Canadian Centre for Swine Improvement
Annual Report

2008-2009

Annual Meeting
June 17, 2009
Wendake, Québec

The Canadian Centre for Swine Improvement Inc. is a national organization managed by a Board of Directors with representatives from the following member organizations:

CANADIAN PORK COUNCIL

CANADIAN MEAT COUNCIL

CANADIAN SWINE BREEDERS ASSOCIATION

ATLANTIC SWINE CENTRE

CENTRE DE DÉVELOPPEMENT DU PORC DU QUÉBEC INC.

ONTARIO SWINE IMPROVEMENT INC.

WESTERN SWINE TESTING ASSOCIATION

CCSI's mission is to enhance the ability of the Canadian swine industry to compete domestically and abroad, by providing leadership, coordination and services for swine genetic improvement

.

Central Experimental Farm, Building # 54, 930 Carling Ave, Ottawa, Ontario, K1A 0C6
Telephone: (613) 233-8872 - FAX: (613) 233-8903
E-mail: info@ccsi.ca Internet: www.ccsi.ca

Canadian Centre for Swine Improvement Inc.

Annual Report 2008/2009

Table of Contents

Message from the Chairman

Welcome everyone to our 2009 AGM. It has been my honour and pleasure to serve as your chairman for the past year. I approached the position with excitement and some trepidation. I had big shoes to fill following John Vande Glind's excellent leadership.

CCSI provides a very important service that is integral to my business and to many of yours. It is certainly in my best interest to see that it continues to grow and thrive. I believe that CCSI provides the means for private purebred breeders to succeed by producing and providing top genetics at home and around the world. That said, the swine industry has had more than its fair share of challenges from currency values to H1N1. All we can wonder is, "what next?"

The ability of our customers to pay for the improved genetics we provide or to recover the cost is severely diminished. Often the best solution I have heard offered by the so-called experts is "Don't worry, it'll get better, it always has". For me, that holds out little hope but it is the best we have to go on for now.

It has been a great experience to work with Brian. He does have the optimistic attitude that genetic improvement must continue, despite the general situation of the industry. The financial situation of CCSI has been a challenge as long as I have been involved on the board, but Brian is able to keep things on track and moving forward.

We are making an effort, as a board, to become more involved with the management of CCSI to give the additional support that we feel it needs to be successful. There are a lot of challenges with communication when the board represents stakeholders from all of Canada but with some effort to use the technology available we should be able to improve our communication.

One of my goals, as chairman, is to get the new technology developed at CCSI used at the breeder level. I have felt, for some time, that we have a gap in getting breeders to use the new tools available.

Thank you to Brian and his staff for accepting me in my new role. I continue to be impressed by how you keep a multitude of projects going at the same time.

Finally, thank you to the board of directors for your input and support this past year. It was a learning experience for me and you have been very patient and forgiving. I hope that, together, we can advance CCSI and the Canadian swine industry.

Mr. John Gough

Chairman

Proposed Agenda for June 17, 2009

1. Message from Chair
2. Approval of agenda
3. Approval of minutes from last Annual Meeting – June 10, 2008
4. General Manager's report
5. Presentation and Approval of Financial Report for the year ending March 31, 2009
6. Selection of Auditor
7. CCSI Awards
8. Names of Directors appointed to CCSI's 2009/10 Board
9. Other Business
10. Adjournment

Minutes from Last Annual Meeting

ANNUAL MEETING OF THE CORPORATION
Canmore Inn & Suites, Canmore, Alberta
June 10, 2008

Board of Directors 2007/08

Madeleine Hayeur	Canadian Swine Breeders Association
Stephen Moffett	Canadian Pork Council
John Webb	Canadian Meat Council
Dan Hurnik	Atlantic Swine Improvement Centre
Donald MacDonald	Atlantic Swine Improvement Centre
Lyse Grenier-Audet	Centre de Développement du Porc du Québec
Pierre Falardeau	Centre de Développement du Porc du Québec
John Gough	Ontario Swine Improvement
Phil Smith	Ontario Swine Improvement
John Vande Glind	Western Swine Testing Association
Alfred Wahl	Western Swine Testing Association

Board of Directors 2008/09

Scott Robinson	Canadian Swine Breeders Association
Stephen Moffett	Canadian Pork Council
John Webb	Canadian Meat Council
Dan Hurnik	Atlantic Swine Improvement Centre
Donald MacDonald	Atlantic Swine Improvement Centre
Pierre Falardeau	Centre de Développement du Porc du Québec
Lyse Grenier-Audet	Centre de Développement du Porc du Québec
John Gough	Ontario Swine Improvement
Phil Smith	Ontario Swine Improvement
John Vande Glind	Western Swine Testing Association
Alfred Wahl	Western Swine Testing Association

Directors present at the meeting were Pierre Falardeau, John Gough, Lyse Grenier-Audet, Donald MacDonald, Stephen Moffett, Scott Robinson, Phil Smith, John Vande Glind and Alfred Wahl.

1. Message from Chair

John Vande Glind opened the meeting at 10:00 am. The Chair's message is shown on page 1 of the 2007/08 Annual Report..

2. Approval of Agenda

Moved by Phil Smith. Seconded by Donald MacDonald. Carried.
That the agenda be approved as circulated.

3. Approval of minutes from the last Annual Meeting

Moved by John Gough. Seconded by Stephen Moffett. Carried.
That the minutes be approved as circulated.

4. Activity Reports

4.1 General Manager's Report

The General Manager's report was presented by Brian Sullivan and is shown on pages 5 to 10 of the Annual Report.

4.2 Chief Geneticist's Report

The report of the Chief Geneticist was presented by Pramod Mathur and is shown on pages 11 to 16 of the Annual Report.

4.3 Computer Services Manager's Report

The report of the Computer Services Manager was presented by Jim Groves and is shown on page 17 to 18 of the Annual Report.

5. Presentation and Approval of CCSI's Financial Statements

5.1 Financial statements for year completed March 31, 2008

Moved by Lyse Grenier-Audet. Seconded by Alfred Wahl. Carried.
That CCSI's financial statements for 2007/08 be approved as circulated.

5.2 Selection of an Auditor

Moved by Alfred Wahl. Seconded by Donald MacDonald Carried.
That Bath Haché CA Professional Corporation be selected as the firm to conduct the next financial audit for CCSI.

6. CCSI Awards

Alfred Wahl was the winner of the Brian Kennedy Memorial Award for 2008. Albert Eringfeld and John Vande Glind presented the award. Murray Roeske was the winner of the CCSI Swine Breeders' Merit Award. His award was presented by Alfred Wahl and Brian Sullivan the yesterday evening as he was unable to attend today's meeting. Dave Vandenbroek also took the opportunity to present the Ontario Swine Improvement Industry Contribution Award to Pramod Mathur, who was unable to be present to receive the award at the OSI Annual Meeting in 2007.

7. Names of Directors appointed to CCSI's 2008/09 Board

Members of the Board of Directors for 2008/09 are listed above.

8. Other business

Donald MacDonald expressed gratitude to Western Swine Testing Association for hosting this year's meeting and a special thanks to Wim Van Berkel for the tremendous hospitality.

Stephen Moffett commented that the Canadian Pork Council very much recognized the importance of the high quality of Canadian genetics. CPC has a very high level of respect for CCSI and he is very impressed with the advancements that have taken place. CPC has full confidence in and supports

CCSI. They appreciate the communication and cooperation that exists between the two organizations..

9. Adjournment

Moved by Lyse Grenier-Audet that the meeting be adjourned.

The meeting was adjourned at 11:49 am.

General Manager's Report

CCSI's 14th year of operation was a busy and productive year. Some of the highlights include:

- 73,552 nucleus pigs tested in 84 herds
- 66,409 litter records used in genetic evaluation for sow productivity
- Implementation of a new service for evaluation of intramuscular fat in live pigs
- 25 technicians certified for ultrasonic scanning of backfat and loin muscle
- Establishment of a pork quality standards working group
- 6 research projects in the areas of molecular genetics, pork quality and disease resistance
- *e*Farm as a web-based sow management package for commercial producers, including a Chinese version being used by producers in China
- A series of workshops on Canadian swine genomics held at the Plant and Animal Genome conference, and the Banff Pork Seminar leading to the creation of PigGen Canada
- Initiation of new research projects and proposals focusing on genomics
- participation in the National Pork Value Chain Roundtable, the National ID and Traceability Committee and the Canadian Swine Health Board
- New services for other species groups

More information on these and other activities can be found in other sections of this report. I encourage you to read through the report and feel free to contact any of us at CCSI regarding these or any areas of common interest.

Genetic suppliers in Canada have continued to invest time, energy and money into maintaining and improving our genetic resources. This is in spite of the severe financial challenges facing the swine industry. They have also recognized, more than ever, the importance of cooperating for the collective good of the whole industry in the area of genomics research. This focus on science and innovation will help ensure that Canada's swine genetics remain a key competitive advantage for our industry.

CCSI's success comes from collaboration with members, researchers, other organizations and our clients in the genetics sector. We very much appreciate the cooperative approach for the collective good of our industry, and look forward to developing these collaborations further as we go forward.

I would like to express my sincere gratitude to the other members of the staff at CCSI for their dedication and support this past year. I have also very much appreciated working with John Gough in his first year as Chairman. Thanks to John and the rest of the directors for their support and dedication to the CCSI and the industry.

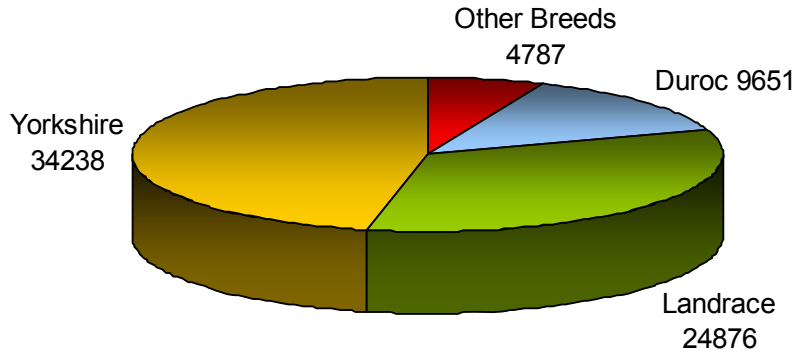
Brian Sullivan
General Manager

Genetic Improvement Services

Performance Testing

There were 73,552 purebred pigs tested under the Canadian Swine Improvement Program between April 1st, 2008 and March 31st, 2009. The numbers of animals per breed and sex as well as average performances are provided in Appendix 6.

Pigs scanned in 2008 by breed



There were 66,409 litters born from about 40,000 purebred sows on 118 farms sent to CCSI in 2008 and included in genetic evaluations for litter size. The breakout by breed and parity, and average performances are provided in Appendix 7.

Genetic Evaluations

- Routine national bi-weekly evaluations are provided for age, backfat, lean depth, lean yield, loin eye area, feed conversion ratio, litter size and piglet survival for 7 breeds: Yorkshire, Landrace, Duroc, Lacombe, Hampshire, Piétrain and Tai Zumu.
- Genetic evaluations are also routinely calculated for number of piglets weaned per litter, litter weight at weaning, age at first farrowing, farrowing interval, meat quality traits (pH, colour, reflectance, drip loss and marbling) feet & legs conformation, number of teats and piglet birth weight variability as new data is available.
- New economic weights were computed for growth, feed efficiency and carcass traits, as part of a project in collaboration with CDPQ. Sire and dam line indices were updated accordingly in national and on-farm evaluations starting in April 2009.
- Genetic evaluations have been developed for loin intramuscular fat (IMF) predicted on live pigs from ultrasonic measurements.
- More work is underway to include molecular information in routine genetic evaluation, using IGF2 gene as an example. Genotype probabilities estimated from all information available were included in genetic evaluation procedures.

Genetic Improvement

The table below shows the expected genetic gains obtained in a commercial setting last year compared to previous five years, assuming a crossbreeding system using a terminal Duroc boar on a Landrace × Yorkshire hybrid sow.

Trait	Unit	Average change per year 2002-2007	Change in 2008
Days to market	days	-1.32	-1.60
Lean yield	%	+0.09	+0.09
Loin eye area	cm^2	+0.28	+0.27
Feed Conversion Ratio	kg feed / kg	-0.018	-0.022
Backfat	mm	-0.20	-0.14
Loin depth	mm	+0.32	+0.22
Litter size	piglets/litter	+0.25	+0.22

Based on the genetic gains in selection herds active in 2008

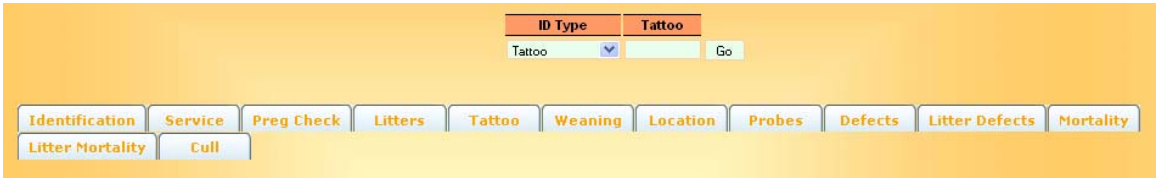
There has been an increase in the speed of genetic change for growth and feed conversion, while the rate of change for lean yield and loin eye area were maintained. There was a deceleration in the rate of genetic progress made for backfat thickness and loin depth. More details on genetic trends by breed and trends over time are provided in Appendices 4 and 5.

Computer and Website Services

*e*Farm

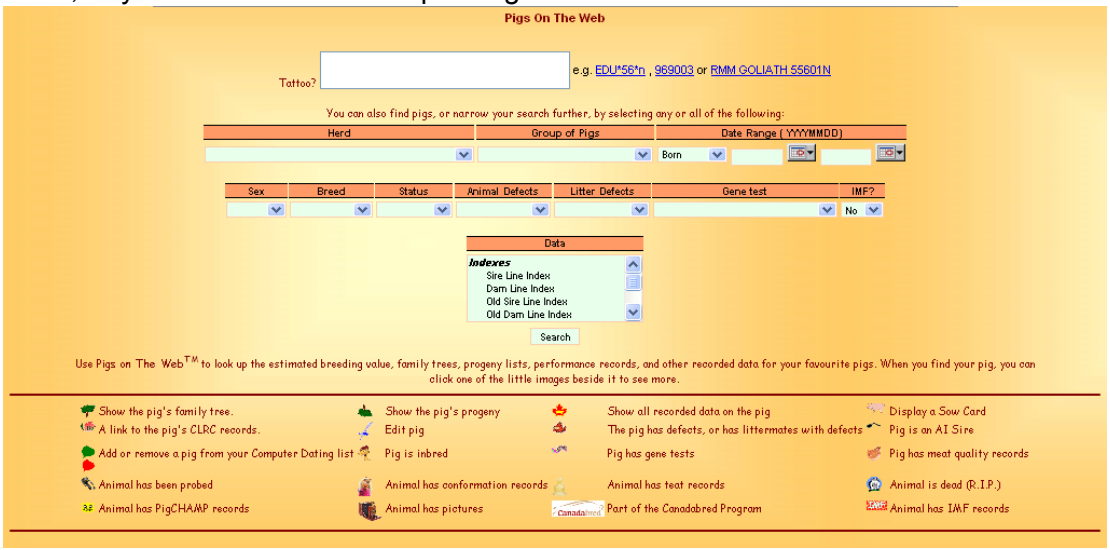
*e*Farm is a set of applications that helps breeders and producers to manage their barn inventory, create and edit pigs and also to enter important information for genetic evaluations and more. Some new changes to *e*Farm include the ability to input and use “within herd IDs” to manage sow inventory. This allows producers to enter data using the identification system they are currently using for on farm management purposes.

Various new data entry screens were recently added including animal defects, litter defects, litter mortality, locations, pregnancy checks and more. There is also a new entry screen that allows all the individual entry screens to be accessed in one place. This provides convenient access to view and update all information recorded on an animal.



Pigs on the Web

Pigs On The Web is a tool to search the database for specific individual pigs or groups of pigs to access pedigree, performance and genetic information. The latest version now allows users to select and show various types of data with the pigs that are listed. Clicking on the data heading will sort the list of pigs by that column. In addition, when selecting different types of data (for example, mortality or defect records), additional detail is shown with the list. A growing list of icons appear beside the pig ID, including pedigree, progeny, scan data, carcass data, live intramuscular fat (IMF), DNA test results, defects, mortality, Canadabred, pictures and more. These icons are clickable links to details about each individual pig. Pigs can be listed using the “Group of Pigs” feature, or you can create a “Group of Pigs” from the results of a search.



Service in your language of choice

*e*Farm and other website services are currently available in English, French and Chinese. Plans to add Spanish are in progress and the infrastructure allows for easily adding other languages, including those with special characters such as Chinese.

Slaughter data

Seven hundred thousand (700,000) slaughter records, primarily from Western Canada, are stored in CCSI's database. CCSI is currently working with Ontario Pork to routinely and automatically transfer Ontario slaughter data to CCSI for interested producers. One of the objectives is to link slaughter data back to the purebred animals to benchmark how changes in genetics impact the market hogs.

Research Projects

For the IMF project, a process was developed allowing the transfer of data for technicians, image analysis, and reporting. Technicians upload the raw data to CCSI, where it is then downloaded for image analysis, and final results are then uploaded back to CCSI. This allows for the centralization of images and results.

For most of the recent projects, DNA samples have been taken by breeders or regional centers and submitted to various laboratories for analyses. Applications and database structures were created to store the laboratory results for use in the research projects, but also to allow viewing of the results by the owners.

A growing community of CCSI website users

More and more breeders, producers and others are becoming regular users of the CCSI website services in Canada and as far away as China. Users range from large Canadian breeding companies to smaller independent breeders, multipliers, commercial producers, service providers, researchers and consultants. There are consistently over 100 active users logging in each month and this continues to grow. Computer hardware and software are being regularly upgraded to keep pace with this growth and ensure reliable service 24 hours a day, 7 days a week.

Some interesting statistics on CCSI's database

Over 3.7 million animals
2.5 billion EBV results
Over 3 million animals scanned
Over a million litter records
700,000 slaughter records
Almost 500 user accounts

Standards

National Accreditation Program for Ultrasound Technicians

CCSI manages the National Accreditation Program with the National Standards Officer (Jean-Paul Daigle from CDPQ) and a team of regional senior technicians involved in training and certification in their own provinces. The accreditation process for swine technicians has been recently updated using input from the CCSI Ultrasonics Standards working group. In April 2009, a national accreditation session was held at the Deschambault test station which resulted in the certification of seven level II technicians. Several other regional and on-farm sessions were also held, providing twenty-five technicians from across Canada a certification which allows them to submit scanning data to CCSI for use in national genetic evaluations.

National Accreditation Session (from left to right) Nathalie Plourde, Jean-Paul Daigle, Murray Duggan and Laurence Maignel

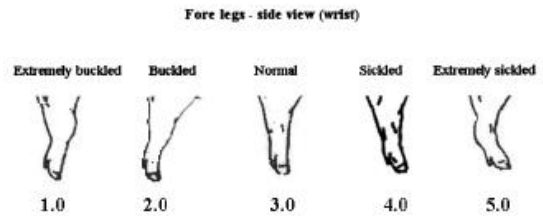
Training and accreditation for intramuscular fat on live pigs

Live intramuscular fat scans

As part of one of CCSI's research projects in partnership with CDPQ and Biotronics, five technicians across Canada were trained to collect ultrasound images on live pigs for prediction of intramuscular fat (IMF) content in the loin. Guidelines have been developed for IMF certification and the first session was held in April 2009, with five technicians from across Canada participating. Several farms have now started to routinely collect data for use in national genetic evaluations for IMF.

Standards for Canadian pork quality measurements and other traits

Work is underway to update Canadian standards for carcass and meat quality measurements. A Meat Quality Standards working group includes geneticists and meat scientists, along with technical staff from regional centers and breeding companies across Canada.



Other traits such as feet and leg scoring are on the list of potential measures to be included in the national accreditation program.

Research Projects

Meeting Consumer Preferences through Pork Marbling

CDPQ and CCSI were jointly undertaking this project coordinated by Ontario Pork to identify current marbling levels within the Canadian swine herds and to explore methods to increase the marbling levels to meet the requirements of specific markets. A test group of commercial cross market hogs from Duroc sires with the highest available EBVs for IMF was evaluated at the Deschambault Test Station. The trial has clearly demonstrated that the combination of genetics, management and feeding strategies can substantially increase intramuscular fat deposition.

Use of molecular information for addressing current and emerging issues for the quality of Canadian pork

This project, funded by Agriculture and Agri-Food Canada's Advancing Canadian Agriculture and Agri-Food (ACAAF) Program, has examined promising genes and markers to determine their frequencies in Canadian pig breeds as well as their potential effects on different traits of interest, particularly for meat quality. More specifically, IGF2, HFABP, MC4R, CAST and the PRKAG3 genes were studied in the framework of this project. This led to various developments such as the calculation of genotype probabilities and testing the use of these genotype probabilities in genetic evaluations. Among other applications of this project, the first "SNP chips" available on the market have been tested on a sample of influential AI boars and on pigs with phenotypic data that are difficult or expensive to measure such as individual feed intake and meat quality.

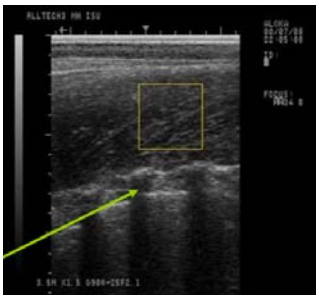
Dr. Mohsen Jafarikia, Molecular Geneticist, CCSI

SNP Chip panel from Illumina

Genetic Selection of Pigs for their Resistance to Diseases such as Post-weaning Multisystemic Wasting Syndrome

This project was also funded by Agriculture and Agri-Food Canada's ACAAF program and has explored avenues to improve the general immunity of pigs through genetics. The project required the collection and the centralization of mortality rates and causes of death from participating herds across Canada. It also involved blood sample collection for in vitro immunological and hematological testing on approximately 900 purebred pigs from 10 participating herds in Quebec, Ontario, Saskatchewan and Prince Edward Island. A goal is to have practical methods to identify families and individuals which are genetically more resistant than others in each breed based on mortality records and molecular tests, as well as hematological and immunological tests.

Using ultrasound technology on live pigs to improve pork marbling



This was another project funded by Agriculture and Agri-Food Canada's Food ACAAF program and aimed to evaluate use of ultrasound scanning coupled with ultrasound image analysis technology developed at Iowa State University, to predict intramuscular fat levels in live pigs. Over 1,000 Duroc and 90 Yorkshire pigs were scanned during the project to begin building a database on intramuscular fat, and 301 were slaughtered to determine the accuracy of the prediction. Live predictions have correlated very well with the IMF in the pork loins. CCSI is now including the ultrasonic estimation of IMF in genetic evaluations, and scanning for IMF on the live pig is now included in the National Technician Accreditation Program.

A DNA test to evaluate and improve meat color in Canadian pigs

A gene affecting pork color was recently studied at Iowa State University. In collaboration with Western Swine Testing Association and the Lacombe Research Centre, CCSI coordinated testing for this gene and carcass evaluation on 500 pigs. Loins from carcasses of these pigs were transported from the Olymel plant in Red Deer to Lacombe Research Centre for evaluation of loin color at 24 hours, 3 days and 7 days post mortem. The study examined the effects of breed, sex and genotype. The results showed that a combination of these factors can significantly affect pork colour. Testing in commercial hogs could confirm the results and lead to practical tools for control of pork colour. Financial support was provided by the Alberta Livestock Industry Development Fund (ALIDF) and the Agriculture and Food Council (AFC) in Alberta.

Using the IGF2 gene for improving the productivity of sows

The "lean" (A) allele of the IGF2 gene is known for its positive effects on lean yield and uniformity. More recently, it was suggested that the "fat" (G) allele could also have a positive impact on sow productivity. This project was done in collaboration with Western Swine Testing Association and financial support from Alberta Livestock Industry Development Fund. The project enabled 1,000 pigs to be tested for IGF2, particularly sows born from heterozygous sires which carry both the "lean" (A) and "fat" (G) alleles. The project compared the productivity of daughters which received the paternal A allele to daughters which received the paternal G allele. The gene is particularly interesting in that progeny are influenced only by the allele that they receive from the sire, while the allele from the mother only gets expressed through her sons in the following generation. Therefore, producers can use terminal sire lines with the "A" allele for lean market hogs, while at the same time benefit from maternal lines that carry the "G" allele for better conditioning in the commercial sow.

Interaction with swine industry and other pig organizations

Support for CCSI's Member Organizations

Administrative and management services for CSBA

Participation in the National ID Traceability Working Committee and the Working Group for Tag Management and Distribution

Member of the Science Cluster Team that assisted with the genomics theme of the Pork Science Cluster Program

Member of OSI Board and of CDPQ Genetics and Test Station Advisory Committees

Canadian Swine Health Board

Member organization of the Canadian Swine Health Board and participated on the organization committee for the Swine Health Forum in Saskatoon on July 7 and 8, 2009.

Canadian Swine Exporters Association

CCSI provides support for exporters by hosting foreign delegations, participating in international conferences and seminars, and technical support regarding the swine improvement program. The past year has been particularly active in China, including participation in two visits to promote Canadian swine genetics and the technology behind the genetics.

Li Li presenting CCSI to swine breeders and producers in China

National Pork Value Chain Roundtable

Representation of CCSI and CSBA at the National Pork Value Chain Roundtable and participate in the Innovation Pillar Working Group.

Swine Genomics Steering Committee

Part of organizing team for genomics workshops in conjunction with the 2009 Plant and Animal Genome Conference and Banff Pork Seminar

Other

Leadership and support for the creation of PigGen Canada.
European Forum of Farm Animal Breeders patent watch
Institut pour la Filière Porcine (IFIP) research collaboration

Other species

Goats: www.GoatGenetics.Ca

Launched in 2008, GoatGenetics.Ca is a bilingual website which centralizes pedigrees, lactation records and conformation scores along with genetic evaluations. It provides a list of who's who in goat genetics, top ranking goats and general information on dairy goat genetic improvement. A secured access Member Services area allows Canadian goat breeders to look up the genetic values of animals in their herd and to use different reports and selection tools. CCSI computes national genetic evaluations for dairy goats on a bi-monthly basis.

CCSI has worked with the various stakeholders to study the feasibility of developing a goat herd improvement program for Ontario. This study was supported financially by the Agriculture Adaptation Council and some key industry organizations in the province. The industry is looking at ways to implement the recommendations, including working with others across Canada to develop a strong national program for goat improvement.

Rabbits: www.RabbitGenetics.Ca

A research project was launched in 2008 in collaboration with the Research Centre on Animal Science (CRSAD) in Deschambault, Québec, to develop genetic evaluations for rabbit lines selected for meat production. Pedigree and performance data were loaded into a rabbit-specific database at CCSI and a pilot website (RabbitsGenetcis.Ca) was launched to display pedigrees. Development of genetic evaluations is in progress.

Bison: www.bisonvaluechain.ca

CCSI has developed a web-based information sharing system in collaboration with a bison marketing company from Alberta. The system connects the cow-calf producer, feedlot operator, packing plant and marketer in a value chain. It includes the ability to track animal identification and other attributes, slaughter and grading information, movement and ownership, and allows selected information to be shared among the various stakeholders in a secure and controlled manner, such that individual users can only access data which is appropriate to be shared.

Sheep

Consulting services have been provided to the Quebec Sheep Centre (CEPOQ) for several years. Services have included extension work on genetic evaluations, and support in the development of the concept of GenOvis Canada as a national sheep improvement program. Several research projects have been submitted recently by CEPOQ involving CCSI, especially in the area of information technology and use of molecular information in breeding programs.

Appendix 1. Members of the Board of Directors, 2008-2009

Scott Robinson	Canadian Swine Breeders Association
Stephen Moffett	Canadian Pork Council
John Webb	Canadian Meat Council
Dan Hurnik	Atlantic Swine Improvement Centre
Donald MacDonald	Atlantic Swine Improvement Centre
Pierre Falardeau	Centre de Développement du Porc du Québec
Lyse Grenier-Audet	Centre de Développement du Porc du Québec
John Gough	Ontario Swine Improvement
Phil Smith	Ontario Swine Improvement
John Vande Glind	Western Swine Testing Association
Alfred Wahl	Western Swine Testing Association

Appendix 2. CCSI Staff

Brian Sullivan, General Manager

Francine Roy, Secretary and Office Manager

Jim Groves, Computer Services Manager

Laurence Maignel, Geneticist

Li Li, Programmer/Analyst

Mohsen Jafarikia, Geneticist

Stefanie Wyss, Technical Assistant

CCSI Staff in Ottawa
First row (from left to right): Brian Sullivan, Jim Groves
Second row (from left to right): Stefanie Wyss,
Laurence Maignel, Francine Roy and Li Li

Dr. Mohsen Jafarikia in Guelph

Appendix 3. Genetics Committee Members

Name	Organization
Frédéric Fortin, Chair	Centre de développement du porc du Québec inc
Andy Robinson	University of Guelph
Brian Sullivan	Canadian Centre for Swine Improvement
Claude Robert	Laval University
Dave Vandenbroek	Ontario Swine Improvement
David Trus	Agriculture and Agri-Food Canada
George Foxcroft	University of Alberta
Graham Plastow	University of Alberta
Jamie Wilkinson	University of Alberta
Jean Lévesque	Société des éleveurs de porcs du Québec
Jean-Paul Daigle	Centre de développement du porc du Québec inc
Jim Groves	Canadian Centre for Swine Improvement
Jon Meadus	Agriculture and Agri-Food Canada
Laurence Maignel	Canadian Centre for Swine Improvement
Margaret Quinton	University of Guelph
Marie-France Palin	Agriculture and Agri-Food Canada
Mohsen Jafarikia	Canadian Centre for Swine Improvement
Muriel Power	Atlantic Swine Centre
Murray Duggan	Fast Genetics Inc.
Nicole Dion	Sogéporc
Rob Gribble	Ontario Swine Improvement
Roger Cue	McGill University
Shu Chen	Lab Services Division, University of Guelph
Stefanie Wyss	Canadian Centre for Swine Improvement
Tun-Ping Yu	DNA LandMarks
Wim Van Berkel	Western Swine Testing Association

Genetics Committee Members May 2009

From left to right (back row): Wim Van Berkel, Murray Duggan, Jamie Wilkinson, Frédéric Fortin, Jim Groves, Jean Lévesque, Rob Gribble, Jean-Paul Daigle, Brian Sullivan; Front row (from left to right): Margaret Quinton, Stefanie Wyss, Nicole Dion, Mohsen Jafarikia, Laurence Maignel

Appendix 4: Genetic change by breed and economic value for commercial herds

Yorkshire

Trait	2002		2007		Average annual gain (2002-2007)	Gain in 2008
	#pigs	EBV average	#pigs	EBV average		
Sire Line Index (points)	22129	60	37323	94	6.8	10.0 pts
Dam Line Index (points)	22129	46	37323	95	10.0	8.0 pts
Lean Yield (%)	22129	-0.24	37323	-0.02	0.04	0.05 %
Loin Eye Area (cm^2)	22129	-0.88	37323	-0.16	0.10	0.30 sq cm
Age (days)	22129	6.3	37323	0.9	-1.1	-1.5 days
Feed Conversion (kg/kg)	22129	0.082	37323	0.011	0.010	-0.020 kg/kg
Backfat (mm)	22129	0.31	37323	0.03	-0.06	-0.05 mm
Lean Depth (mm)	22129	-0.99	37323	-0.18	0.16	0.32 mm
Number Born (pigs/litter)	22129	-1.49	37323	0	0.30	0.17 pigs
Sire Line Index ($)	22129	-17	37323	-2.5	2.9	4.4 $
Dam Line Index ($)	22129	-28	37323	-2.4	5.1	4.3 $

Landrace

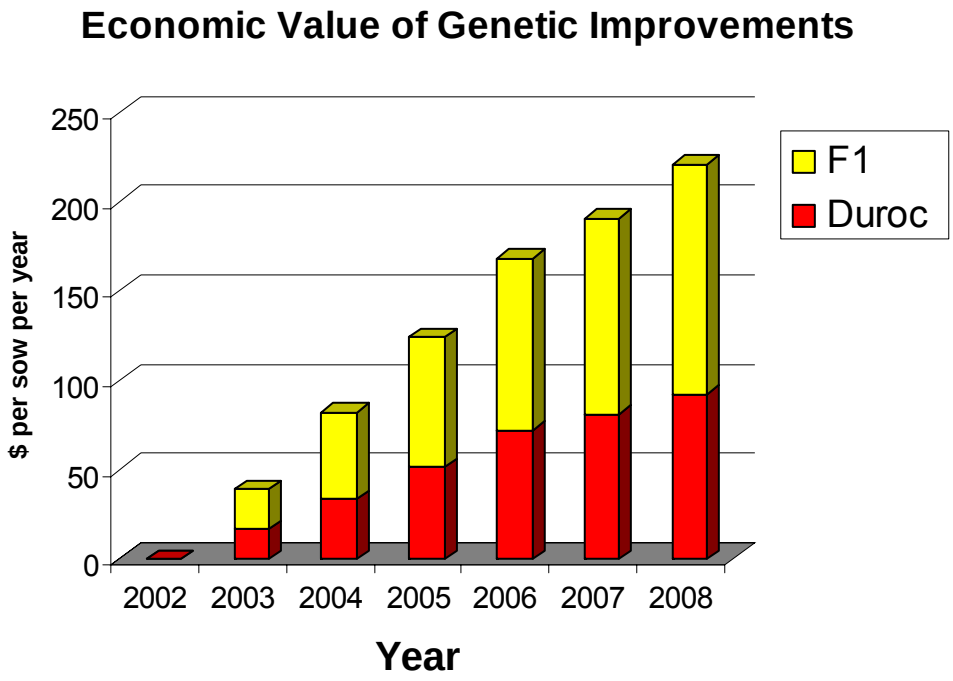
Trait	2002		2007		Average annual gain (2002-2007)	Gain in 2008
	#pigs	EBV average	#pigs	EBV average		
Sire Line Index (points)	15592	60	24747	97	7.4	7.0 pts
Dam Line Index (points)	15592	45	24747	94	9.8	11.0 pts
Lean Yield (%)	15592	-0.3	24747	-0.02	0.06	0.03 %
Loin Eye Area (cm^2)	15592	-0.84	24747	-0.04	0.16	0.08 sq cm
Age (days)	15592	5.9	24747	0.6	-1.1	-1.1 days
Feed Conversion (kg/kg)	15592	0.079	24747	0.007	-0.014	-0.014 kg/kg
Backfat (mm)	15592	0.79	24747	0.04	-0.15	-0.07 mm
Lean Depth (mm)	15592	-1.32	24747	0.01	0.27	0.07 mm
Number Born (pigs/litter)	15592	-1.08	24747	-0.13	0.19	0.24 pigs
Sire Line Index ($)	15592	-16.4	24747	-1.3	3.0	2.8 $
Dam Line Index ($)	15592	-21.7	24747	-2.4	3.9	4.3 $

Duroc

Trait	2002		2007		Average annual gain (2002-2007)	Gain in 2008
	#pigs	EBV average	#pigs	EBV average		
Sire Line Index (points)	7698	47	9745	94	9.4	10.0 pts
Dam Line Index (points)	7698	47	9745	95	9.6	8.0 pts
Lean Yield (%)	7698	-0.71	9745	-0.12	0.12	0.12 %
Loin Eye Area (cm^2)	7698	-2.19	9745	-0.24	0.39	0.34 sq cm
Age (days)	7698	8.6	9745	1	-1.5	-1.7 days
Feed Conversion (kg/kg)	7698	0.122	9745	0.015	-0.021	-0.024 kg/kg
Backfat (mm)	7698	1.6	9745	0.17	-0.28	-0.19 mm
Lean Depth (mm)	7698	-2.29	9745	-0.12	0.43	0.25 mm
Number Born (pigs/litter)	7698	-0.15	9745	0.13	0.06	0.01 pigs
Sire Line Index ($)	7698	-27.2	9745	-3.1	4.8	5.1 $
Dam Line Index ($)	7698	-16.9	9745	-1.5	3.1	2.6 $

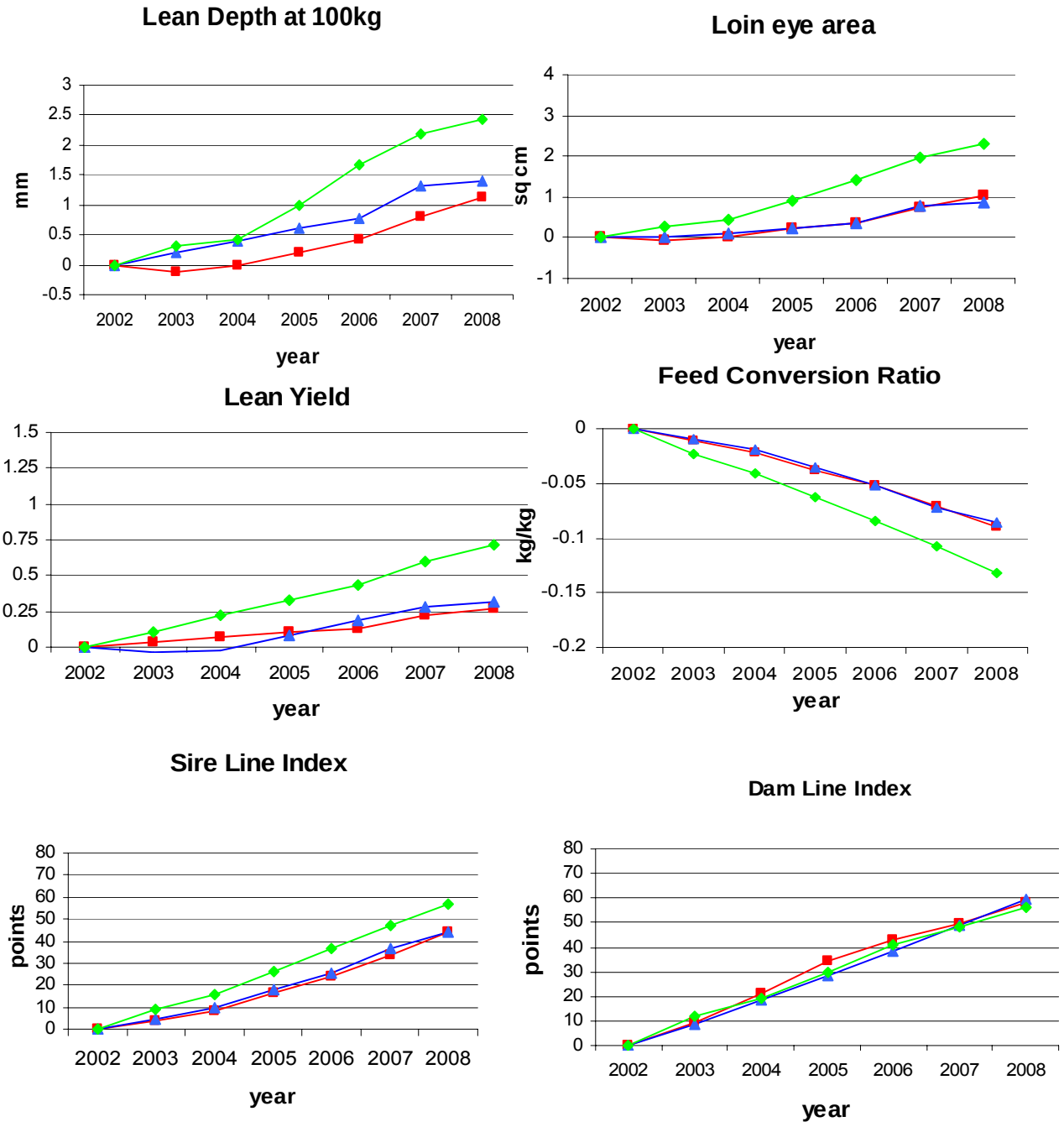
Change in Commercial Sows (F1s) and Hogs
due to genetic improvement in Canada from 2002 to 2008

Trait	Sire Line Duroc	Dam Line			Market Hogs
		Yorkshire	Landrace	F1s	
Sire Line Index (points)	57				
Dam Line Index (points)		58	60	59	
Lean Yield (%)	0.72	0.27	0.31	0.29	0.5%
Loin Eye Area (cm^2)	2.28	1.02	0.87	0.95	1.62 sq cm
Age (days)	-9.3	-6.9	-6.5	-6.7	-8 days
Feed Conversion (kg/kg)	-0.131	-0.09	-0.086	-0.088	-0.11 kg/kg
Backfat (mm)	-1.62	-0.33	-0.82	-0.58	-1.1 mm
Lean Depth (mm)	2.42	1.14	1.4	1.27	1.84 mm
Number Born (pigs/litter)		1.66	1.19	1.43 pigs	
Sire Line Index ($)	$ 29.20				
Dam Line Index ($)		$ 30.00	$ 23.70	$ 53.70	

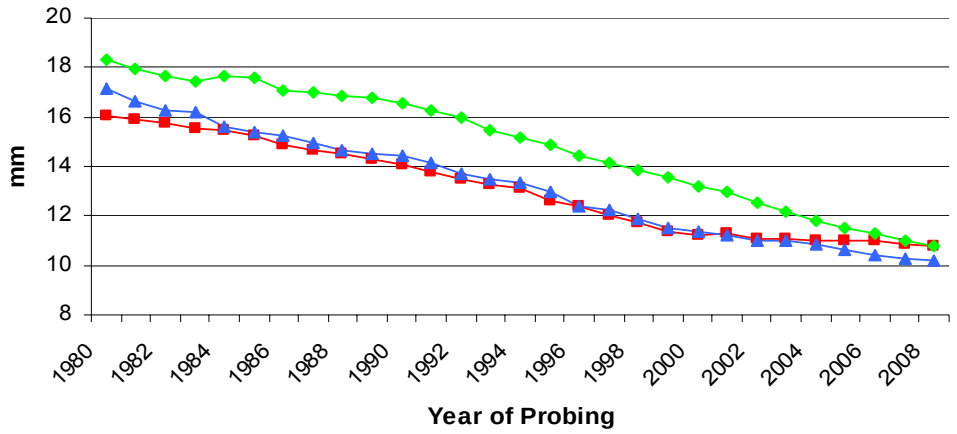


Sows are about $220 per year more productive today than 6 years ago due to genetic improvements in growth, feed efficiency, lean yield and litter size.

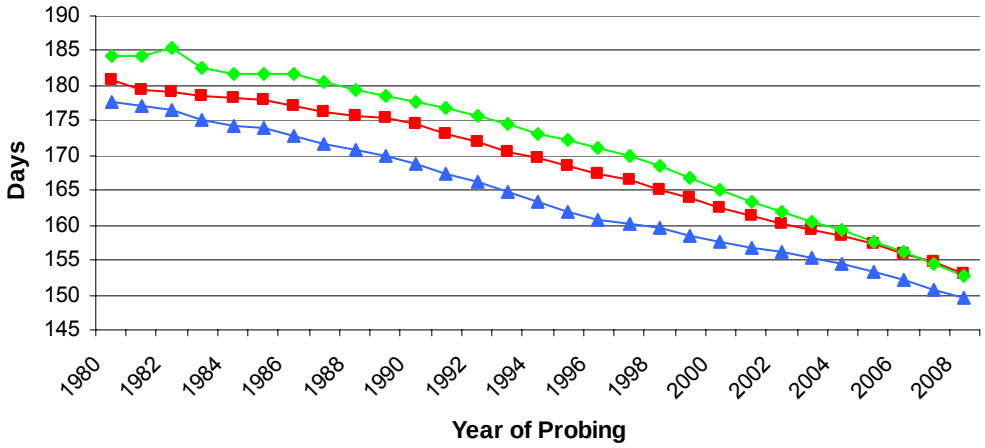
Appendix 5: Genetic Trends for active herds in 2008



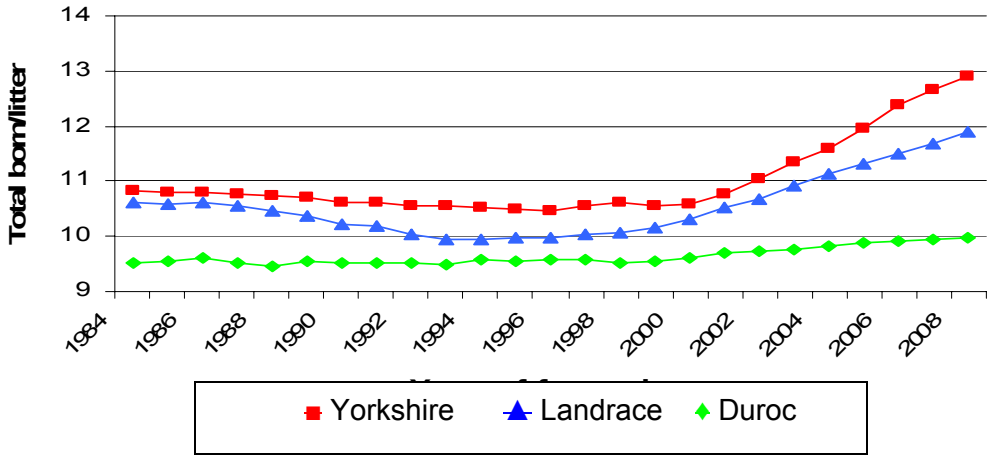
Genetic Trends for Backfat at 100kg



Genetic Trends for Age at 100kg



Genetic Trends for Litter Size



Appendix 6. Summary for Backfat and Age at 100 Kg

April 1, 2008 to March 31, 2009

		#herds	#pigs tested	male averages			female averages		
				#boars	backfat (mm)	Age (days)	#gilts	backfat (mm)	Age (days)
Atlantic	Yorkshire	2	1961	516	12.0	146	1445	12.9	153
	Landrace	2	1026	304	11.4	145	722	11.7	151
	Duroc	3	374	164	11.8	145	210	12.6	152
	All 3 breeds	3	3361	984	11.8	145	2377	12.5	152
Québec	Yorkshire	34	9715	2496	10.0	142	7136	10.4	151
	Landrace	27	8432	2412	9.9	140	6009	9.9	150
	Duroc	17	4517	2116	9.7	140	2343	10.1	150
	All 3 breeds	37	22664	7024	9.9	141	15488	10.1	150
Ontario	Yorkshire	21	5436	719	11.2	148	4716	12.0	157
	Landrace	15	2134	345	11.1	148	1789	11.8	154
	Duroc	13	1250	565	10.7	152	685	10.9	160
	All 3 breeds	22	8820	1629	11.0	149	7190	11.9	156
West	Yorkshire	19	17126	2894	10.1	144	14213	10.7	155
	Landrace	15	13284	2512	9.6	143	10757	10.0	150
	Duroc	15	3510	1999	10.6	148	1511	10.7	157
	All 3 breeds	22	33920	7405	10.1	145	26481	10.4	153
Canada	Yorkshire	76	34238	6625	10.3	144	27510	10.9	154
	Landrace	59	24876	5573	10.0	142	19277	10.2	150
	Duroc	48	9651	4844	10.3	145	4749	10.5	154
	All 3 breeds	84	68765	17042	10.2	144	51536	10.6	153

Note 4787 animals from other breeds were also tested on the program over the period

Appendix 7. Sow Productivity Summary (2008)

	Parity	#herds	total pigs born		pigs born alive	
			N	Average	N	average
Yorkshire	1	85	9989	12.1	6968	10.6
	2	80	7326	12.7	5039	11.3
	3	78	5368	13.5	3593	12.1
	4	77	4033	13.7	2589	12.0
	5	72	2979	13.6	1954	11.8
	6	71	2147	13.4	1420	11.4
	7	69	2361	12.9	1002	11.1
	ALL	89	34203	12.9	22565	11.3
Landrace	1	69	6423	11.5	4423	10.5
	2	66	4781	11.5	3257	10.7
	3	66	3846	12.5	2709	11.5
	4	64	3210	12.4	2134	11.3
	5	62	2495	12.2	1596	11.1
	6	57	1638	11.7	1012	10.7
	7	55	1509	11.3	795	10.1
	ALL	71	23902	11.8	15926	10.9
Duroc	1	45	1244	9.5	736	8.4
	2	44	898	9.9	594	8.9
	3	38	502	10.7	364	9.5
	4	34	243	10.5	174	9.2
	5	22	126	10.2	97	8.4
	6	22	69	10.5	54	9.3
	7	11	46	10.4	39	9.1
	ALL	47	3128	10.0	2058	8.8
All 3 breeds	1	93	17656	11.7	12127	10.4
	2	89	13005	12.1	8890	10.9
	3	87	9716	13.0	6666	11.7
	4	86	7486	13.0	4897	11.6
	5	83	5600	12.9	3647	11.4
	6	79	3854	12.6	2486	11.0
	7	76	3916	12.3	1836	10.6
	ALL	94	61233	12.3	40549	11.0

Note: 5176 litters from other breeds were born over the period

Appendix 8. Herds Participating In the National Program

Atlantic Canada	
Apple Valley Farms Reg & Donald MacDonald Box 43 Mount Stewart, PE C0A 1T0	International Genetics PEI Ltd. Box 43 Mount Stewart, PE C0A 1T0

Québec	
Cie 2427 3963 Québec inc. 2693, boulevard Labelle, C.P. 484 Prévost J0R 1T0	La Porcheteck inc. 462, 2e Rang est Saint-Simon J0H 1Y0
Ferme Claude Forget inc. 841, 4e Rang Saint-Ambroise-de-Kildare J0K 1C0	Ferme Clauvie-Porcs (2002) inc. 202, rang 6 est Saint-Donat G0K 1L0
Ferme Cogeporc inc. 404, Saint-François Saint-Narcisse-de-Beaurivage G0S 1W0	Ferme Denis Vadnais inc. 3320, Chemin Tourville St-Nicéphore J2A 3Y8
Ferme du Laurier 167, rang de la Montagne Saint-Gervais-de-Bellechasse G0R 3C0	Ferme du Murier inc. 137, route Soucy, C.P. 154 Saint-Édouard de Lotbinière G0S 1Y0
Ferme F. Pilote et fils enr. 410, rang Saint-Pierre Saint-Irénée G0T 1V0	Ferme Géni-Porc inc. C.P. 1378 Bedford J0J 1A0
Ferme Grenier Pouliot inc. 2515, chemin Lehoux, R.R. 3 Coaticook J1A 2S2	Ferme J.P. Dion et fils inc. 154, rang Charlotte Saint-Liboire J0H 1R0
Ferme J.R. Raby senc 4222, rang de la Colline Adstock G0N 1S0	Ferme Jacques Ouellet 223, 6e Rang est Saint-Joseph-de-Kamouraska G0L 3P0
Ferme Liloporc inc. 414, rang Saint-Pierre Saint-Irénée G0T 1V0	Ferme Lorix-Québec enr. 841, chemin Tomifobia Stanstead J0B 3E0
Ferme Luc & Estelle Forget inc. 2553, rang Saint-Jacques Saint-Jacques J0K 2R0	Ferme Maguy enr. 810, St-Pierre Laurierville G0S 1P0
Ferme Perfo-Porcs inc. 1735, rang 10 Notre-Dame-du-Bon-Conseil J0C 1A0	Ferme Pleinchamps inc. 460, rang Saint-Pierre Saint-Anselme-de-Dorchester G0R 2N0
Ferme Porasseny inc. 16, des Prairies Saint-François G0R 3A0	Ferme porcine DAJO senc 135, rue Principale Saint-Simon J0H 1Y0
Ferme Porcine de Beauce inc. 1640, rang Saint-Gabriel sud, R.R. 2 Sainte-Marie-de-Beauce G6E 3A8	Ferme porcine Jagari inc. 6330, route 112 Garthby G0Y 1B0
Ferme Raymond Coutu et fils senc 1861, route 158 Saint-Thomas J0K 3L0	Ferme Rechamakayajo enr. 507, rue Desjardins Mandeville J0K 1L0

Québec	
Ferme René Gauthier inc. 404, rang Saint-Pierre Saint-Irénée G0T 1V0	Ferme Rouslay s.e.n.c. 954, rang La Ferme Sainte-Perpétue J0C 1R0
Ferme des Domaines inc. 167, chemin de la Montagne Saint-Gervais-de-Bellechasse G0R 3C0	Ferme Ste-Catherine enr. 404, rue Saint-François Saint-Narcisse-de-Beaurivage G0S 1W0
Ferme Triporc inc. 3251, Haut-de-la-Rivière Sainte-Elizabeth J0K 2J0	Ferme Victorien Fortin inc. 1346, rang Sainte-Anne Métabetchouan-Lac-à-la-Croix G8G 1A3
Groupe Dynaco Coopérative agroalimentaire 41, route 287 sud Saint-Philippe-de-Neri G0L 4A0	Hybrilia SEC 156, rue Grenier Laurierville G0S 1P0
J. & R. Perreault inc. 184, Saint-Jacques Saint-Patrice-de-Lotbinière G0S 1B0	Lemieux, Jean-Marc 76, rang 2 est Saint-Gervais-de-Bellechasse G0R 3C0
Élevage Auger (9150-0561 Québec inc.) 850, chemin des Acadiens Yamachiche G0X 3L0	Les élevages Technos ltée 2080, rang 8 sud Adstock G0N 1S0
Les Porgreg inc. 8795, Chemin du Rapide-Plat Sud Saint-Hyacinthe J2R 2A6	Ferme Cléoporc 815, avenue Champlain Disraëli G0N 1E0
Ferme Almilard inc. 188, route 204, C.P. 39 Sainte-Justine G0R 1Y0	Sogéporc inc. - Ferme de Lourdes 1025, rang Saint-Pierre Notre-Dame-de-Lourdes G0S 1T
Sogéporc inc. - Ferme des Marées 60, chemin du Cenellier La Trinité-des-Monts G0K 1B0	

Ontario	
BMR Genetics Rod deWolde 12 Huston Street Millbrook, ON LOA 1G0	Bodmin Swine Genetics George Procter R.R. #5 Brussels, ON N0G 1H0
Clarion Swine Genetics Clare and Kent Martin R.R. #2 Drayton, ON N0G 1P0	Dora Lee Genetics Ross and Betty Small R.R. #3 Harriston, ON N0G 1Z0
Monoway Farms Wayne and Paul Fear R.R. #4 Brussels, ON N0G 1H0	Novastar Genetics John & Enid Gough R.R.#3, 7959 Falconbridge Mt. Brydges, ON N0L 1W0
PSP Farm Genetics George Socket R.R. #3 Wingham, ON N0G 2W0	Pureline Swine Unit 1 Mike and Lisa O'Brien RR#4 Rockwood, ON N0B 2K0
Pureline Swine Unit 2 c/o Jim Whitehouse R.R. #4 Guelph, ON N1H 6J1	Ribanwood Yorkshires Bancroft, Peter R.R. #1 Newton, ON N0K 1R0
SGO Inc. Embro Division R.M. Matheson R.R. #3 Embro, ON N0J 1J0	Kolgie Swine Limited Joe Kolkman R.R. #2, 6439 Line 49 Logan Monkton, ON N0K 1P0
University of Guelph – Arkell Swine Research Tom Parker R.R. #2 Guelph, ON N1H 6H8	Vista Villa Farms Ltd. Bob and Scott Robinson R.R. #4 Walton, ON N0K 1Z0
Gerica Gerard Kolkman	Orford Swine Bill Wymenga
Dave van Staveren 5767 Minto Normanby Townline RR#3 Clifford, ON N0G 1M0	Carl Oosterhoff
Earl Bowman RR#2 Kenilworth, ON N0G 2E0	James Weber RR#2 Clifford, ON N0G 1M0
Mitchell Swine Mike Mitchell 2087 West Corner Drive Parkhill ON N0M 2K0	Wouter Van Leeuwen 20818 Victoria Road RR#3 Ridgetown, ON N0P 2C0

Western Canada	
Acadia Breeders Ltd. R.R. #3 Lacombe, AB T0C 1S0	Bloomsbury Farms Ltd. Walter Preugschas General Delivery Bloomsbury, AB T0G 0G0
Edulia Farms Herman Simons R.R. #1 Tees, AB T0C 2N0	Fast Genetics Inc. #2-2175 Airport Drive Saskatoon, SK S7L 7E1
F&S Farms Box 1795 Camrose, Alberta T4V 1X7	Five Lakes Farms Jurgen Preugschas Box 537 Mayerthorpe, AB T0E 1N0
Gwynne Vista Farms Keith Rathmeson R.R. 2 Gwynne, AB T0C 1L0	Huvenaars Farms Ltd. Box 142 Hays, Alberta T0K 1B0
Jakubec Farms Box 557 Viking, Alberta T0B 4N0	Outlook Pork Box 186 Nobleford, AB T0L 1S0
PEAK Swine Genetics #217 - 5904B - 50 ST. Leduc, AB T9E 6J4	Pembina Hog Farm General Delivery Darlingford, Manitoba R0G 0L0
Sand Ridge Farm Ltd. Box 216 Neerlandia, Alberta T0G 1R0	

Appendix 9. Participating A.I. Centres

Participating A.I. Centres	
OSI Swine A.I. Centre P.O. Box 400 Innerkip, ON N0J 1M0 Tel: (519) 469-3010 Fax: (519) 469-8692 Email: **mgingerich@osi.org** **www.osi-inc.on.ca**	CIPQ inc. (St-Lambert) a/s Ronald Drapeau 1486, rang St-Aimé Saint-Lambert, PQ G0S 2WO Tél: (418) 889-9748 Fax: (418) 889-8210 Email: **cipq@cipq.com** **www.cipq.com**
CIPQ inc. (Roxton) a/s Ronald Drapeau 2100, Rang 6 Roxton Falls, PQ J0H 1E0 Tél: (514) 375-9977 Fax: (514) 375-2077 Email: **cipq@cipq.com** **www.cipq.com**	Cobiporc Québec (St-Patrice) a/s Sébastien Leclerc 2537, rang St-Jacques, C.P. 2030 St-Jacques-de-Montcalm, PQ, J0K 2R0 Tél: (450) 839-7844 Fax: (450) 839-2992 Email: **info@cobiporcQuébec.com** **www.cobiporc.com**
Magnum Swine Genetics Box 1514 Fort Macleod, AB T0L 0Z0 Tel: (403) 553-4844 1-888-553-4844 Fax: (403) 553-4845 Email: **sales@magnumswine.com** **www.magnumswine.com**	International Genetics PEI Ltd. Box 43 Mount Stewart, PE C0A 1T0 Tel: (902) 659-2883 Email: **broloson@peiqualityswine.pe.ca** **www.peipork.pe.ca/quality/aiunit**