

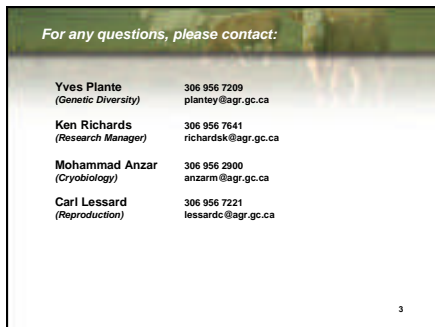
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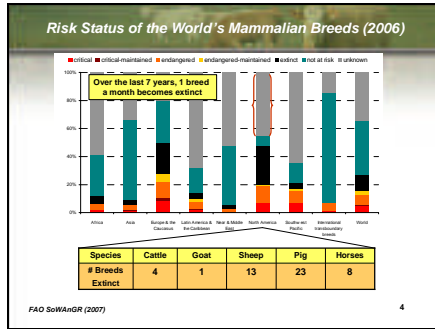
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Drivers of Changes in the Use of Animal Genetic Resources for Food and Agriculture

Why are we loosing farm animal genetic diversity?

- 1) **Purchasing power, urbanization, consumer trends**
- 2) **Trade and retailing systems**
- 3) **Changing natural environment**
- 4) **Technologies focusing on increasing production**
 - a) Mechanization and intensification of agricultural practices
 - b) Breeding and selection, feeding, assisted reproduction, animal health
 - c) Processing, cooling and transport
- 5) **Exit from agricultural sector**

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Reasons to Conserve Farm Animal Genetic Resources


- **National self-sufficiency for food safety and security**
- **To keep potentially useful and useable gene complexes**
- **To overcome selection plateaus and favor heterosis**
- **Insurance policy**
 - Local and global environmental, market and social changes
 - Protection against selection errors
 - Protection against new and emerging diseases
- **Protect our cultural farm animal heritage, historical and educational purposes**

Once an Animal Genetic Resource is gone, it is gone for ever

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Canada and FAO for Farm Animal Genetic Resources (background)

- Global intergovernmental forum
- Work on Animal Genetic Resources started in 1997
- Intergovernmental Technical Working Group
- Development of tools
 - Domestic Animal Diversity Information System
 - Options, guidelines, strategies
 - Global, national and regional focal points
- Preparation of the Interlaken Conference
- Canada's Country Report (2003)
- Canadian Animal Genetic Resources Program (2006)
- State of the World's Animal Genetic Resources (2007)
- Interlaken Declaration and the Global Plan of Action (2007)
- Access and Benefit Sharing from the use of Animal Genetic Resources (2009)



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AAFC-CAGR Team and Committees

Scientific Team
Dr. Ken Richards, Research Manager
Mr. Wenkai Fu, Biostatistics
Dr. Carl Lessard, Gamete and Embryo Biology
Dr. Mohammad Anzar, Cryobiology
Dr. Jao Shreshtha, Quantitative Genetics
Dr. Yves Planie, Genetic Diversity

Scientific Advisors
Dr. Sheila Schmutz, Dept. Animal & Poultry Science
Dr. Rueben Mappleidt, Western College of Veterinary Medicine

Advisory Committee
Agriculture and Agri-Food Canada
Dept. Animal & Poultry Science (Univ. Saskatchewan)
Western College of Veterinary Medicine (Univ. Saskatchewan)
University of Laval (Academia and nodes)
Canadian Farm Animal Genetic Resource Foundation
Rare Breeds Canada
United States Department of Agriculture (USDA-NAGP)
Industry



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CAGR Program – Characterization & Preservation

Mandate: ...describe, preserve, support and increase the utilization of genetic diversity in Canadian farm animals of socio-economic importance for food and agriculture...

Service: ...acquire, evaluate and distribute quality germplasm for breeding and research as well as providing relevant information about the genetic resources provided and to support extension activities and education programs...

Research: ...understand breed genetic structure and trends in inbreeding, combine socio-economic and genetic data as indicators of merit/status for conservation...base-knowledge in reproductive physiology, gamete and embryo biology in target farm animals...adapt or develop new technologies for the long term preservation of valuable genetic resources...through better freezing methods and principles...

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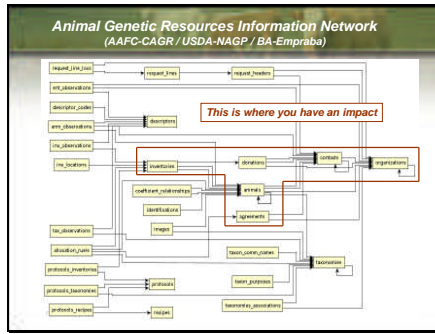
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Steps Necessary for Conservation of Genetic Diversity

Inventory - Database Breed status and effective population size Breeding system Number of sub-populations or specific lines Population trends over time	} Breeders/ CAGR-GRIN
Evaluation - Database and Management Needs Phenotype and unique characteristics Genotypes (MoDAD and Functional Genes) and EBVs Genetic relatedness and coancestry Genetic merit for conservation	
Repository - Active Collection and Industry Participation Voluntary individual collections and donations Organized local collections Cooperative agreements with industry stakeholders Access policies Emergencies Repopulation and Diversity Research	} Breeders/ Registries/ RBC/ CFAGRF/ Industry/ CAGR

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Donations of Germplasm to AAFC-CAGR

Individual Owners/Breeders/Producers Breed Associations AI Companies Interest Groups Commercial Lines Research Lines Diagnostic Laboratories Universities Government Agencies	<p>Donation Agreement</p> <p>AAFC-CAGR (Canadian Animal Genetic Resources Program) is pleased to accept your donation of genetic material to the National Animal Genetic Resources Program (NAGP) for the purpose of maintaining and enhancing the genetic diversity of the Canadian animal genetic resources. This program is a key component of the National Animal Genetic Resources Program (NAGP) and is managed by the Canadian Animal Genetic Resources Program (CAGR).</p> <p>The donor agrees to donate the genetic material to the NAGP and to grant AAFC-CAGR the right to use the genetic material for research and conservation purposes. The donor also agrees to grant AAFC-CAGR the right to use the genetic material for research and conservation purposes.</p> <p>The donor agrees to grant AAFC-CAGR the right to use the genetic material for research and conservation purposes. The donor also agrees to grant AAFC-CAGR the right to use the genetic material for research and conservation purposes.</p> <p>Donor Information:</p> <p>Name: _____ Address: _____ Phone: _____ Email: _____</p> <p>AAFC-CAGR (Canadian Animal Genetic Resources Program)</p>
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Specific Agreements on modalities for donations, storage, use and release can be prepared to satisfy the concerns of the donors.

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Within-breed components of Canadian germplasm collection

Core	Provide sufficient quantities and diversity of germplasm for 200% of breed regeneration through backcrosses.	National, Industry or Breed Emergency
Evaluation	Sufficient material to evaluate germplasm quality over time and genetic diversity.	As needed by CAGR
Working	Germplasm for industry and research use for new or experimental line development or DNA studies.	Requestor submits a proposal to CAGR for appropriate evaluation.
Restricted	Provides a security back-up for private sector germplasm. Agreements on restricted accessibility.	Permission from germplasm owner. No possible release to external users.

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CAGR Germplasm (semen) Inventory (August 2007)

Breeds	# Sires	# Doses
Ayrshire	141	10,049
Brown Swiss	14	1,120
Canadian	4	262
Guernsey	22	1,709
Holstein	2,499	188,349
Jersey	77	5,605
Milking Shorthorn	1	80
Bionics of Aquitaine	2	608
Simental	8	919
Shaver Beef Blend	14	11,408
CBRH (U of S) - Research	28	1,290
Elk	5	591
Bison	7	600
Poultry (blastodermal cells)	42 lines	1,232

Challenges:
 Beef cattle
 Sheep
 Goats
 Pigs
 Horses
 Poultry

No representation in the collections

Lack of interest?
 Lack of communication?
 Misunderstanding?

No needs?

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Conclusion

The long term conservation of Canadian farm animal genetic resources is our collective responsibility. The AAFC-CAGR program is there to facilitate this process. It is up to livestock keepers to make it a success as a gift to future generations of Canadians. The donation of germplasm is required and is a necessary first step in the creation a Canadian gene bank of farm animal genetic resources.

"When the last individual of a race of living things breathes no more, another Heaven and another Earth must pass before such a one can be again."
 William Beebe

"For in the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught."
 Baba Dioum

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