is inherently time and energy inefficient.
    b. Remember that a natural mating will last at least 10 minutes. Each time.
        i. As will be discussed later, at this point in the reproduction and conception cycle, the sow is doing 100% of the work to bring the sperm cells to the end of her uterine horns. When a breeding technician rushes through the process of artificial insemination and removes the other forms of stimulation that the sow needs to continue to draw the sperm cells up the uterine horns, the removal of stimulation will cause her uterine horns to rapidly decrease their peristaltic muscle contractions.
    c. Remember that at this stage the sow is doing 100% of the work, and if the sperm cells do not make it to the end of the uterine horns: all time, energy, and sperm cells have been wasted!
    d. It is worth noting that many people in our industry find that taking their time is what they consider to be the most boring task on the farm; however, it is typically the most value-added time on the entire sow farm (see charts below)!

5. **Flank and underline rubbing.**
    a. As breeding technicians, we can continue to copy and mimic behaviour that happens in nature.
        i. When we massage or rub the mammary tissue, this elicits an oxytocin response.
        ii. When we use our hands to rub or push into the back flanks of the female, this will add to the blood flow of the uterine horns.
    b. As mentioned several times already, the female is doing 100% of the primary work at this stage of her reproduction cycle.
        i. By helping to naturally elicit additional release of oxytocin and additional blood flow, we can help these females to get the sperm cells to the end of her uterine horns.

The following summary statement is both simple and critical: **Stimulation must be stimulating!**

Chart 1: this chart shows total born (farrowing rate x litter size) per 100 matings by time of day.



Artificial Insemination Don'ts:

1. **Weak, semi-useless, or distracted heat detection boars.**
   a. Lousy heat detection boars are: underage or too old, underfed or overfed, never used, housed directly or beside other boars, or boars that were mixed with a number of sows that were early in their heat cycle {and subsequently beaten up by sows in their testosterone or "honking stage"}.
   b. Also, some larger sow barns have too few boars; thus, the few boars that they do have are regularly overworked. This can cause tiredness or disengagement in the boars. Most boars will become fatigued or disengaged after about ~45 minutes.
   c. When boars are brought to the females, they can be easily distracted by feed or dust on the floor. If they are distracted by feed, they will not be paying attention to the females.

2. **No back pressure or minimal back pressure.**
   a. When AI breeding sows in stalls, many sow farms have one additional stabilizing bar in place, this prevents the breeding technician from sitting on the females back.
   b. Many breeding technicians gently lean on the sows back, or provide no back pressure at all. If the average breeding technician is 150-200 lbs and sits on the back of the female, this is still only a fraction of the weight of a boar during a natural mating.
      i. Note: leaning on a sow only provides 5-10 lbs of pressure.

3. **No set time for artificial insemination or breeding whenever we get around to it.**
   a. Sow farms that do not have a daily or weekly plan or schedule will frequently be breeding females that had already been in standing heat.
   b. In this scenario, artificial insemination will be given to some females in their heat cycle that were already in a locked up response before the breeding technician gets to her, and thus these females are already physically tired and hormonally depleted when you get to them.
      i. Although the sperm cells may have been drawn in, the sow is not able to transport these cells to the end of her uterine horn. When this scenario unfolds, many breeding technicians will think that they were successful (because the tube was drawn and emptied by the female; however, they are unaware that they just wasted efforts on time and semen).

4. **Rushing through the AI breeding procedure.**
   a. Many farmers and breeding technicians are often in a rush, or trying to get done "another boring session" of AI quickly.
   b. Many farmers and breeding technicians think that when the tube of semen has emptied "I am done". However, the female does not care about your opinion, your schedule, or your lack of engagement in the process. It is important to remember that the concept of time is a human invention; although pigs do understand routine, pigs neither comprehend or appreciate the concept of time or being in a hurry.

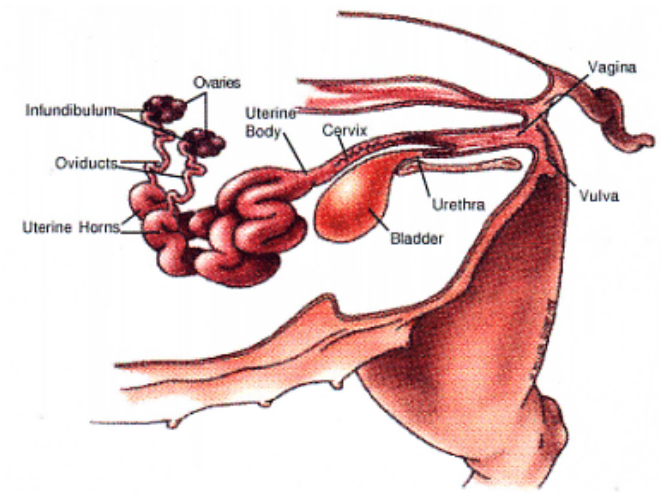
5. **No other helpful stimulation.**
   a. When owners and breeding technicians do not understand what they are doing and why, or what is going on inside of the female that they cannot see, they will not provide anything 'extra' to help stimulate the female during the AI breeding process.

In summary: lousy and inconsistent conception rate results will occur on sow farms that do not have a plan or schedule for success, do not understand the basics of breeding, and/or are simply going through the motions of an AI breeding program.

PART 2: FEMALE INTERNAL BODY PARTS

Not only do we need to appreciate and understand the natural reproductive behaviour of pigs, we also need to know what and where the body parts are, and how they work together. In addition, how do the key hormones make certain body parts active? Once we know this, breeding technicians can provide targeted help so that the gilt/sow can conceive.

Picture 1: Internal Body Parts



1. **Brain**
   a. **Hypothalamus**: this is the part of the brain responsible for body regulation and most hormones.
      i. Connected to both eyes and nose (optic and olfactory).
      ii. Controls, activates, and triggers the Pituitary Gland.
   b. **Pituitary Gland**: the size and shape is similar to a garden pea.
      i. Produces, stores, and releases the hormone oxytocin.
      ii. When released, oxytocin travels from the brain, through bloodstream to the receptors –> the uterine horns.
         1. The travel time from the brain to the uterine horns takes about 90 seconds.
2. **Cervix**
   a. The cervix is the strongest muscle in the body. At this stage in the reproductive cycle, the cervix has 2 main functions:
      i. To tightly clamp onto the end of the boar's penis, for ~15 minutes straight.
      ii. The cervix is the "gate-keeper" to the uterus. Usually the cervix is closed to prevent bacteria from traveling or migrating to the uterine horns.
         1. The cervix has internal digits and crevices with a type of mucous that is a harsh region for bacteria and sperm cells.
   b. It is worth noting that the cervix takes ~18 days post farrowing to fully contract. If sows are weaned before 18 days, a certain percentage of sows will have a cervix that is not able to properly clamp onto a foam tipped catheter.

3. **Intrauterine junction**
    a. Located at the end of cervix, and where the uterine horns are connected.
    b. This is where the semen is deposited in both conventional & PCAI.

4. **Uterus**
    a. When the sow is not pregnant, the length of each uterine horn is 2-3 feet long.
    b. The uterine horns are activated by oxytocin. Oxytocin has a very short half-life (5-10 minutes).
    c. At this stage of reproduction, the role of the uterine horns is to draw semen in using peristaltic muscle action.
    d. When the uterine horns are activated, they will contract for ~45 seconds, and then rest for 45 seconds.
    e. Uterine contractions will rapidly diminish in both intensity and duration if stimulation(s) are withdrawn.
    f. The uterine horns provide 100% of the work to draw semen in; from the semen tube, through the catheter, up the entire length of each uterine horn, and then arrive at the oviduct.

5. **Oviduct**
    a. Located at the end of the uterine horn.
    b. Basically, the oviduct is a sperm cell "parking-lot" and "safe zone".
    c. The oviduct provides a "halo effect" for the sperm cells. What this means is that the immune system's white blood cells do not come here.
    d. Each Oviduct can store ~100M sperm cells.
    e. Sperm cells wait in the oviduct for ovulation to occur, remaining in place for 20-24 hours.
    f. When the eggs are released during ovulation, there are a number of hormones that get released. The presence of these hormones signal to the sperm cells to leave the oviduct to swim towards the eggs.

SHARPEN YOUR KNIFE:
ON-FARM SAMPLING TECHNIQUES FOR ACCURATE DIAGNOSTIC TEST RESULTS

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On-farm sampling for disease investigation is the most cost-effective and diagnostically rewarding when the best samples are chosen from pigs that are the most representative of the disease process. Time should be taken to identify recently (acutely) affected, untreated pigs for live animal sample collection or for euthanasia and post-mortem sampling. Accurately identifying the best pigs for sampling will have the greatest impact on the success of the diagnostic workup. When animal selection is optimal, a total of three pigs should be sufficient to provide diagnostically useful information regarding a disease condition.

For pigs euthanized for sample collection, post-mortem examination is carried out to identify disease processes (lesions) and to collect samples. Specific sampling will depend on the disease problem in the herd, but making a general inspection of all organs can help in identifying any problems that are unexpected or confounding the main problem.

The method of carrying out a post-mortem is up to the personal preference of the individual operator. Developing a routine will help ensure that all important structures are examined, and that nothing is missed. Carry out the post-mortem in an area that allows for the operator's relative comfort, as well as addresses biosecurity concerns (away from the rest of the herd, easy cleanup, etc.). Good lighting is necessary. Plan ahead, having all equipment that will be needed and anticipating which tissues will need to be sampled based on the clinical problem in the herd.

<u>General process of post-mortem examination:</u>

Examine the outside of the pig before opening the carcass. Routinely check for fluid-filled blisters (vesicles) involving snout, mouth and coronary bands of the feet that could indicate a foreign animal disease (Figure 1). Check for evidence of diarrhea, and if present, note the colour and consistency (any evidence of blood?).

The pig can be positioned either on its back or on its left side for the post-mortem. Open the carcass along the ventral midline, from the tip of the jaw to the pelvis, first incising skin and then extending the cut to the underlying muscle. Alternately, cut through and peel back the sternum (Figure 2). Making the initial incision over the sternum will help prevent puncture of distended gastrointestinal organs and resulting contamination. For larger pigs, cut the ribs near the sternum using either rib cutters (tree loppers) or a knife and remove or reflect back the chest wall.

Figure 1. Vesicle (blisters) on snout and coronary band.

Figure 2. Postmortem exam with pig positioned on back – opening the carcass.
Image source: Newport Laboratories

With both the chest and abdominal cavities exposed, identify major organs and look for lesions (Figure 3). Does the carcass look pale? This could indicate blood loss and prompt a search for a site of hemorrhage (stomach, intestine?). Check ribs for bone strength. Open several joints to look for exudate or cartilage chips or flaps. Every post-mortem will provide more baseline information, so that the operator will have a better understanding of what is 'normal' in a pig. Take photos whenever possible to show to your veterinarian or diagnostician.

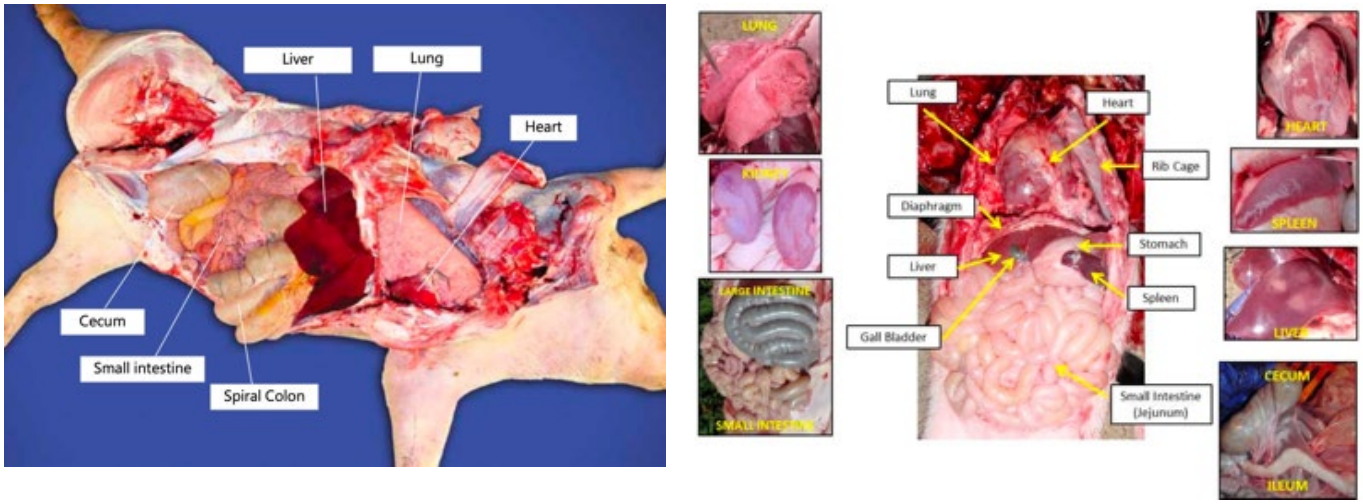

Figure 3. Internal organ location in a pig carcass.
Image source: Newport Laboratories

A range of tissue samples should be taken in all cases and fixed in formalin for histopathology (microscopic examination of tissues). Thorough sampling from a wide range of organs can provide information about the disease condition of interest in the group, as well as evidence of concurrent disease problems that are sometimes unexpected, but of equal importance. Sampling a full range of tissues is especially helpful in identifying underlying disease issues in herds with vague clinical signs, such as "fallbacks". A second set of tissue samples are collected, but not placed in formalin ("fresh" samples), which will be used for additional testing for infectious disease agents when indicated. Swab samples are useful for cases with fluid in the thoracic (chest) or abdominal cavities, and for sampling from brain and joints. Be careful when swabbing surfaces – it is very easy to contaminate swabs, and this will lead to erroneous bacterial culture results.

Samples to routinely collect for histopathology (in formalin) include:

- Lung* - Spleen - Liver
  *At least 2 pieces – cranial (front), caudal (back) - Kidney
- Trachea - Spiral colon - Mesentery (gut attachments)
- Heart - Muscle -Lymph nodes
- Brain and spinal cord (when neurological disease is suspected)

Baseline samples to collect for various microbiology tests (fresh) include:

- Lung (3 pieces) - Liver - Kidney - Spleen
- Other samples are added to this list depending on the disease condition under investigation.

<u>Special sampling for various disease syndromes:</u>

Pneumonia (coughing, thumping):

-Open trachea to assess the lining and check for exudate.
-Check tonsils – in pigs, tonsils are incorporated into the soft palate.
-Look at both lungs – record how much (%) of lung is abnormal (dark, firm).
-Sample lung at the margin of normal and abnormal tissue (3 pieces), lung in 2 additional sites cranial and caudal to the margin (1 piece each), bronchial lymph node (2 pieces), trachea (2 pieces), and tonsil (Figure 4).

A. Lung B.Trachea C.Tonsil

Figure 4. Sampling sites for lung, traches, and tonsil.

Diarrhea:

-Euthanize animals individually and **immediately** collect intestinal samples (Figure 5). Place samples for histopathology into formalin immediately, to prevent autolysis or degradation of the tissue.
-Collect 8 samples from the small intestine – 2 from each of proximal (near the stomach), middle, and distal (near the colon) segments of intestine and place into formalin. Also collect 2 from the distal segment for microbiology testing (culture, PCR).
-Collect 4 samples from the large intestine – 2 from spiral colon into formalin and 2 from spiral colon for microbiology.

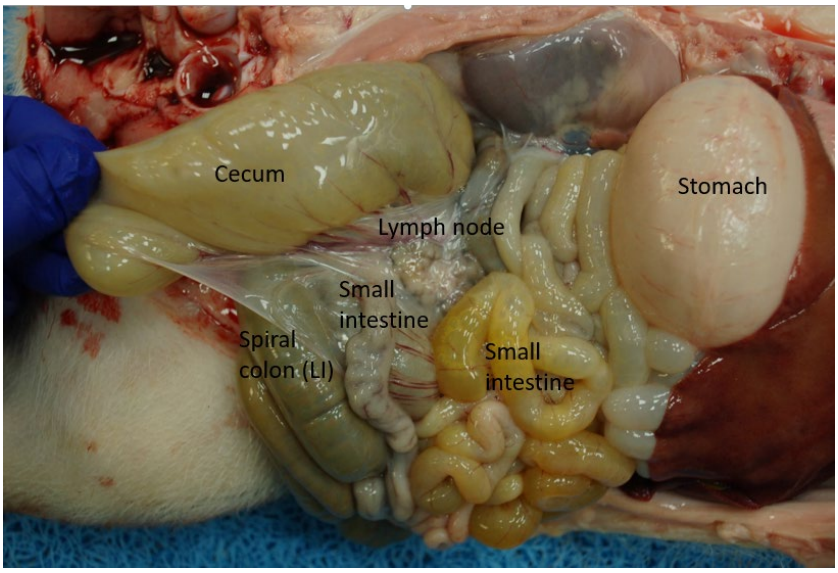

Figure 5. Gastrointestinal organ sampling sites.

Sudden death:

-In cases of truly 'sudden' (unexpected) death without evidence of illness prior to death, the most important organ systems to concentrate on are the cardiovascular system (heart and blood / blood vessels), lung and brain. Check for intestinal accidents (twists) and splenic torsion.
-Look for any evidence of hemorrhage in stomach (ulcer?), abdominal cavity, or small intestine or colon (porcine proliferative enteritis (Lawsonia)?).
-Include a meningeal (brain) swab to check for meningitis (Figure 6). This can be sampled from the caudal (back) of the brain, at the junction with the cervical (neck) spinal cord. Avoid contamination from skin or surrounding tissue when incising skin and when sampling.
-Include brain for histopathology and other potential tests. In large pigs, brain removal is a challenge in field post-mortems and the intact head can be submitted for brain removal at the lab.

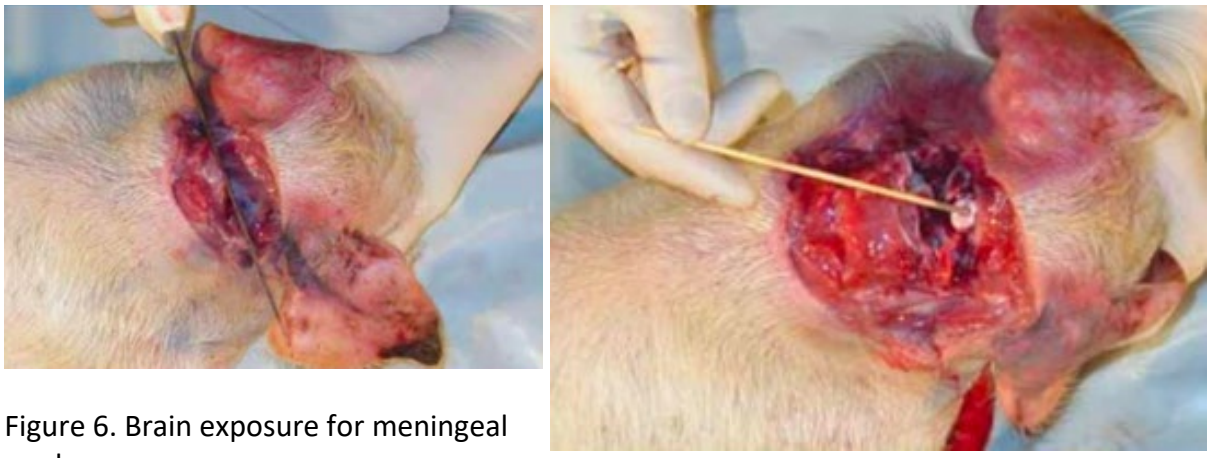

Figure 6. Brain exposure for meningeal swab
Source: Newport Laboratories

Fallbacks:

-These can be tough cases. The goal of the post-mortem is to look for lesions that might be common to all of the affected pigs and to take a wide range of samples both in formalin and as fresh samples into order to allow various tests to be carried out.

Lameness:

-Submission of whole carcasses to the diagnostic lab is the preferred approach for lameness workup. Alternatively, multiple legs from acutely lame, untreated animals can be submitted to the diagnostic lab for examination.

Abortions:

-The greatest chance of reaching a useful diagnosis depends on submitting multiple fetuses from multiple aborted litters to the diagnostic lab for testing. Submitting three whole litters is optimal. Alternatively, 4-6 fetuses can be selected from three litters. Avoid single litters and single fetuses! Submission of placenta with fetuses is also preferred.

CYBERSECURITY CAPACITY IN CANADIAN AGRICULTURE: BUILDING RESILIENCE FOR A SUSTAINABLE FOOD SYSTEM

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SUMMARY

The agri-food system is a vital sector of the Canadian economy and farmers, as business people and entrepreneurs, are at the front lines of maintaining strong and resilient rural communities. Evolving food systems capable of supporting nine billion people in the context of climate change is one of the 21st century's key global challenges. Nationwide, a renewed public policy conversation is helping to position Canada as a global leader in food quality and productivity, informed by sustainable development goals. The opportunity presented by robotics, big data and artificial intelligence, machine learning, blockchain technologies, and low-cost sensors is poised to transform agriculture by revolutionizing how we produce food and how we distribute it. While digital transformation is not without its challenges , next-generation equipment – along with agronomic and other data analytic services – are giving producers the opportunity to manage each hectare of land and each individual animal in near real-time. These "precision agriculture" or "smart farming" technologies provide opportunities to boost productivity and profitability and to enhance traceability. In addition to driving economic growth, digitalization also can help ensure that farmers use inputs such as antibiotics or fertilizers more precisely, and lessen harmful outputs (emissions, waste and land disturbance), thus reducing agriculture's environmental footprint. As a critical infrastructure, the food supply chain – from farm to fork – is essential to the health and wellbeing of every Canadian. However, like other critical infrastructures, the agri-food sector is becoming a growing target for cyber attacks. This session will consist of two components: (1) knowledge sharing of findings from the *Cyber Security Capacity in Canadian Agriculture* initiative, a multi-year project funded by the Government of Canada, which aimed to understand and develop knowledge resources to support, cybersecurity capacity in Canadian agriculture; and (2) a facilitated exercise within which participants will learn the basics of developing an on-farm cybersecurity policy. Participants will also receive information about a suite of resources designed to help producers develop greater awareness of the value of attending to on-farm cybersecurity as a new best management practice for farm business risk management and farm business development.

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LEGAL COMPLIANCE FOR AGRICULTURAL EMPLOYERS IN ONTARIO

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SUMMARY

The vast array of legislation impacting Ontario workplaces in agriculture can be nothing short of overwhelming. Navigating through the web of rules and regulations is not only difficult, but often leaves producers feeling like they have less answers than they did before.

While every situation a producer may encounter is different, having a solid knowledge of the legal framework regarding what workplace regulations may apply gives an advance start in dealing with situations appropriately, as well as taking pre-emptive action to ensure legal compliance.

APPLICABLE LAWS

1. *Employment Standards Act,* 2000, SO 2000 c 41
2. *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1
3. *Workplace Safety and Insurance Act*, 1997, S.O. 1997, c. 16, Sch. A
4. *Human Rights Code*, RSO 1990, c. H.19
5. *Agricultural Employees Protection Act*, 2002, S.O. 2002, c.16
6. *Immigration and Refugee Protection Regulations*, SOR/2002-227
7. *Environmental Protection Act*, RSO 1990, c E.19

CASE STUDIES

1. Violation of the *OHSA*: *Ontario (Ministry of Labour) v. Cramer Dairy Farms Inc.,* 2009 ONCJ 118

Facts: Cramer Dairy Farms Ltd. ("Cramer Dairy") was owned and operated by two brothers. The brothers had employed their nephew Peter to work on the farm. In 2011, Cramer Dairy installed new underground electrical cables and water lines to a milk house and machine shed. The project involved the digging of a trench. During the course of the project, the trench collapsed, and Peter became trapped. Peter died as a result of the accident.

Findings: Because the accident occurred during the course of a construction project, the Construction Regulation of the *OHSA* was found to apply to the case, and Cramer Dairy was found to have been in violation of various aspects of it. The court found that the construction project was "very risky", due to existing soil conditions including three days of rain prior to the accident, and the inexperience of the person operating a backhoe. The court stated that it was an "unacceptably dangerous situation". This was an aggravating factor in sentencing. The court took into account that Cramer Dairy was a small family farm with modest economic activity, and that the family derived its living from the farm when determining the appropriate fine. It also took into account that there were no previous

offences, and that since the accident Cramer Dairy had taken steps to produce an employee manual in accordance with the *OHSA*.

Costs: Cramer Dairy was fined $80,000.00, plus the 25% victim surcharge which amounts to $20,000.00.

2. Violation of the *ESA*: *P&S VanBerlo Limited operating as Berlo's Sweet Potatoes v. Philip J. Banton*, 2016 CanLII 12223 (ON LRB)

Facts: P&S VanBerlo Ltd. ("VanBerlo Ltd.") was a family run farm growing tobacco, sweet potatoes and ginseng. VanBerlo Ltd. employed as many as 40 labourers at a time. Banton was employed as a seasonal labourer for two years on the farm, before becoming a full-time employee for an additional period of six and a half years. He earned $585.55 per week. In 2013 Banton suffered an injury to his finger resulting in partial amputation while working, and a WSIB claim was filed. The WSIB claim was denied on the basis that WSIB informed VanBerlo Ltd. to offer Banton modified duties. VanBerlo Ltd. made an offer of modified duties to Banton, which Banton refused. Banton then requested that an Record of Employment (ROE) be issued, so he could go off on sick leave. VanBerlo Ltd. refused to do so, and Banton filed a compliant with the Ontario Labour Relations Board. A few weeks later, VanBerlo Ltd. terminated Banton's employment purportedly on the basis that he had been working for another farmer during harvest season.

Findings: The court found that VanBerlo Ltd.'s decision to terminate Banton was directly related to him having filed a complaint with the Ontario Labour Relations Board. The court found that Banton was owed termination pay. In addition, he was owed compensation for loss of expectation of continued employment at a rate of 1 month per year of service, as well as damages for pain and suffering because Banton was injured and unable to work at the time of his dismissal.

Costs: VanBerlo Ltd. had to make payment of $3,793.00 to Banton for termination pay, $24,350.99 on account of loss of continued employment and $5,000.00 for pain and suffering.

3. Violation of the *HRTO*: *Moore v. Curraghmore Farm Inc.*, 2013 HRTO 1586

Facts: Curraghmore Farm Inc. ("Curraghmore Farm") was a horse farm. Moore began working at the farm in May of 2011. In June of 2011 Moore injured his right arm while mowing lawn at the farm. He received a doctor's note stating that he should be placed on light duties, which he provided to his employer the next day. Moore was told to go home. He returned for his next scheduled shift, and again was told to go home. Moore then received a phone call telling him that he was laid off due to lack of work, and an ROE was issued. After the ROE was issued, Moore was asked to come back to Curraghmore Farm on a few occasions to mow the lawn and complete other work. A WSIB claim was also filed. Moore did not do any other work for the farm after July 1, 2011.

Findings: The court found that Moore had been hired as a permanent employee, not seasonal. Furthermore, there was evidence that there was work available to be done at the farm after Moore was terminated. The court also found that Curraghmore Farm did not accommodate Moore's injury because he was sent home as opposed to accommodated

duties being offered. On a balance of all of the evidence, the court found that Moore was terminated due to his injury, not lack of work.

Costs: Curraghmore Farm was ordered to pay $13,000.00 as damages for injury to dignity, feelings and self-respect to Moore. It was also ordered to pay a month's wages for lost wages to Moore, plus interest. The farm's WSIB premium may have also increased as a result of the claim, from anywhere in the range of 3-50% depending on total annual premium amount and number of claims filed in a 3 year period.

BASIC LEGAL COMPLIANCE REQUIREMENTS

A. PROPERLY CHARACTERIZING YOUR EMPLOYEES FOR ESA EXEMPTION PURPOSES

Under the *Employment Standards Act, 2000* ("*ESA*"), workers in several industries are subject to special rules and exemptions. In order to determine what special rules and exemptions apply to a particular employee, it must be determined which industry category they fall within. The employees of agricultural operations usually fall into one of the following industry categories: Farm Employee, Harvester, Construction and Regular ESA classification.

See attached ESA Characterization Memo.

B. WORKPLACE VIOLENCE AND HARASSMENT POLICIES

Every employer in Ontario must prepare and review, at least annually, a policy on workplace violence, as required by the OHSA [section 32.0.1 (1) (a) and (c)].

This policy is required regardless of the size of the workplace or the number of workers.

If six or more workers are regularly employed at a workplace, this policy must be in writing and posted in a conspicuous place in the workplace.

See attached Example Violence and Harassment Policy.

C. POSTING REQUIREMENTS

All workplaces covered by the *Employment Standards Act* must distribute an employment standards poster to all employees. Employers are no longer required to post it in the workplace.

All workplaces covered by the *Occupational Health and Safety Act* must put up:

- a health and safety at work poster
- a copy of the *Occupational Health and Safety Act*
- the names and locations of your workplace joint health and safety committee members

See attached Employment Standards Poster and Health and Safety at Work Poster.

D. JOINT HEALTH AND SAFETY COMMITTEES

A joint health and safety committee is required if there are 20 or more workers who are regularly employed and have duties related to one or more of the following operations:

- Mushroom farming
- Greenhouse farming
- Dairy farming
- Hog farming
- Cattle farming
- Poultry farming.

Starting June 30, 2006, a worker health and safety representative is required on:

- All farming operations with 6 to 19 regularly employed workers, regardless of the type of farm or commodity, and
- Farming operations that have 20 or more regularly employed workers that are not required to have a joint health and safety committee.

Attachments:

1. ESA Characterization Memo
2. Example Violence and Harassment Policy
3. Employment Standards Poster
4. Health and Safety at Work Poster

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Employee ESA Characterization

Overview:

Under the *Employment Standards Act, 2000* ("*ESA*"), workers in several industries are subject to special rules and exemptions. In order to determine what special rules and exemptions apply to a particular employee, it must be determined which industry category they fall within.

Agricultural Employment Categories:

A. **Farm Employee:** A person whose work is a direct part of the primary production of certain agricultural products (i.e., planting crops, cultivating, pruning, packing produce, shipping produce).

B. **Harvester:** A person employed to harvest, gather, or bring in crops.

C. **Construction:** A person employed to complete constructing, altering, decorating, repairing or demolishing buildings, structures, roads, sewers, water or gas mains, pipe lines, tunnels, bridges, canals or other works.

D. **Regular ESA Classification**: Staff whose role is not specifically and only related to primary agricultural production.

ESA Exemptions for each Employment Category:

A. **Farm Employees**

Farm employees are ***not*** entitled to:

- minimum wage;
- daily/weekly limits on hours of work;
- daily rest periods
- time off between shifts;
- weekly/bi-weekly rest periods;

- eating periods;
- three-hour rule;
- overtime pay;
- public holidays/public holiday pay;
- paid vacation.[1]

B. **Harvesters**

Harvesters are ***not*** entitled to:

- daily/weekly limits on hours of work;
- daily rest periods;
- time off between shifts;
- weekly/bi-weekly rest periods;
- eating periods;
- overtime pay.

However, harvesters differ from farm employees in that they ***are*** entitled to:

- public holidays/public holiday pay ***if*** they have worked for the same employer for at least 13 consecutive weeks;
    - if a harvester is required to work on a public holiday, the employer can either pay them their regular rate for hours work and give them another day off with holiday pay, or the employer can pay them public holiday pay and premium pay for hours worked
- vacation pay ***if*** they have worked for the same employer for at least 13 weeks (*does not have to be consecutive weeks in this case);
- minimum wage, unless they are being paid on a piece work basis and the rate is high enough that at least minimum wage could reasonably be earned or if the employer provides room and board and deducts those costs from pay.[2]

C. **Construction Workers**

Construction employees are ***not*** entitled to:

- daily/weekly limits on hours or work;
- daily rest periods;
- time off between shifts;
- weekly/bi-weekly rest periods;
- notice of termination/termination pay;
- severance pay;

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[1] Ministry of Labour, Immigration, Training and Skills Development, *Agriculture, growing, breeding, keeping and fishing* (31 May 2022), online: Government of Ontario <https://www.ontario.ca/document/industries-and-jobs-exemptions-or-special-rules/agriculture-growing-breeding-keeping-and-fishing#section-0>.
[2] *Ibid*.

- public holidays/public holiday pay if they have been ***either***:
    - employed for less than 5 years and receive 7.7 percent or more of their hourly wages for vacation or holiday pay
    - employed for 5 years or more and receive 9.7 percent or more of their hourly wages for vacation or holiday pay.[3]

All Construction employees are entitled to regular overtime pay, unless they are working on road construction or maintenance, or sewar/watermain construction.

[3] Ministry of Labour, Immigration, Training and Skills Development, *Manufacturing, construction and mining* (31 May 2022), online: Government of Ontario <https://www.ontario.ca/document/industries-and-jobs-exemptions-or-special-rules/manufacturing-construction-and-mining>.

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This example policy is not meant to be legal advice. Before finalizing a policy, it is recommended that you obtain legal advice, to ensure it is tailored to your operation. However, this example policy will be a useful tool in creating a legally compliant police for your workplace.

EXAMPLE WORKPLACE VIOLENCE AND HARASSMENT POLICY

_____ maintains a zero-tolerance policy towards harassment, discrimination, and violence in the workplace. _____ is committed to providing a safe and healthy work environment free from violence, threats of violence, discrimination, harassment, intimidation and disruptive behaviour for all of our employees. _____ has adopted this policy which prohibits harassment, discrimination, violence and threats of violence, and encourages employees to take affirmative steps to identify and these situations.

The purpose of this policy is:

- to identify the types of behaviour prohibited by this policy
- to provide procedures to follow when complaints of discrimination or harassment made by employees _____ arise
- to ensure that all employees of _____ are aware that harassment and discrimination are unacceptable practices incompatible with our company standards, and a violation of the law

1. SCOPE:

This policy:

- applies at every level of _____ and extends to all owners and employees (including full-time, part-time, temporary, probationary, casual and contract staff)
- applies to every aspect of the employment relationship, including recruitment, selection, promotion, transfers, training, salaries, benefits, discipline and performance appraisals

The Ontario Human Rights Code prohibits discrimination on the basis of race, ancestry, place of origin, ethnic origin, citizenship, creed (religion), colour, sex (including pregnancy and gender identity), sexual orientation, disability, age (18 and over), marital status (including same sex partners), family status, receipt of public assistance (in accommodation) and record of offences.

_____ believes in and wholly supports the intent of the Human Rights Code and is committed to providing an environment free of discrimination, harassment, violence and threats of violence, where all individuals are treated with respect and dignity and can fully contribute and have equal opportunities.

_____ is committed to informing and educating employees about harassment, discrimination and violence, regularly monitoring organizational systems for barriers, providing a fair and effective complaints procedure and promoting appropriate standards at all times.

This policy prohibits discrimination and harassment based on the following grounds: age, creed, race, ancestry, place of origin, colour, national or ethnic origin, citizenship, language or dialect, religious or political beliefs, gender, sexual orientation, disability, marital or family status, or record of offences. Such acts may include: inappropriate physical contact, creating an intimidating or offensive work environment, or creating a degrading, humiliating or hostile work environment.

The policy also prohibits any form of threat or assault towards another person and/or property whether physical, verbal, in writing or electronic.

The following behaviour is prohibited under this policy:

Discrimination: means any form of unequal treatment based on a *Code* ground, whether imposing extra burdens or denying benefits. It may be intentional or unintentional. It may involve direct actions that are discriminatory on their face, or it may involve rules, practices or procedures that appear neutral, but disadvantage certain groups of people. Discrimination may take obvious forms, or it may happen in very subtle ways.

Harassment: means a course of comments or actions known, or ought reasonably to be known, to be unwelcome. It can involve words or actions that are known or should be known to be offensive, embarrassing, humiliating, demeaning or unwelcome, based on a ground of discrimination identified by this policy. Harassment can occur based on any of the grounds of discrimination.

Examples of harassment include:

- Epithets, remarks, jokes or innuendos related to a person's race, gender identity, gender expression, sex, disability, sexual orientation, creed, age, or any other ground
- Posting or circulating offensive pictures, graffiti or materials, whether in print form or via

e-mail or other electronic means

- Singling out a person for humiliating or demeaning "teasing" or jokes because they are a member of a *Code*-protected group
- Comments ridiculing a person because of characteristics that are related to a ground of discrimination. For example, this could include comments about a person's dress, speech or other practices that may be related to their sex, race, gender identity or creed.

Even if a person does not explicitly object to harassing behaviour, or appears to be going along with it, this does not mean that the behaviour is okay and it could still be considered harassment.

Sexual and gender-based harassment: sexual harassment is a form of harassment that can include:

- Gender-related comments about a person's physical characteristics or mannerisms
- Paternalism based on gender which a person feels undermines his or her self respect or position of responsibility
- Unwelcome and unsolicited physical contact
- Suggestive or offensive remarks or innuendoes about members of a specific gender
- Propositions of physical intimacy or of a sexual nature
- Gender-related verbal abuse, threats or taunting
- Leering or inappropriate staring
- Bragging about sexual prowess or questions or discussions about sexual activities
- Offensive jokes or comments of a sexual nature about an employee or client
- Rough and vulgar humour or language related to gender
- Display of sexually offensive pictures, graffiti or other materials including through electronic means
- Demands for dates or sexual favours

Sexual Solicitation: this policy prohibits sexual solicitations or advances by any person who is in a position to grant or deny a benefit to the recipient of the solicitation or advance. This includes managers and supervisors, as well as co-workers where one person is in a position to grant or deny a benefit to the other. Reprisals for rejecting such advances or solicitations are prohibited.

Poisoned environment: a poisoned environment is created by comments or conduct (including comments or conduct that are condoned or allowed to continue when brought to the attention of management) that create a discriminatory work environment. The comments or conduct need not be directed at a specific person, and may be from any person, regardless of position or status. A single comment or action, if sufficiently serious, may create a poisoned environment.

Violence: violence includes, but is not limited to the following:

- Causing physical harm to another person;
- Threats of any nature, whether verbal, in writing or electronic;
- Aggressive behaviour that constitutes a reasonable fear of bodily harm to another person;
- Verbal assault, causing emotional duress;
- Intentional damage or destruction of _____ property;
- Possession of a weapon while on _____ premises or while representing _____.

Employees have the right to lodge a complaint with _____ in the event they are being discriminated against or harassed by anyone in the work environment on any of the grounds protected in the Human Rights Code. Employees are encouraged to bring such complaints to the attention of _____ in order that _____. may ensure that all individuals can enjoy a workplace free from discrimination and harassment.

Employees and volunteers who engage in discrimination and/or harassment will be subject to disciplinary action up to and including dismissal.

2. REPORTING HARRASSMENT, DISCRIMINATION OR VIOLENCE

Every person has a right to claim and enforce their right to a workplace free of harassment, discrimination or violence. No person shall be negatively treated for bringing forward a complaint, providing information related to a complaint, or helping to resolve a complaint. It is a violation of _____ policy to discipline or punish a person because they have brought forward a complaint, provided information related to a complaint, or otherwise been involved in the complaint resolution process.

Complainants are encouraged to explain to the person who is harassing or discriminating against them that the conduct is unwelcome, but are not obliged to do so. If addressing the person responsible could lead to an escalation of the harassment or discrimination or the complainant believes it may lead to violence or safety risks, complainants should not be expected to have to directly interact with that person.

If the situation cannot be resolved by speaking to the person responsible, or the complainant does not wish to speak to that person with respect to the situation, a complaint may be made by speaking to _____. If the complaint is about _____, the complaint may be made to _____. If a complaint is made against a member of senior management or an owner of _____ an external third party will be called in to investigate. All complaints will be taken seriously and acted upon promptly. All efforts will be made to ensure a healthy work environment for the complainant and decisions and actions will be communicated to all parties.

Where possible, the complaint should be made in writing on the Workplace Violence & Harassment Reporting Form, including details of:

- What happened – a description of the events or situation

- When it happened – dates and times of the events or incidents
- Where it happened
- Who saw it happen – the names of any witnesses, if any

The person receiving the complaint will notify the person(s) complained against (the respondent(s)) of the complaint and provide the respondent(s) with a copy of the written complaint.

If necessary, based on the situation, the complainant or the respondent will be placed on a paid leave of absence, moved to a different location within the organization, or provided with alternative reporting relationships. The decision will be made on a case-by-case basis, and will reflect the principle that the complainant will not be penalized for making the complaint.

3. DISPUTE RESOLUTION

Where appropriate, _____ will offer the parties an opportunity to mediate the complaint. No person will be required to undertake mediation. Mediation may be conducted by _____ or a neutral and expert third-party mediator. Mediation may take place at any stage during the complaint process.

Representation

Complainants and respondents are entitled to seek representation of their choice, including legal counsel during the complaints process, at their own expense.

Documentation

Every person who believes he or she has experienced harassment, discrimination or violence, as well as every person who has been notified of a complaint against them, is advised to create and keep written notes about the events at issue, and to maintain any relevant written documentation.

Confidentiality

Advisors, investigators, mediators and persons receiving complaints will, to the extent possible, protect the confidentiality and privacy of persons involved in a complaint, subject to the requirements of a fair investigation and resolution process.

All documents related to a complaint, including the written complaint, witness statements, investigation notes and reports, and documents related to the complaint, will be securely maintained separate from personnel files.

4. INVESTIGATION PROCESS

All complaints will be investigated and held in strictest confidence. Names of complainant(s) will not be disclosed or the circumstances related to the complaint unless disclosure is necessary for the purposes of investigating the complaint or taking disciplinary measures in relation to the complaint.

Informal

At his\her discretion, the _____or designate may discuss the allegation with the complainant and alleged offender, with a view of reaching a resolution. This informal process provides the _____ or designate with an opportunity to resolve relatively straightforward complaints in an expeditious manner.

The informal resolution process will be concluded within fifteen (15) working days of submission of the complaint. If a resolution acceptable to both the complainant and respondent is agreed upon, the issue will proceed no further. A report of the resolution will be prepared by the _____ or designate and signed by both parties and added to the case file.

If no resolution is achieved, the complainant may ask the _____ or designate to initiate the formal complaint procedure.

Formal

The _____ or designated outside professional will interview the complainant and the person(s) alleged to have engaged in harassment or discrimination against the complainant.

A copy of the complaint report will be given to the respondent who will be given an opportunity to respond to the allegations in writing. The _____ or designate will interview any witnesses and collect any evidence related to the complaint. The _____ or designate may also seek advice from a lawyer or labour relations professional or appoint an outside investigator within thirty (30) days of the complaint being made.

Appointing an Investigator

An investigator may be selected from within the organization based on their ability to remain independent and objective. An external investigator who is knowledgeable about conducting harassment investigations may be brought in where it is identified as being appropriate to maintain a fair and neutral process.

The investigator will complete the investigation wherever possible, within ninety (90) days of

receiving the assignment. At the conclusion of the investigation the investigator will prepare a written report summarizing the allegations, will contain information gathered from interviews and evidence collected.

5. POTENTIAL OUTCOMES

Based on the findings in the investigator's report, the _____or their designate will decide whether the policy has been violated. If the policy has been violated, the _____will determine the appropriate consequences for the person(s) who violated the policy. These may include:

- An apology
- Education and training
- Verbal or written reprimand
- Counselling
- Suspension with pay
- Suspension without pay
- Termination of employment

In determining the appropriate consequences, the _____ will take into account the nature of the violation of the policy, its severity, and whether the individual has previously violated the policy.

Where a violation of the policy is found, the _____ will also take any steps necessary to repair the effects of the discrimination or harassment on the complainant, and to prevent any further recurrences of harassment or discrimination within the organization, as well as monitoring the outcome of the complaint.

6. COMMUNICATION

The complainant and the respondent(s) will each be provided with a copy of the investigator's report, and _____'s decision regarding outcomes.

Where a complainant is dissatisfied with the outcome of the complaint, he or she will be reminded of his or her rights under the Ontario Human Rights Code and the Occupational Health and Safety Act.

7. RELATED DOCUMENTS & REFERENCES

*Ontario Human Rights Commission (*http://www.ohrc.on.ca/en)
*Occupational Health and Safety Act (*https://www.ontario.ca/laws/statute/90o01)
*Ontario Human Rights Code (*https://www.ontario.ca/laws/statute/90h19)

Ministry of Labour, Training and Skills Development

Employment Standards in Ontario

The *Employment Standards Act, 2000* (ESA) protects employees and sets minimum standards for most workplaces in Ontario. **Employers are prohibited from penalizing employees in any way for exercising their rights under the ESA.**

What you need to know

Public holidays

Ontario has a number of public holidays each year. Most employees are entitled to take these days off work and be paid public holiday pay. Visit **Ontario.ca/publicholidays**.

Hours of work and overtime

There are daily and weekly limits on hours of work. There are also rules around meal breaks, rest periods and overtime. Visit **Ontario.ca/hoursofwork** and **Ontario.ca/overtime**.

Termination notice and pay

In most cases when terminating employment, employers must give employees advance written notice of termination or termination pay instead of notice. Visit **Ontario.ca/terminationofemployment**.

Vacation time and pay

There are rules around the amount of vacation time and pay employees earn. Most employees can take vacation time after every 12 months of work. Visit **Ontario.ca/vacation**.

Leaves of absence

There are a number of job-protected leaves of absence in Ontario. Examples include sick leave, pregnancy leave, parental leave and family caregiver leave. Visit **Ontario.ca/ESAguide**.

Minimum wage

Most employees are entitled to be paid at least the minimum wage. For current rates visit **Ontario.ca/minimumwage**.

Other employment rights, exemptions and special rules

There are other rights, exemptions and special rules not listed on this poster, including rights to severance pay and special rules for assignment employees of temporary help agencies.

Subscribe to our newsletter and stay up to date on the latest news that can affect you and your workplace. Visit **Ontario.ca/labournews**.

Learn more about your rights at:

Ontario.ca/employmentstandards

1-800-531-5551 or TTY 1-866-567-8893

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Version 9.0

Ontario

Health & Safety at Work

Prevention Starts Here

Ontario's **Occupational Health and Safety Act** *gives workers rights. It sets out roles for employers, supervisors and workers so they can work together to make workplaces safer.*

Improve Health and Safety:

- **Find out** about your Joint Health and Safety Committee or Health and Safety Representative.
- **Talk** to your employer, supervisor, workers, joint health and safety committee or health and safety representative about health and safety concerns.

Call the Ministry of Labour, Training and Skills Development at 1-877-202-0008

Report critical injuries, fatalities, work refusals anytime.

Workplace health and safety information, weekdays 8:30am – 5:00pm.

Emergency? Always call 911 immediately.

Find out more:
ontario.ca/healthandsafetyatwork

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Workers have the right to:

- **Know** about workplace hazards and what to do about them.
- **Participate** in solving workplace health and safety problems.
- **Refuse** work they believe is unsafe.

Workers must:

- **Follow** the law and workplace health and safety policies and procedures.
- **Wear** and **use** the protective equipment required by their employer.
- **Work** and **act** in a way that won't hurt themselves or anyone else.
- **Report** any hazards or injuries to their supervisor.

Employers must NOT take action *against workers for following the law and raising health and safety concerns.*

Employers must:

- **Make sure** workers know about hazards and dangers by providing information, instruction and supervision on how to work safely.
- **Make sure** supervisors know what is required to protect workers' health and safety on the job.
- **Create** workplace health and safety policies and procedures.
- **Make sure** everyone follows the law and the workplace health and safety policies and procedures.
- **Make sure** workers wear and use the right protective equipment.
- **Do everything** reasonable in the circumstances to protect workers from being hurt or getting a work-related illness.

Supervisors must:

- **Tell** workers about hazards and dangers, and respond to their concerns.
- **Show** workers how to work safely, and make sure they follow the law and workplace health and safety policies and procedures.
- **Make sure** workers wear and use the right protective equipment.
- **Do everything** reasonable in the circumstances to protect workers from being hurt or getting a work-related illness.

Ontario