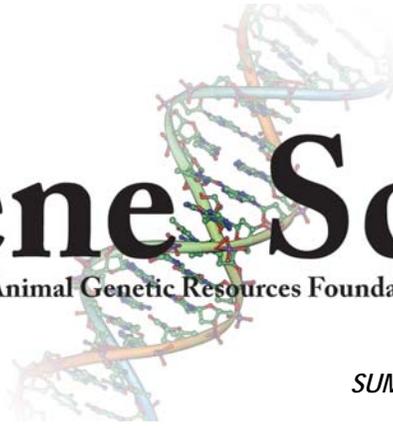




The Gene Scene

The Canadian Farm Animal Genetic Resources Foundation Information Letter



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CHAIR'S CORNER

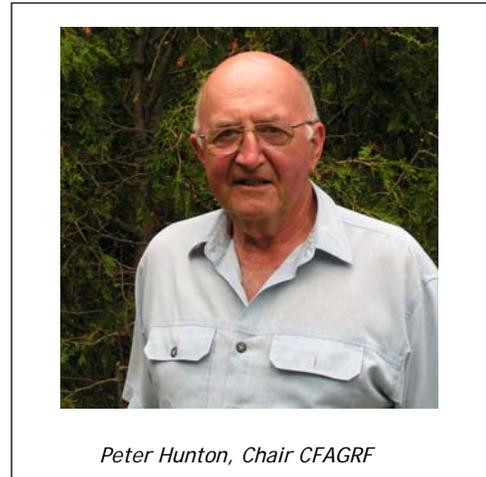
First, for those who are not aware, the Chair of the Foundation has changed hands since our last issue. Due to an excess of other work commitments, Dr. Stephen Moore asked to be relieved of his Chair responsibilities and has stepped down. I have offered to fill the position, subject to ratification at the next Annual Meeting. An email poll of Directors agreed that this was the best way to conduct the process. We would like to thank Steve for his contribution to the Foundation. Looking at our past Chairs, I know these are big shoes to fill. I will do my best.

We also have a new Executive Director, Dr. Bethany Muir. Bethany has a Ph.D. in Dairy Genetics from the University of Guelph and currently works at Holstein Canada as Coordinator of Research and Development. Welcome Bethany, and a warm thank you to our previous Executive Director, Jim Dalrymple, for a job well done over many hard years. We look forward to continued collaboration with Jim, as we are honoured to announce he has agreed to serve as a Foundation director.

Since our last communication with you, our membership and supporters, the Foundation has received support from the Advancing Canadian Agriculture and Agri-Food Program (ACAAF) for research to preserve genetic variability and diversity. The project is already underway at the University of Guelph. A graduate student began studies in January and is now investigating for his research program. He has completed some course work and prepared a review of literature. A Foundation Steering Committee meets regularly to keep track of progress.

The Foundation's greatest accomplishment; the establishment of the Agriculture and Agri-Food Canada Centre for Animal Genetic Resources in Saskatoon, is now bearing fruit and we are delighted to have the Centre's Research Manager, Ken Richards, as a contributor to this issue of Gene Scene.

However, more remains to be done. The Foundation will continue to press for more work in the area of germplasm conservation both at the Centre and elsewhere. In the



Peter Hunton, Chair CFAGRF

Centre's original Business Plan, industry involvement was anticipated along with Government, and the Foundation is dedicated to working towards this end. In addition, we envisaged that the Centre in Saskatoon would be the hub of research conducted, with spokes of activity in other locations in Canada. Currently, the project at Guelph is the Foundation's main focus, but **more potential contributions will be explored** both at the academic and industrial levels.

The Foundation is currently very short of funds. We will be approaching previous and new potential supporters in the near future to secure money to keep the project at Guelph on track. We are committed to spending about \$14,000 cash and \$100,000 in-kind annually during the project's two-year duration. Additional funds will be required for continued operations at the Foundation and to undertake new initiatives.

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CONTINUED CONSOLIDATION IN POULTRY INDUSTRY

Dr. Peter Hunton

Breeding of Egg Layers is now concentrated in just two corporations, both headquartered in Europe. The E.W. Group in Germany owns Hy-Line, H&N International and Lohmann, while Hendrix Genetics, located in The Netherlands, owns Babcock, Bovans, Dekalb, Hisex, ISA, and Shaver. Both companies' products are widely distributed around the world, but primary breeding is limited to a few sites. Canada is prominent in the affairs of both companies. Hendrix operates breeding operations at the former Shaver farms in Cambridge, ON while Lohmann has a grandparent farm and some pure lines in Brantford, ON.

On the meat chicken side, a few more players are involved. E.W. Group owns Ross, Arbor Acres, and LIR, with breeding operations in several countries in various parts of the world. Hendrix Genetics own Hybro, based in The Netherlands, and Cobb-Vantress, owned by Tyson Foods in Arkansas, also has widespread breeding operations. In addition, the Hubbard brand, now owned by Grimaud Freres in France competes internationally. In turkeys, E.W. Group owns British United Turkeys and Nicholas, with breeding farms in the UK and US respectively, while Hendrix Genetics owns Hybrid Turkeys, headquartered in Kitchener, ON.

More than 90% of the world's egg, chicken and turkey industries are supplied with breeding stock from these organizations.



The poultry industry - a concentrated affair.

GENETIC CONSERVATION RESEARCH ~ A COLLABORATIVE EFFORT

Dr. Bethany Muir

Since securing Advancing Canadian Agriculture and Agri-Food Program (ACAAF) funding for a project entitled "*Development of a plan of action to preserve genetic variability and diversity in Canadian farm animals*", the Foundation and researchers at University of Guelph have been hard at work on this worthwhile initiative. The Foundation, since it represents the interests of the Canadian commercial livestock industry, several groups involved in breed conservation, and has many members in the scientific community, is in an ideal position to develop such a plan.

The study aims to inventory science-based approaches and develop an action plan for reducing the speed of the current decrease in the genetic variability of Canadian livestock. After producing an inventory of scientific methods available, researchers will investigate their possible application to each livestock sector in the Canadian context.

Priorities for action will be recommended, taking into account international as well as domestic conservation efforts.

The resulting approaches will be equally important for intensely selected large breeds and for breeds with small sizes, although they will likely be quite different for each. Recommendations for limiting inbreeding and conserving genetic variation in both large and small populations will be given. Several scientific methods have been described for addressing these challenges, however, they have generally not been applied or incorporated into coherent strategies adapted to the needs of each livestock industry, particularly in the Canadian context.

Since starting his studies in January, Melkaye Melka (Ph.D. student at the University of Guelph) has completed part of his course-work and conducted a literature review of scientific approaches for genetic diversity analysis and conservation. With additional input from Foundation members, this theoretical review will be a stepping-stone to the development of conservation action plans for each major livestock species; swine, poultry, dairy and beef. In September, the Steering Committee will meet to discuss progress and make recommendations for continued research.

CANADIAN GENETICS RESOURCES CENTRE (CAGR) - UPDATE

Ken Richards, Research Manager, Canadian Genetic Resources Program

The CAGR program continues to progress towards their mandate of protecting and conserving the genetic diversity of Canadian domestic animal genetic resources. CAGR professional staff along with other AAFC genetic resource staff across Canada were successful in obtaining a 4 yr grant to conduct research in genetic diversity studies (Yves Plante), gamete/embryo physiology (Carl Lessard), cryobiology (Muhammad Anzar), database development (Wenkai Fu) and to facilitate acquisition and maintenance of donated germplasm. The funds will also be used to support a graduate student in genetic diversity studies. Comments from the external review panel were very positive indicating it should be a strategically important project, which was well conceived, well organized and developed. CAGR staff in collaboration with staff from the Western College of Veterinary Medicine has also been successful in receiving external funds for reproductive physiology research.

CAGR staff moved into the new research wing (new offices and research laboratory and other facilities) in the Veterinary Medicine building in April. The new state of the art research wing combines all the reproductive research at the Vet College into a common area and facilitates research collaboration among staff.

Wenkai Fu recently joined the staff of the CAGR program for bioinformatics / database development. He will be responsible for developing an internet-accessible animal genetic resource database, which will contain information on holdings by breed, including pedigree, phenotypic and genotypic information and linkage to other databases such as FAO and the USDA. It is anticipated the database development efforts will be conducted collaboratively with the USDA.

The CAGR program has started to receive donations of semen and embryos. Several donations involving beef and dairy cattle have arrived including a large donation from Donald Shaver. More donations are currently being arranged. If individual breeders or organizations are interested in donating semen or embryos to the national

collection for long-term conservation of the genetic diversity of Canadian livestock and poultry breeds, please contact one of the above-mentioned professionals. Standard cooperative agreements and donation forms are readily available for use.

During June 11-15, a meeting of the FAO Commission on Genetic Resources was held in Rome, Italy. Animal Genetic Resources dominated the agenda with several sessions devoted to finalization of the State of the World's Report on Animal Genetic Resources, negotiating the Global Plan of Action of Animal Genetic Resources, and the Interlaken Declaration and the Multi-Year Plan of Work for the Commission. Canada actively participated in all sessions where most of our interventions were accepted by member countries. The State of the World's Report, the Global Plan of Action and the Interlaken Declaration are to be finalized at the International Technical Conference on Animal Genetic Resources, Interlaken, Switzerland in early September 2007.



CAGR - a research hub for genetic diversity, gamete/embryo physiology, cryobiology and database development.

INBREEDING IN CANADIAN DAIRY BREEDS

Brian Van Doormaal, General Manager, Canadian Dairy Network

Each year, based on official animal registration and pedigree information within its database, Canadian Dairy Network computes current statistics related to the level of inbreeding within the Canadian cow population of each dairy breed. In this way, the average level of inbreeding for animals born in the most recent complete calendar year as well as trends in the level of inbreeding over time can easily be monitored. The following table is based on animals born since 1970 up to and including registered animals born in 2006.

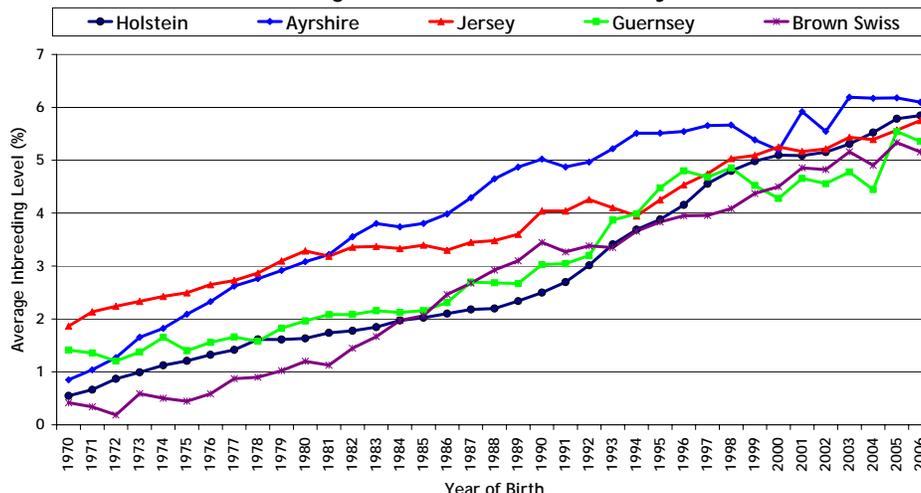
breeds has been similar and moderate, reaching 5.85%, 5.75% and 5.16% inbreeding for 2006, respectively. The Guernsey breed experienced a sharp increase in 2005 that has continued for heifers born in 2006 at 5.36%. As with previous years, the Canadienne breed has the highest average rate of increase reaching 6.83% while Milking Shorthorns continue their decreasing trend relative to the average inbreeding level in 2000.

CURRENT INBREEDING LEVEL AND CHANGE IN AVERAGE INBREEDING BY BREED					
Breed	Average % Inbreeding for 2006	Average Annual Increase in Average Inbreeding Percentage by Time Period			
		1970-1979	1980-1989	1990-1999	2000-2006
Ayrshire	6.10	.23	.20	.05	.13
Brown Swiss	5.16	.05	.21	.13	.16
Canadienne	6.83	.08	.29	.20	.25
Guernsey	5.36	.05	.08	.19	.17
Holstein	5.85	.12	.07	.26	.13
Jersey	5.75	.13	.05	.15	.08
Milking Shorthorn	2.13	.04	.00	.27	-.09

The graph below shows the inbreeding trend for animals of the five main dairy breeds born in Canada since 1970. While the Ayrshire breed continues to have the highest average level of inbreeding among the five major dairy breeds in Canada, currently at 6.10%, it has been successful in controlling any increases for registered heifers born since 2003 (see graph below). In recent years, the rate of increase in the average level of inbreeding for the Holstein, Jersey and Brown Swiss

Due to their small population size, annual changes in inbreeding levels for especially the Canadienne and Milking Shorthorn breeds are more sporadic from year to year so overall trend information is more informative.

Inbreeding Trends in Canadian Dairy Breeds



For further information, please feel free to contact:
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