

FARM INNOVATION PROGRAM PROJECTS

Value-added manure coming to a field near you

Farmers are constantly plagued by nutrient loss in soils especially after summer and fall manure applications. Dr. Bonnie Ball Coelho, soil scientist with Agriculture and Agri-Food Canada, is looking at additives for swine manure to slow nitrogen conversion and minimize nutrient losses from leaching.

The project is just getting underway and Ball Coelho is encouraged by the early results. Currently in year one of three, she is testing the on-farm viability of additives to retain nitrogen in manure-applied soils. Ball Coelho is part of the Southern Crop Protection and Food Research Centre in London, Ontario, and is working together with Ontario Pork on this research, through the Federal Innovation Program (FIP).

Common in the US, many nitrification inhibitors are not registered in Canada and Ball Coelho's research project will test drive the addition of two products to swine manure. She expects the results will demonstrate how hog producers can conserve valuable nutrients to improve crop uptake and boost crop yields in manure-applied soils.

STARTING SMALL: LAB TESTING

Beginning in the lab, the nitrification inhibitor, ammonium thio-sulfate (ATS), and Biochar are mixed with manure in individual trials. ATS is a commercially available liquid fertilizer material that slows the conversion of ammonia to nitrogen. Biochar, an ash-like co-product of bio-oil production from wood waste, enhances carbon storage and may reduce N leaching in soils. The potassium contained in Biochar will better balance soil NPK ratios to match crop demand and it may delay N release.

Ammonium is a less mobile nitrogen source for plants than nitrate. So slowing the conversion of ammonium to nitrate, by adding ATS to manure, retains valuable nutrients in the soil, reduces the overall amount of N and prevents N from leaking through the soil into waterways. Similarly, Ball Coelho says Biochar immobilizes N for additional soil retention and prevents leaching. Biochar also increases the viscosity of liquid manure – an added on-farm benefit for watery manure or leaky soil. Manure odour is noticeably reduced with the addition

of Biochar, something farmers with close neighbours might appreciate.


GETTING DOWN IN THE DIRT

Ball Coelho's research has since been taken on-farm, and tested on winter wheat ground. "Winter wheat is an ideal crop to test nitrogen availability because it's easy to see if there is too much or too little N," says Ball Coelho. Throughout the 2011 winter, Ball Coelho and her team have been monitoring the water movement from the manure-applied field measuring water nutrients from field tile, run-off and deep percolation losses. The crop and water movement will be closely monitored right through to the 2011 harvest when crop yields and soil levels will be measured to gauge nutrient availability.

"Manure additives can pay off in many ways," says Ball Coelho, who lists added nutrients, nutrient balance and nutrient retention as the biggest incentives. Environmental benefits can be realized with reduced N leaching into waterways. And while it's difficult to attribute a dollar value to the reduction of manure odour, some farmers may find it priceless, depending on the proximity of their neighbours.

Although relatively inexpensive, Ball Coelho recommends large quantities of Biochar be added directly to manure pits for convenience and should be thoroughly mixed at time of spreading. Small scale trials have shown that once integrated into the tank, the Biochar will re-float to form a protective layer that may control manure odour. Since only small amounts of ATS are needed, preliminary research suggests farmers add ATS to manure tanks when applying.

With the next phase of research moving to on-farm trials farmers interested in participating in Ball Coelho's project are encouraged to contact Ontario Pork.

Ball Coelho's research will weigh the benefits of the additives and calculate the return on investment to evaluate their on-farm viability. ATS is readily available; BioChar may not be in some areas and is still in the early stages of research –but they could both offer swine farmers a new valuable and economical manure management tool. 

THIS PROJECT WAS FUNDED IN PART THROUGH GROWING FORWARD, A FEDERAL-PROVINCIAL-TERRITORIAL INITIATIVE. THE AGRICULTURAL ADAPTATION COUNCIL ASSISTS IN THE DELIVERY OF SEVERAL GROWING FORWARD PROGRAMS IN ONTARIO.



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Information transfer from farm to plant in real time

A small mobile tracking device has potential to deliver big advantages for Ontario's pork industry. A pilot project is underway by Ontario Pork to determine the feasibility of transmitting hog movement information electronically in real time. "We are looking at ways of making it more efficient to capture and transfer information to all players in the chain," says Tim Metzger, national program coordinator for Ontario Pork.

Metzger is working with two transport companies and one processing plant to test the concept of moving information instantly. Transporters involved in the study are equipped with the handheld devices that collect information at loading. When a truck is full and ready to go, load information is transmitted to the dispatch and processing facility. As such, processors are aware of the number of pigs on the truck, what farm they are coming from and when they were loaded.

One benefit of real-time hog tracking is accuracy. "Transporters usually book loads of pigs with an estimated number per load, but the actual number of pigs delivered may vary depending on how many pigs the producer feels are ready

to market on shipping day," explains Metzger. "With this new program, once load information is sent by the driver, the plant knows exactly how many pigs to expect."

Real-time tracking will be especially helpful in emergency situations – for instance, in the event of the temporary closure of a processing facility (due to a breakdown, etc.). In this situation, it is important to prevent hogs from being loaded. Once they are placed on a truck, hogs are usually not allowed back inside the barn for biosecurity reasons. Transferring load information in real time makes it possible to alert transporters not to load a truck, avoiding the difficult task of finding a holding spot for the hogs. Or in the case of a truck that is already loaded and en route to a closed facility, drivers can be contacted and appropriately redirected.

The added benefit of an electronic system is animal tracking, which complements the Canadian Swine Traceability System (PigTrace Canada) – a national program intended to enhance trace-back and trace-forward investigations during an animal disease outbreak affecting swine. Quick identification of animals and farms will improve the industry's chances of returning to trade as soon as possible. ■

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New technology keeps an 'eye' on pig performance

Manage your hog barn from the comfort of your home? That's what Kees de Lange and his swine research team at the University of Guelph are proposing, using cutting-edge video imaging and software technology to provide farmers with real-time performance data.

De Lange describes the new technology as "a small investment with the potential for a big payoff," and says it could be available to Ontario hog farmers in two years.

Introduced in the UK, this video imaging and software analysis program is being tested for accuracy in monitoring body weight gains in grower-finisher hogs. De Lange and his team have been working on the technology at the University of Guelph Arkell swine research unit for several months, and are now ready to test it on commercial hog operations in Ontario. On farm, the technology will measure the average weight per pen of hogs and help farmers make accurate management decisions.


"There is considerable potential for hog operations to improve production efficiencies using real-time performance monitoring," says de Lange. He predicts this technology could easily save hog farmers \$2 per hog by providing more accurate body weight data. With direct access to data via their home computers, farmers would be able to make on the spot decisions about selecting pigs for market and diet changes in multiple phase feeding programs. There would also be reduced labour costs since hogs won't need to be manually weighed on scales, and the convenience of having an extra video camera 'eye' in the barn at all times.

"Farmers can receive video images continuously to measure and analyze their hogs," says Elyse Love, a masters student working on the project and analyzing data that is

being collected. Video cameras are set up above feeders and drinkers, areas where hogs generally stand still long enough for cameras to capture accurate images. The software uses the images to trace the hog's shoulders, mid-back and hams. The images are then checked automatically to confirm accuracy and reliability, converted to average pen body weights and stored on the computer which can be accessed via the internet.

The software application is currently being tested to estimate the body weights of individual pigs as well as pen averages. In the next phase when the technology goes on farm, the focus will be on pen averages to help farmers make management decisions on a pen-by-pen basis. Love notes the challenge with estimating average pen weights is that not all pigs in a pen contribute equally to the total number of images in a particular pen. "For example, if a heavy pig contributes more images, this may result in a bias and overestimate the average pen weight," adds Love. "This explains why the emphasis is on images from individual pigs in the studies that we are conducting at the university."

Project partner, Wallenstein Feeds of Wallenstein, Ontario, provided the original connection between the UK company and the University of Guelph. Ontario Pork and the Farm Innovation Program (FIP) are also partners in the research project, to bring this innovative management tool to Canadian hog farmers.

"The preliminary data shows potential but further assessment is needed," says de Lange. He will continue to work with the team to evaluate the video imaging and software technology, assessing the practical applications as an on-farm management tool. 

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Reducing feed costs for gestating sows with condensed distiller solubles

Adding condensed distiller solubles (CDS) – commonly referred to as corn syrup – to gestating sow rations can lead to considerable savings in feed costs on farms with existing liquid feed infrastructure.

This is the finding of a recent Farm Innovation Program (FIP) research project conducted by Rodney, Ontario pork producer Marijn Fleuren and Dr. Paul Luimes at University of Guelph's Ridgetown Campus. "We reduced the cost of our sow ration by \$7.05 per metric ton (MT) as fed or \$3.41 per sow which, in our case, translates to \$1,194 per year," says Fleuren, who farms 350 sows farrow-to-finish with his parents.

Fleuren and Luimes's work builds on research that shows CDS can be a beneficial and cost-effective ingredient in hog diets relative to corn and soybean meal. At the farm level, however, adding these ingredients into on-farm mix rations can pose a challenge.

"The mechanical addition of a liquid product into a dry feed ration requires careful design and calibration," explains Fleuren. As such, the FIP study set out to develop a system to effectively incorporate liquid CDS into dry feed for gestating sows.


The research was ideally suited to Fleuren's operation as a liquid feed system was already in place for his finishing pigs. Making the system work for gestating sow rations required some experimentation in order to get the pump working properly and adequately blending.

Once they achieved the optimal set-up, the researchers tackled the secondary study objective – to determine the maximum inclusion rate from a mechanical perspective. This rate was based on the mechanical limitations, specifically how well it mixed. Results showed gestating sows can be fed a dry feed ration that contains 60 kg CDS/MT as fed (based on mechanical limitations) without an impact on feed intake or manure consistency.

If dry corn was used in the sow ration instead of high-moisture (23%) corn, the inclusion rate could be increased to 140 kg/MT as fed, which translates to even greater feed cost savings of \$16.45/MT or \$7.97 per sow.

As there was no impact on feed intake, the study also demonstrated that sows have a similar appetite for a dry feed ration with liquid CDS compared to a non-CDS ration.

The adoption rate of this technology on other farms will depend on existing infrastructure. "Installing a storage tank along with the pump, plumbing and electrical would likely make the technology cost prohibitive," says Fleuren. "However, if there is some existing infrastructure, this technology could be a cost-effective addition."

In their final report, Fleuren and Luimes include practical pointers and pictures to help producers set up similar projects. The report also provides details of potential financial savings. More information about the study and its results can be found online at www.ontariopork.on.ca. 

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