Use of loin intramuscular fat content predicted with ultrasound technology in the Canadian Swine Improvement Program

Canadian Centre for Swine Improvement inc.

CDPQ Centre de développement du porc du Québec inc.

Laurence Maignel[1], Jean-Paul Daigle[2], Stefanie Wyss[1], Frédéric Fortin[2], Brian Sullivan[1]

[1]Canadian Centre for Swine Improvement (CCSI), Central Experimental Farm, Building #54, 960 Carling Avenue, Ottawa, Ontario, K1A 0C6

[2]Centre de développement du porc du Québec (CDPQ), Place de la Cité, tour Belle Cour, 2590, boul. Laurier, bureau 450, Québec City, Québec G1V 4M6

Context

Pork marbling is an important meat quality trait for some international and domestic markets, and a main component influencing sensory quality. The Canadian swine industry has a strong reputation of high quality and standards. Improving or differentiating Canadian products will be vital in the coming years. Moreover, pigs have been selected very efficiently for leanness in the past decades to address market requirements, and this has probably resulted in a slow decrease in intramuscular fat (IMF) levels. The Canadian Centre for Swine Improvement (CCSI) has been working for several years on the development of methods to predict loin marbling levels in live pigs in order to include it in the Canadian Swine Improvement Program.

Training and Accreditation of Swine Technicians for IMF Scanning

Intramuscular fat predicted on live pigs has been recently included in the Canadian accreditation program for ultrasonic technicians managed by the Canadian Centre for Swine Improvement. This program has been in place for many years to make sure that scanning data (backfat and lean depth) recorded on farms across Canada are collected by certified technicians using specific standards. A total of 41 technicians are currently accredited under the CCSI program and send scanning data to the CCSI database for genetic evaluations. In 2009, intramuscular fat content was added to the national accreditation program, and 10 senior technicians are currently certified for loin IMF scanning.

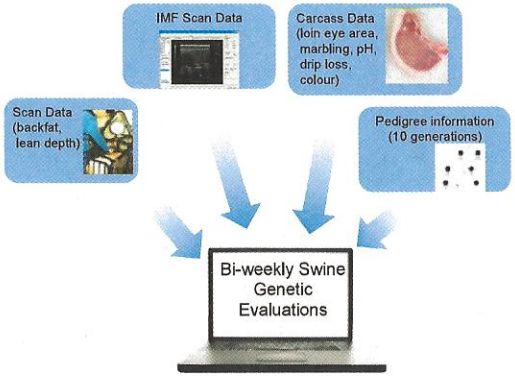
Genetic Evaluation of Purebred Breeding Stock for Loin Intramuscular Fat

Previous studies have shown that loin IMF % predicted on live pigs is well correlated with chemical intramuscular fat (r=0.69) and is highly heritable (h^2=0.69). CCSI has developed web tools and genetic evaluation programs to be able to centralize IMF data and include it in bi-weekly genetic evaluations for purebred swine.

IMF data centralization

All ultrasound images collected on purebred Durocs by certified technicians are loaded into the CCSI database and analyzed remotely. The image analysis results are made available on-line for breeders.

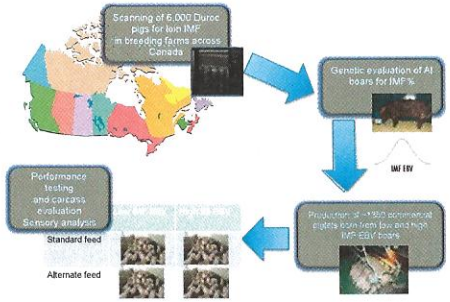
Genetic evaluation



Predicted loin IMF % is combined with other scanning data and any carcass data available on scanned pigs and their relatives, to compute estimated breeding values (EBVs) for loin IMF content using a specific statistical methodology (BLUP).

New Project on 'Production of Highly Marbled Canadian Pork by Combining New Technologies, Quantitative Selection and Feeding'

A large research project involving 6,000 Duroc pigs scanned across Canada was designed to enlarge the live IMF database and confirm genetic parameters estimated in a previous study.



Data collected during the project are used for genetic evaluation of IMF. Boars with either low or high IMF EBVs are used to produce commercial pigs fed with standard or specific feeding programs formulated to increase marbling. The field tests will provide valuable information about the effect of genetics and feeding on the marbling level in pork loins.

Implications for the Meat Processors

Canada is the first country to include intramuscular fat predicted with ultrasound technology in its national program with the aim to provide genetic tools for breeders and producers across Canada to customize marbling levels in pork loins. Combining genetics and feeding adequately will provide the meat industry with consistent products adapted to specific domestic and export markets.

Acknowledgments

This project is supported by the Canadian Agricultural Adaptation Program from Agriculture and Agri-Food Canada.