Use of Novel Technologies to Optimize Pig Performance, Welfare and Carcass Value

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Keeping on top of new technologies is critical for businesses to remain competitive and profitable. Technology for data recording is becoming increasingly important and more affordable in pork production whether you are a commercial hog producer, a swine genetics company or involved in the packing and processing of pork. It simply comes down the old adage that you can't improve what you don't measure. But of course, there is much more to it

Figure 2. Pens at CDPQ's Deschambault test station with feed and water intake recording as well as play objects fitted with accelerometers
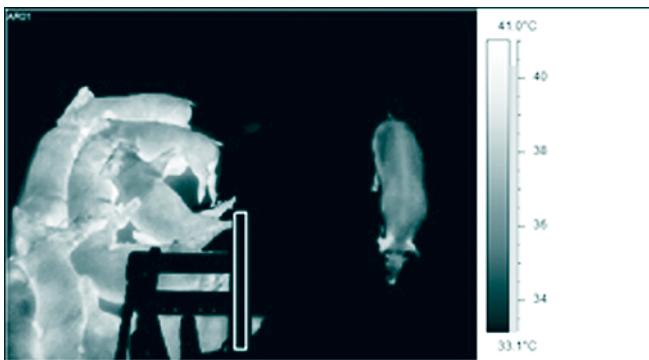

Figure 1. An infrared camera image of a pen of pigs at AAFC's Lacombe Research and Development Centre

than simply adopting every technology that you hear or read about. There is a need to identify technologies that can truly help your business and be sure the technologies can work as promised. It can be challenging, if not impossible, for individual businesses to adequately assess and test many of the promising technologies that are out there. Collective efforts by the industry can address this challenge and with that in mind, the Canadian Centre for Swine Improvement (CCSI) is coordinating a large collaborative project on novel technologies. Some of the technologies tested can help monitoring pigs from nursery through to market weight. Others measure carcass and pork quality attributes. There are even technologies able to predict carcass and pork quality on the live animal.

The project includes the following pilot studies, three on live pigs and five on carcass and pork quality:

- Automated recording of feed/water intake and 3D vision systems to estimate weight/ conformation
- Infrared thermography diagnostic platform to monitor swine to health and predict feed efficiency
- Use of accelerometers to automatically assess pig behaviour and welfare
- Using 3D vision for rapid and objective hog carcass quality assessment
- Rapid in vivo prediction of pork composition and quality traits using near-infrared spectroscopy
- Determination of the age of bruises on pig carcasses at slaughter
- Application of rapid methods for non-invasive assessment of pork quality
- Quick, non-invasive technology for prediction of loin marbling in fresh loins on the cutting line

These pilot studies are underway in research facilities and will be completed during 2016. The results will help the industry to make informed decisions about these technologies. In each case we need to consider the value of what is being
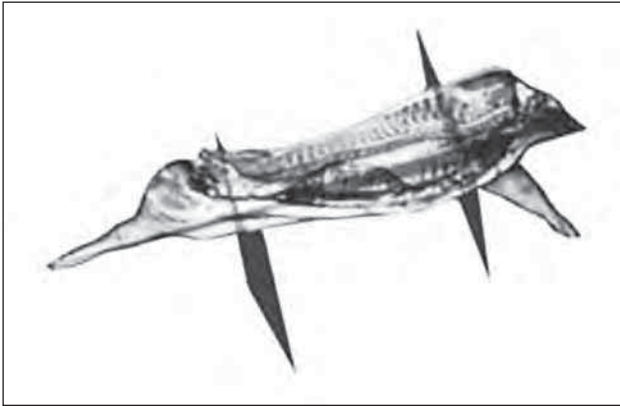
Figure 3. A 3-dimensional image captured on a half carcass at AAFC's Sherbrooke Research and Development Centre

measured as well as the accuracy, the cost and the practicality. Knowing which technologies are not ready yet is just as important as knowing which technologies are ready for commercial testing. From those that are deemed ready, the goal is to work with industry partners to test each selected technology on a total of at least 1000 pigs and carcasses.

One of the technologies that is now being considered for commercial tests is the automated recording of water intake. In the pilot study the water intake on individual pigs has been found to correlate highly with feed intake. As well, sudden changes in water intake can be indicators of individual pig health. The technology may also be helpful in assessing and reducing water wastage which was found to vary considerably amongst individual pigs. This could lead to a practical tool which can improve efficiency and pig health while also reducing environmental impact.

The overall project is assessing several novel technologies which can help producers to monitor health, welfare and feed efficiency while also offering tools to predict and enhance carcass value. There are also technologies for packers to better evaluate carcass and pork quality. This will allow them to get more value from each carcass and also to provide signals back to producers to motivate further improvement. The importance of attracting investment in new technologies is apparent as all industries are benefiting from greater data management and process control through electronically controlled devices. An added advantage of moving toward novel technologies and more electronically controlled devices is the attraction of new employees seeking to use their technical skills and interest as part of their career, thus a benefit in the pork industry to attract younger and well qualified personnel.

This project is funded by Swine Innovation Porc within the Swine Cluster 2: Driving Results Through Innovation research program. Funding is provided by Agriculture and Agri_Food Canada through the AgriInnovation Program, provincial producer organizations and industry partners.

About the Canadian Centre for Swine Improvement (CCSI)

CCSI is a non-profit organization created in 1994 to provide support to the Canadian pork industry by providing leadership, innovation and coordination in national genetic evaluations; database establishment and maintenance; program standards; and research and development. Members include Canadian Pork Council, Canadian Meat Council, Canadian Swine Breeders Association, regional swine improvement centres and users of the Canadian Swine Improvement Program.

PSC Scientist participates in world code for swine welfare

Dr. Jennifer Brown
Research Scientist- Ethology

Prairie Swine Centre In March, Dr. Jennifer Brown, PSC's Research Scientist in Ethology, travelled to Paris to participate in a meeting of the OIE (World Organisation for Animal Health). The purpose of the meeting was to draft international animal welfare guidelines for pigs, similar to our Canadian Codes of Practice, but in this case for the entire planet! The OIE is the organization responsible for improving animal health worldwide, and is recognized by the World Trade Organisation, with a total of 180 Member Countries. Its primary responsibility is related to animal health and the development of guidelines for disease detection, notification, prevention and control. More recently the OEI has developed welfare guidelines for animal transport, slaughter, care of lab animals and livestock. The OIE's Terrestial Animal Health Code already includes specifications for beef cattle, dairy cattle and broiler chickens, with pig and horse codes now under development. Dr Brown was the only North American participant; other committee members include vets and researchers representing Denmark, Spain, Brazil, China and Australia. The pig code will now be reviewed and ratified by all member countries, and will be completed in 2017.