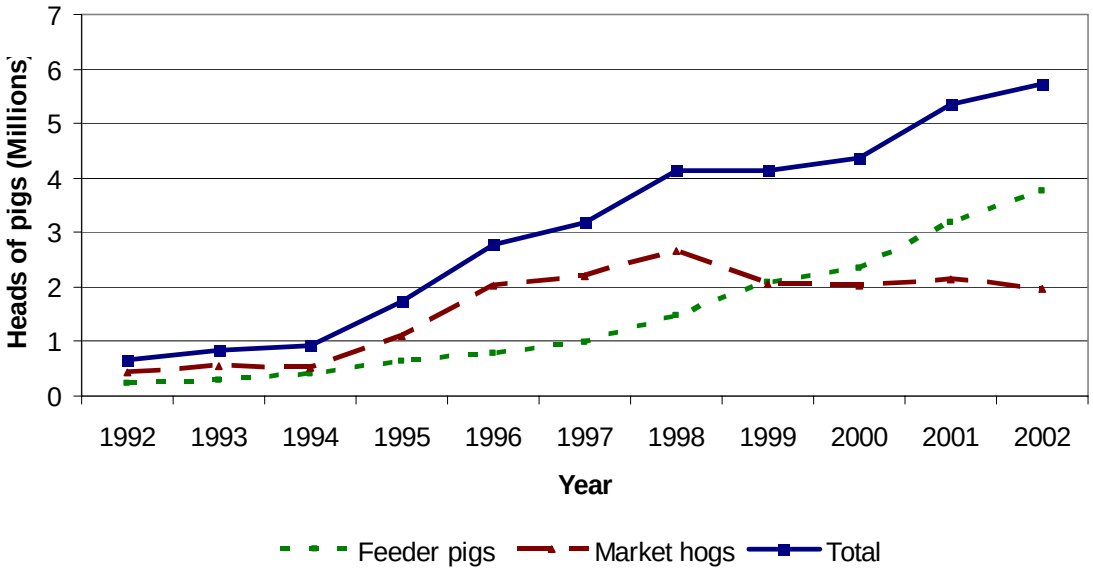
Canadian Swine Improvement Program

The Canadian Centre for Swine Improvement (CCSI) works together with Ontario Swine Improvement on delivery of genetic improvement services in Ontario. OSI is in fact one of CCSI's member organizations, and appoints two directors to CCSI's 11 member Board. The Ontario program is part of a larger national program which is pulling together all regions of Canada in the area of swine genetic improvement. The result is one of the largest and arguably the most successful genetic improvement programs around the world. The strong and growing international demand for Canadian pork is a strong indication that this program is indeed extremely effective.

Canada's pork production increased by 73% over the 10 years from 1992 to 2002 and continues to grow. Almost all of this increase is exported, $2.2 billion in pork exports and a further $490 million in live hog exports in 2002 according to the latest statistics (Source: Canadian Pork Council, www.cpc-ccp.com/stats.html).

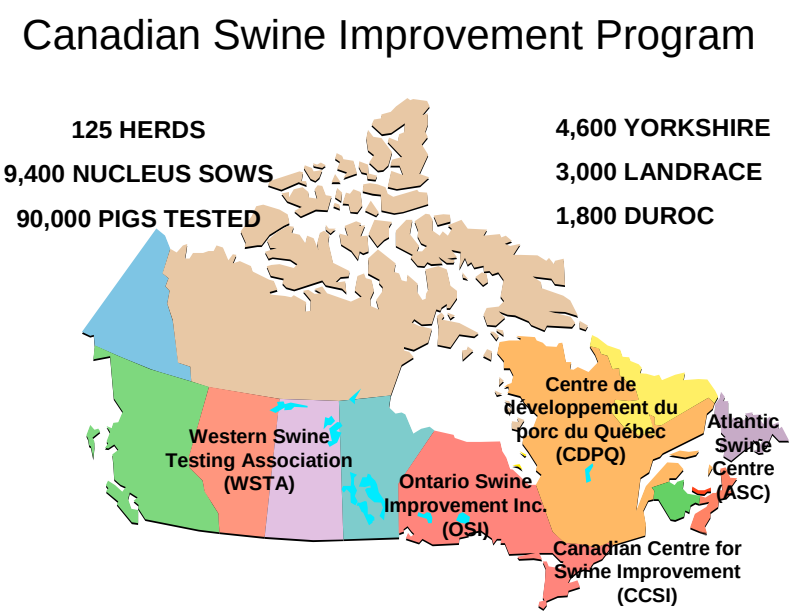
Live hog exports from Canada



The ability to produce a high quality product efficiently has given Canada a competitive edge in international markets.

Canada, through the Canadian Swine Improvement Program (CSIP) has a proven history in making genetic improvement in participating herds from across the country. The program is supported by key organisations in the Canadian swine industry such as Canadian Pork Council, representing the interests of commercial producers, the Canadian Meat Council, representing packers, the Canadian Swine Breeders Association, representing breeders, and regional swine improvement centers in Western Canada,

Ontario, Quebec and Atlantic Canada providing a variety of services to breeders and producers in their regions.



The swine improvement program in Canada has resulted in significant genetic and economic gains in purebred lines and market hogs that are comparable to and at times exceeding those in other leading countries in the world.

Average genetic improvement in Canadian herds

	Annual Improvement	Value per Unit	Value per market Hog	Value per Sow per Year
Litter Size	0.22 pigs per litter	$ 24.74/pig	$ 0.60	$ 11.97
Lean Yield	0.15%	$1.17/%	$ 0.18	$ 3.51
Growth Rate	1.5 days	$0.27/day	$ 0.41	$ 8.10
Feed/Gain	0.022 feed/gain	$18.75/unit	$ 0.42	$ 8.36
Total			$ 1.61	$ 31.94

Source: Canadian Center for Swine Improvement, www.ccsi.ca

Benefits from this genetic improvement are permanent and cumulative. Improvements made this year will benefit clients every year in the future. Future years' improvements will be added on top of this with very little investment each year. For example, the accumulated genetic gains from last five years are worth $8.05 per market hog. It is these gains, accumulated over time, that have given the Canadian pork industry its competitive position in world markets.

Canadian Genetics

Canadian genetics consist largely of Duroc as sire line and the Landrace and Yorkshire breeds as dam lines. The selection within purebreds allows maintenance of breed purity, continual long term genetic improvement and maximum utilization of heterosis or hybrid vigor in the F1 females and market hogs; compared to the use of synthetic lines.

The Duroc breed remains one of the best choices of terminal sire lines in commercial production systems. Hybrid vigor is maximal when Duroc boars are mated to F1 sows. When compared to other terminal sire line choices, there is a positive effect on many important traits. Many trials around the world have shown the advantage of the Duroc breed for growth and feed conversion, and confirmed the special advantage of this breed for meat quality. Also, the Duroc breed brings interesting advantages on hardiness and social behavior. As a terminal sire, the Duroc produces the best carcass quality, with high dressing yield. The best pork quality with exceptional marbling, tenderness and juiciness are all important considerations.
Source: Canadian Centre for Swine Improvement, www.ccsi.ca/reports_2003/ Duroc_as_terminal_sire_line.pdf

The use of F1 commercial gilts produced by crossing of Yorkshire and Landrace maternal lines has been proven scientifically and accepted internationally as the number one choice in top female lines. The Canadian Landrace and Yorkshire maternal lines are not only selected for higher sow productivity but also for superior carcass quality. Already known to produce very efficient hogs with exceptional carcass quality, F1 commercial sows from Canadian Yorkshire and Landrace breeds are becoming increasingly more productive. In the last 5 years alone, litter size has increased genetically by a full pig per litter. New efforts are underway to further enhance piglet survival, number of functional teats and strength of feet and legs.

The use of purebred Yorkshire and Landrace to produce the commercial sow means that you know what you are getting. Crossing this F1 sow to purebred Canadian Duroc is a recipe to success. This simple and balanced genetic program provides economic efficiency and the most uniform market hog with the most consistent carcass in the slaughterhouse.

The Canadian Duroc, Yorkshire and Landrace breeds have been screened for Halothane gene for several years. More recently, all the AI sires from these major breeds have been tested to be free from the unfavourable effects of the RN gene affecting pork quality. More testing is underway for important candidate genes and markers affecting carcass quality and sow productivity.

These genetic advantages are some of the key reasons that Canada is the largest exporter of pork in the world.

Canadian Centre for Swine Improvement Inc.

Organisation

Canadian Centre for Swine Improvement (CCSI) is a non-profit national organisation created by the Canadian swine industry. The Board of Directors of CCSI is made up of key organsations in the Canadian pork industry. Active members of CCSI are the Canadian Pork Council, representing the interests of commercial producers, the Canadian Meat Council, representing packers, the Canadian Swine Breeders Association, representing breeders, and regional swine improvement centers in Western Canada, Ontario, Quebec and Atlantic Canada providing a variety of services to breeders and producers in their regions.

Creation

CCSI was created on December 15, 1994, following privatization of the Canadian Swine Improvement Program from Agriculture and Agri-Food Canada. CCSI is a an example of the successful privatization of a program by AAFC. Since its creation, CCSI has made considerable advances in the scope and quality of its services, while transferring all the related costs to its industry users.

Mandate

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

Employees

There are eight employees in CCSI, among which there are four geneticists with a long term experience and internationally recognized research works, and three computer specialist with experince in networking, database managements and development of software and web applications that are used across Canada. CCSI's office manager has over 15 years of experiece in administration and finanacial management.

CCSI works in close co-operation with universities, federal research centres and professional staff of regional centres. CCSI has a national genetics committee that reviews the progress of the research and development projects and provides advice for important decisions.

Services

CCSI serves about 125 breeders and breeding companies and about a dozen AI units. These genetic suppliers account for an estimated 30 to 50% of the breeding stock marketed in Canada (higher in some regions, lower in others) and for a major portion of Canadian exports of swine genetics. CCSI's domestic services include National Genetic Evaluation, National Data Base Management, National Standards and Data Quality Assurance, National Swine Health Information, Consulting Services and Training.

National Database

CCSI maintains the national database that has records on about 3 million pigs from across Canada and about 90,000 records are added every year. This database is used to provide on-going services as well as for research and development.

Research and Development

CCSI is committed to remain at the leading edge of technological advances in swine genetics in order to pass on the knowledge and benefits to clients. The research team has successfully completed projects supported by CARD program of AAFC, IRAP program of National Research Council and industry based organizations. CCSI operates the research program with industry partners, research institutions and Canadian universities. This co-operative approach results in a large, cost-effective, coordinated research effort. Research projects completed recently include: pilot genetic evaluations for meat and carcass quality; methods for measuring meat and carcass quality on live animals and at slaughter plants; breeding objectives and breeding standards; enhanced genetic evaluation methods for performance and sow productivity traits; feasibility of in-vitro tests for disease resistance, and use of molecular genetics for the Canadian swine industry. CCSI works closely with clients and research institutions from initial project specification to implementation.

Other significant accomplishments

CCSI, through the Canadian swine improvement program has contributed significantly to the genetic improvements in quality and efficiency of pork production. The gains during the last five years amount to a reduction of about 7.5 days of age to market weight, 1.4 mm reduction in backfat, 106 gm less feed per kg of growth, 0.67% higher lean yield and 1.2 sq cm larger loin eye area in the market hogs and about one extra pig in the litter. As a result, an average commercial sow is about $183 more productive from 2003 genetics compared to sows from 1998 genetics. Considering 26 million pigs marketed in Canada in 2001, the cumulative benefits to the Canadian swine industry from genetic improvement were estimated to be $270 million/year (J. Chesnais, 2002). Since then, the rate of genetic improvement has improved substantially and Canada is marketing even more hogs with every year, 28 million in 2003. Hence, the benefits are expected to be even greater in years to come.