



What is achieved and what
remains?

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Pensioner

Introduction

Since I got this opportunity to speak, may be for the last time, I will try to express my personal view of the matter linked to Research and Development, Integration to practical use and Political strategy for AnGR in the future security for food supply.

The presentation may be somewhat fragmentized, but a similar manuscript will be made, where the message will be substantiated more in depts.

Over view of my presentation

1. Preconditioned reviews
2. Achievement
3. What remains
4. Conclude
5. Thanks

Preconditioned views

In following parts:

- a. General
- b. Profession
- c. Trends

General

- Change in view: From Conservation to sustainable management; encompassing all breeds
- Perspectives of genetic diversity as Genetic Resources
- Valuation of AnGR -
- Genetic Resources as issues of policy;
i.e. Similar to Environment, the Officials had to make law, in order to prevent ruin of the Environment by the industry

Profession

- Important achievement in Breeding theory
 - The Bulmer effect – the effect of parent's selection
 - Use of kinship matrix
 - The establishment of the unique "genetic contribution" theory, a view of the dynamic of the breeding force
 - Revitalization of inbreeding and mutation as important factors in long term perspective
 - The individual's random sampling term as unique genetic resources for reestablishing new genetic variation in every new generations, accounting for 50 % of the total genetic variation -
 - The phenotype selection is additive genetic selection plus all epistatic of multiple forms of linear by linear epistasis

Profession (2)

– Controversy:

- Economics teaching of present values gives conclusions that max. earning to day imply acceleration of inbreeding and reduced genetic diversity in future, i.e. future diversity has no values to day
- Reduction of genetic diversity is an irreversible process, leading to reduced future possibilities and reduced securities of food supply
- Strong selection on limited no. of traits may lead to over estimated earnings of the breeding program, if the effect of negative change of correlated important functionality traits are not accounted for, simultaneously

Trends – Research worries

- Research are not only seeking the truth:
 - Simulation work on extraordinary simply models -
 - The correlation between the simulated model and the real world is hardly mentioned as a critical factors for the results -
 - The expectations of the effect of innovation from biotechnology for animal breeding has from several Scientist been grossly exaggerated for the last 20 years –
 - I am looking foreword to more findings of functionalities of genes and totality views how the dynamic works together, genetically
 - biotechnology has had bigger business potential within other area than breeding -

Trends (2)

– Breed diversification

o Closed breeding populations

- **Poultry**- 50 % of alleles in commercial existing lines are lost ⇒ What about its resistance in a pandemic situation, continuous genetic uniformity further would lead to a diversity crisis which may result in an epidemic catastrophe
- **Pig**- Existence of several national lines of breeds, make immigration or exchange of genes possible!!
- **Holstein**- No national lines, anymore, its popularity may be on a long term perspective undermined for the pure breed novelty
- **Icelandic Cattle**- It must be highly inbred, what should be done – Icelandic decision

o Open breeding populations

- **Several Cattle breeds** – Important to maintain diversity by sustainable breeding program
- **Several sheep and goat breeds** – Important to maintain diversity – to meet climate change

Achievement

NGH`s contribution

In following parts:

- a. Book, important reports and tools
- b. Projects (financed) 1998-2004
- c. Strategy involvements
- d. Presentation and other contributions
- e. Information; Home pages, publications, etc

NGH`s contribution:

- Book, important reports and tool:
 - Book: Sustainable management of AnGR, John Woolliams et.al
 - Report: Business ideas for niche products based on old breeds, Project leader Kirsten Værdal
 - Inbreeding assessment of IT-program for use in ordinary animal recording schemes, Project leader Peer Berg – resulting in EVA program and several teaching courses

NGH`s contribution (2):

- Projects (financed) and seminars: 1998-2004:
<http://www.nordgen.org/ngh/download/prosjekterngh.pdf>:
 - Sustainable Breeding in the Nordic Red Dairy Breeds, Project leader Torstein Steine
 - Baltic and Nordic cattle breeds in the global context: a molecular genetic approach, Project leader Johanna Vilkki
 - Sustainable breeding goals, Project leader Birgitta Danell
 - Characterization of genotype and production traits of the old Norwegian cattle breed STN, Project leader Odd Vangen
 - Origin and genetic diversity of northern European sheep breeds, Project leader Emma Eythorsdottir
 - Selection programmers in small Nordic livestock populations, Project leader Gunnar Klemetsdal

NGH`s contribution (3):

- Projects (financing) and seminars: 1998-2004:
<http://www.nordgen.org/ngh/download/prosjekterngh.pdf>
- Combination of Moet and progeny test in Nordic red cattle, Project leader Esa Mäntysaari
- Nordic poultry breeds, Project leader Poul Sørensen
- Coordinating and optimizing the conservation of livestock breeds in Nordic, Project leader Torkild Liboriussen
- Analysis and comparison of genetic diversity in northern European cattle breeds Project leaders Ingrid Olsaker/Ilona Miceikiene
- Pedigree and DNA-marker assisted conservation of small populations, Project leader Peer Berg
- Reaction norms and genotype-environment interaction in Nordic Dairy cattle, Project leader Erling Strandberg

NGH`s contribution: (4)

– Strategy

- Member of a working group: A NORDIC APPROACH TO ACCESS AND RIGHTS TO GENETIC RESOURCES, NMR
- NGH`s Strategic plan 2001-2003 og 2004-2009:
<http://www.nordgen.org/ngh/download/strategiplan-no.pdf>
- National management of Genetic Resources for Animal, Plants and Forrest trees (2000), Leader for a working group appointed by LMD, report
- Organizational models for national gene resource work (2004), Member of a working group appointed by LMD, report
- Participating in working group for FAO in preparation of the SoW-process and course preparation in Hungary

NGH`s contribution:(5)

- Presentations and other contributions:
 - Workshop on Cryopreservation of AnGR in Europe, Paris (2003). Status and proposals of future plans for managing AnGR in the Nordic, presented
 - International Consultation on Options and Strategies for the Conservation of FAnGR. Montpellier (2005). Institutional Issues and Frameworks in Ex-situ Conservation of FAnGR, presented
 - Workshop on Legal and Strategic Aspects of ANGR in Europe, (2006), EU, Brussels. Possible global guidelines for AnGR, presented
 - Utilization and conservation of farm animal genetic resources, Book; (2007) Edited by Kor Oldenbroek, Chapter 9; Practical implications of utilization and management.

NGH`s contribution:(6)

- Presentations and other contributions:
 - GENETIC DIVERSITY AND SUSTAINABLE UTILIZATION OF ANIMAL GENETIC RESOURCES (AnGR) IN THE NORDIC REGION – NATIONAL AND REGIONAL POLICIES (2006), Invited paper to the 8th World Congress on Genetics Applied to Livestock Production, Brazil
 - Several others presentations about AnGR matters in Baltics, in Nordics and side events in FAO

NGH`s contribution:(7)

– Information; -

- Establishment of Home pages, publications, etc
- Internet as tools for knowledge presentations
- Reports, NGH NYTT=husdyr nytt, Genviten, Nordisk GenRessurser, annual reports etc.
- News

What remains

- a. Further knowledge
- b. Organizational cooperation /development
- c. Political awareness

Knowledge (1)

– Conservation

- Prioritizing breeds for conservation according to breeds with max. variation and No. of private alleles using method presented by Simianer
- Evaluations of breeds` specific traits for trademark potentials
- Visualize the figures of the national ex-situ gene bank of semen and embryos in every Nordic countries and let all this data be summed up in a page of NordGen` s web page to demonstrate the Nordic activities altogether
- Insist on and secure cooperation with AI-industries for ex-situ conservation of semen and embryos, separate gene banking is far to expensive, regardless of attempt from a few politicians to propose central storage like in plants²⁰

Knowledge (2)

– Sustainable use

- Utilizing optimal selection methods for all breeding populations
- Excessive use of individual males, means non sustainable management → To many ignore this!
- Finding the optimal driving force for each and all traits necessary for defining a complete and sustainable breeding improvement goal for each species using the principle of Factor analysis
- Some countries in the Nordic region are importing the major portion of semen from none Nordic countries, this is not a sustainable breeding practice

Knowledge (3)

– Sustainable use

- It is important to maintain national breeding activities, in order to maintain necessary competence for security reason
- Future environmental restrictions linked to animal production will require genotypes that minimize waste, instead of to day situation where they maximize waste -
- Increased export of genetic materials require attentions to ExG-interaction
- Integrate the new real finding from biotechnical research to the breeding programme instead of speculative castles in the air

Knowledge (4)

– Sustainable use:

- Breeding for resistance of diseases of animals would be the best value response for society in the future -
- A product, guaranteed produced without using antibiotic, might be a potential marked lead as trade mark

Organizational (1)

- Should be considered:
 - Strategic cooperation between similar breeding organizations, in order to arrest inbreeding effects -
 - Breeding cooperative is not only working for the members, but also exports, which is a different “business model” than the classical cooperation
 - Breeding cooperatives are only first level exporters
 - It is not developed business model for later level benefit sharing

Organizational (2)

- Should be considered:
 - Very little discussion of strategy to survival from buying up, patents claim etc. – need to be done
 - Should be taken initiative to search for and discuss model to take strategic lead. Nordic region have the best infrastructure and breeding technology in the world
 - The Nordic breeding organizations do not believe enough in their own abilities to be the best -

Political

- If the Nordic players of AnGR are clever enough and able to agree, they could lead a process for making a international platform for exchange of AnGMaterial
- In that discussion, an AnGM transfer agreement should be serious considered, that take care of sharing of benefits regarding third parts and patent claim in further use.
- The following up of the Interlaken nationally would be very important, in years to come
- All genetic resource players should be involved in this process

Conclude

The financial crises have shown that experts are not always expert as they thought.

Common sense is good to have both for the political and the developmental part of the agencies, and maybe it should be manufactured or revitalized as a criteria for some research people

The most important is to be inquisitive and interested in searching the truth and its connection to real life

But it may also be important to have a touch of feelings, in order to play on the political level

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