Nutrition Updates from Canada's Top Researchers

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Nutritional strategies for improving performance, profitability and sustainability took centre stage at a conference that brought some of the livestock industry's top researchers together on May 2 and 3.

On the morning of the second day, scientists from the University of Alberta, the University of Manitoba and Agriculture and Agri-Food Canada in Sherbrooke, QC shared their newest findings on their goals and strategies for feeding pigs, from farrow to finish.

Chantal Farmer

Improving milk production from hyper-prolific sows

Milk yield, in terms of the amount produced per piglet, is falling behind as sows become more prolific, says AAFC lactation biologist Chantal Farmer, who is based in Sherbrooke.

In her presentation, Farmer said there are many different strategies available to improve milk production, but more research is needed to help boost the milk yield from hyper-prolific sows to help them support their larger litters.

The amount of milk a sow produces is the main determinant of how well a suckling pig will grow, yet sows do not produce enough milk to sustain optimum growth and this problem has become worse with development of hyper-prolific sows, said Farmer.

How the sow is fed before breeding, during gestation and after farrowing will have an impact on her mammary development, she said. Interestingly, flaxseed provided to a sow during gestation will also improve development of mammary glands in her female piglets.

Mammogenesis (mammary development) in swine occurs during three distinct stages: During pre-puberty (starting at 90 days), during the last third of gestation and during lactation. Feeding strategies during those stages will enhance mammogenesis, while feed restrictions can dramatically reduce mammary development.

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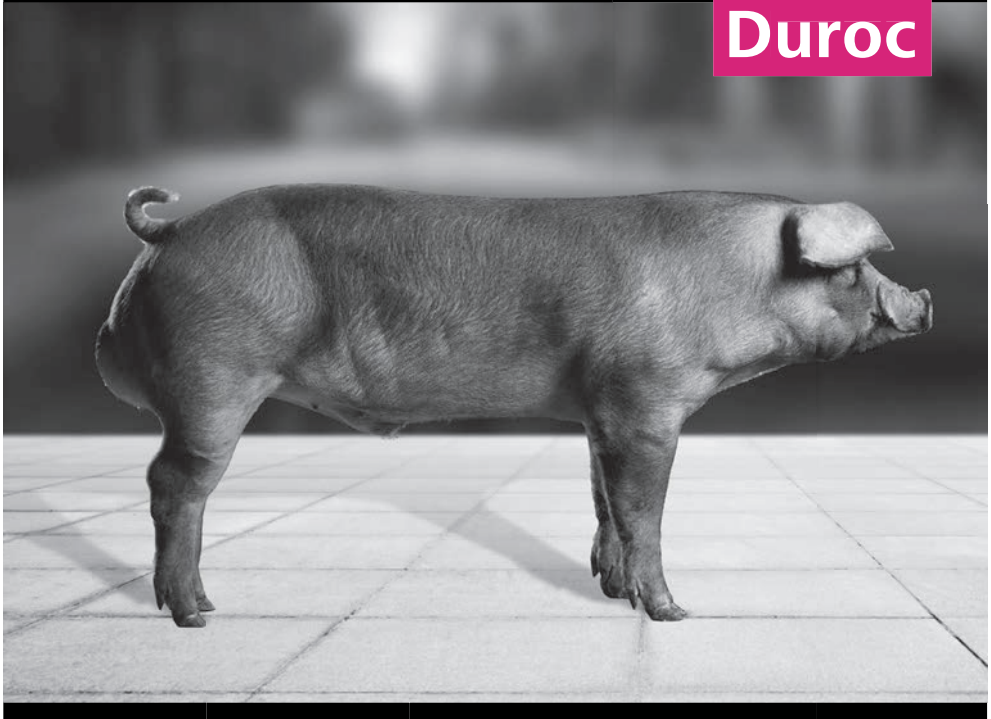

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Overall, maintaining body condition and ensuring that the sow is not exposed to cereal ergots are essential in ensuring good milk production, said Farmer. Ergot decreases prolactin concentration, which will have a "drastic" effect on mammary secretion, she said.

In brief, Farmer's studies have found that administering the phytoestrogen genistein from 90 days to puberty will increase the number of mammary cells. A high energy diet during late gestation will could harm mammary development and milk production, but it is important to maximize energy and protein intake during lactation, she said.

Environmental stressors, such as noise and high temperatures, can also reduce mammary development during gestation, said Farmer. She concluded her talk by saying there is still much more to learn about proper nutrition and management to improve mammogenesis in hyper-prolific sows.

Starch vs. Starch

Nutritionist Ruurd Zijlstra, Professor and Chair of Agricultural, Life and Environmental Sciences at the University of Alberta, presented research concerning use of pre-biotics as an alternative to dietary antibiotics for promoting gut health and growth in pigs.

Zijlstra explained at the outset that various starches contain varying levels of two distinct molecules; amylopectin, which is digested rapidly and converted to glucose and amylose (termed resistant starch), which is fermented in the gut.

Grains in general contain about 90 per cent amylopectin and 10 per cent amylose, said Zijlstra.

"When you are able to change the ratio of amylopectin to amylose in the starch matrix, you can make a starch either 100 per cent digestible all the way up to 100 per cent fermentable. The way we can make use of the knowledge is that crop breeders may develop varieties of different cereal grain with different rations of amylose to amylopectin, mostly for human nutrition," he said.

Ruurd Zijlstra

Zijlstra is part of a research team that published a paper in 2017 describing results from feeding purified starch from different grain varieties to grower-finishers and to nursery pigs.

"If I were a registered dietician, I would tell you, eat all the resistant starch that you can, eat all the fermentable fibre that you can, you will have much better gut health, lower risk of heart disease, lower risk of colon cancer and everything else, and of course, less chance of becoming obese because you have lower energetic efficiency," he said.

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"But, in pig production, we have some interest in making sure that our pigs reach market weight, at least within a reasonable time, so we need to find a balance between the good effects of gut health, but not running into problems with reduced energetic efficiency."

The target then, is to find the right amount of resistant starch to stimulate gut health, he said.

"Dietary carbohydrates can have a very strong prebiotic effect . . . and are certainly strongly associated with indicators of gut health," said Zijlstra.

More research is needed to find the right balance between good gut health and optimum growth, as well as to determine the benefits during a disease challenge, he said.

Results of the study were published in the September 2017 edition of the Oxford Journal of Nutrition.

Dr. Martin Nyachoti

Getting the Most from Dietary Co-Products

Martin Nyachoti, a professor in Animal Science at the University of Manitoba, presented results from a study performed with and co-authored by PhD candidate Jong Woong Kim.

Co-products such as canola meal and distillers' dried grains present both opportunities and challenges, Nyachoti said in his presentation.

"The work that has been done, especially in the last 10 years or so has generated a significant dataset on many of these co-products that I think can be utilized," said Nyachoti. "An approach to mitigating increases in feed cost is to expand the ingredient options that could be used to formulate effective livestock diets, hence the increased interest in co-products."

Any diet formulation must closely match the animals' needs, said Nyachoti.

However, co-products from seed-crushing and ethanol plants will contain high levels of fibre as well as some anti-nutritional factors.

When considering use of a co-product, it is therefore critical to understand its chemical characteristics and nutritive value; to use the best systems possible in formulating a diet, especially considering levels of energy, amino acid and phosphorous, and to properly apply technologies that enhance their nutritive value, including grinding and extruding.

Links to his study are available from his page on the University of Manitoba website.

The organizing committee from the 2018 conference acknowledges that it takes a team effort and the financial assistance from many organizations to be a success. They want to sincerely thank all of their 2018 sponsors for their generous support of this worthwhile industry event.

Past Proceedings - Animal Nutrition Conference
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Download the Proceedings of the Animal Nutrition Conference of Canada (ANCC).
2018 - Edmonton, AB (coming soon)
2017 - Quebec City, QC

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— By Brenda Kossowan

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