THE FINNISH NATIONAL CONSERVATION PROGRAM FOR ANIMAL GENETIC RESOURCES

Mervi Honkatukia, Natural Resources Institute Finland

Working Group
of AnGR

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How the preservation of native breeds started in Finland?

- in 1983 report by a working group initiated by the Ministry of Agriculture and Forestry, MMM
  - inventory and characterization of status of native breeds
- the Genebank working group was established in 1984
- Preservation work started in 1985 by setting up live genebanks to prison farms for cattle and sheep
- 5 school farms have started to keep native cattle already since 1975

Finnish National Strategy for Farm Animal Genetic Resources

- **National animal genetic resources strategy was launched in 2004**
- In addition to cattle and sheep, horse, chicken, dog, bee, reindeer, pig and goat were included in the program
- An updating process for National Genetic Resource Programs
  - A new, joint program for all sectors, inluding animal-, fish-, forest- and plant sectors

National conservation program

- implemented through collaboration between Natural Resources Institute Finland (Luke) and Ministry of Agriculture and Forestry.
- MMM’s National Board for Genetic Resources develops and monitors the Strategy.

Goals for the national conservation program

- To prevent extinction
- To enhance sustainable use of AnGR
- To preserve maximal genetic diversity
- To find a balance between breeding goals for economically important traits and maintenance of genetic diversity
- To increase awareness of national animal genetic resources

Breeds involved in the national programme

- native breeds
- imported breeds with a relatively long breeding history in Finland (e.g. Finnish Ayrshire cattle, Texel sheep)

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Current status of breeds

Breed	Number of females	Breed status
Dark European Honeybee (Apis mellifera mellifera)	Not known	Endangered
Finnhorse	1000	Vulnerable
Landrace chicken	5000	Vulverable (some of the sublines are engangered)
Åland sheep	1300	Vulverable
Kainuu grey	750	Vulverable
Eastern Finncattle	1600	Vulverable
Northern Finncattle	840	Endangered/Vulverable
Western Finncattle	1500	Vulverable
Finngoat	7000	Vital/Vulverable
Finnsheep	10 000	Vital

Activities in general

***In situ* conservation:** living ’gene banks’ for Eastern Finncattle, Northern Finncattle, Western Finncattle and Finnsheep.

Network of active hobby chicken breeders in the conservation of the Finnish Landrace Chicken

Activities in general (cont.)

- Seminars, Web pages, social media (FBs)
- International collaboration e.g. with NordGen
- Research activities (R&D)

Activities in general (cont.)

- ***Ex situ* conservation:**

cryopreservation of cattle semen and embryos, sheep semen, goat semen, Finnish Landrace rooster semen, horse semen and dog semen.

- Living genebanks are supporting the work done in farm level
- Several stakeholders are responsible for monitoring progress
- Farmers can apply subsidies for a several native breeds

Breed	In vivo conservation	Body in responsible
Finnhorse	Registered farms	Finnish Hippos
Landrace chicken	Keeper network	Luke
Åland sheep	Farms in production monitoring Farm network	Pro Agria Föreningen Ålandsfåret
Kainuun grey	Farms in production monitoring Genebank farm	Pro Agria
Finnsheep	Farms in production monitoring Genebank farm	Pro Agria
Texel	Farms with production monitoring	Pro Agria
Eastern Finncattle	Genebank farms Farms in production monitoring	Faba, Luke
Western Finncattle	Genebank farm Farms with production monitoring	Faba, Luke
Northern Finncattle	Genebank farm Farms with production monitoring	Faba, Luke
Finnish Ayrshire	Farms with production monitoring Nucleus herd	Faba, Viking Genetics
Fennoscandian Reindeer	Herds	Paliskuntien yhdistys, Luke
Finngoat	Farm network	Pro-Agria, Finnish Goat Association, Luke

Finnish cattle breeds

- Three native cattle breeds
- Finnish dairy cows:
  - 59 % Finnish Ayrshire
  - 39,5 % Holstein
  - 1,5 % Finncattle

Kirsti Hassinen

- Native breeds are not competitive in milk yield

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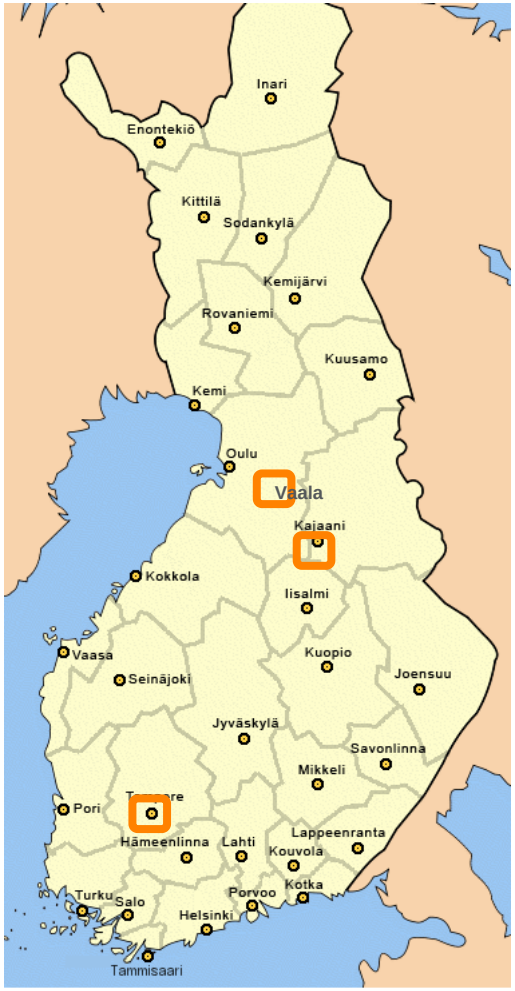
In situ genebanks for Finncattle:



- Genebank farms for Finncattle are located in vocational schools and in a prison farm
  - **Eastern Finncattle**: Kainuu Vocational School (Kajaani) and Ahlman Vocational School (Tampere): 30 females
  - **Northern Finncattle**: Pelso Prison Farm (Vaala): 60 females
  - **Western Finncattle**: Ahlman Vocational School (Tampere): 40 females

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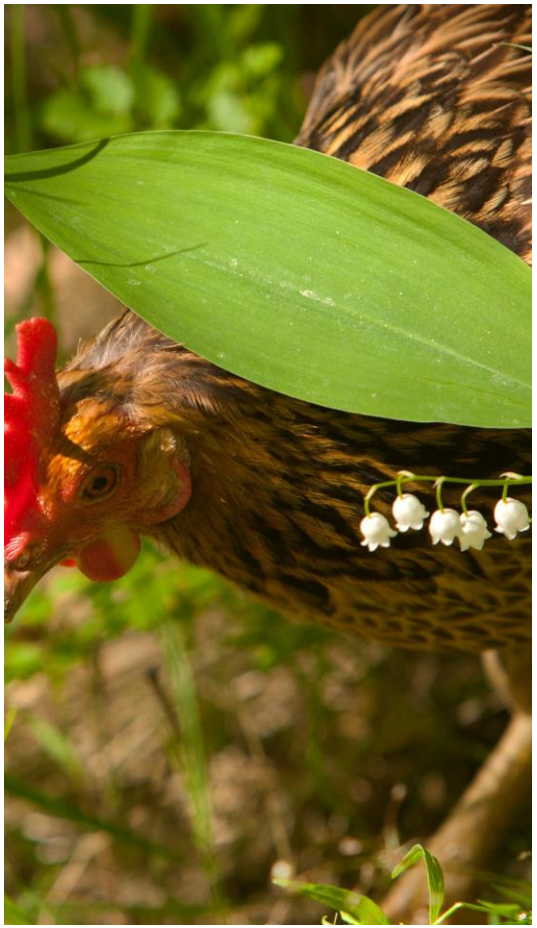
Pelso Prison Genebank Northern Finncattle and Finnsheep

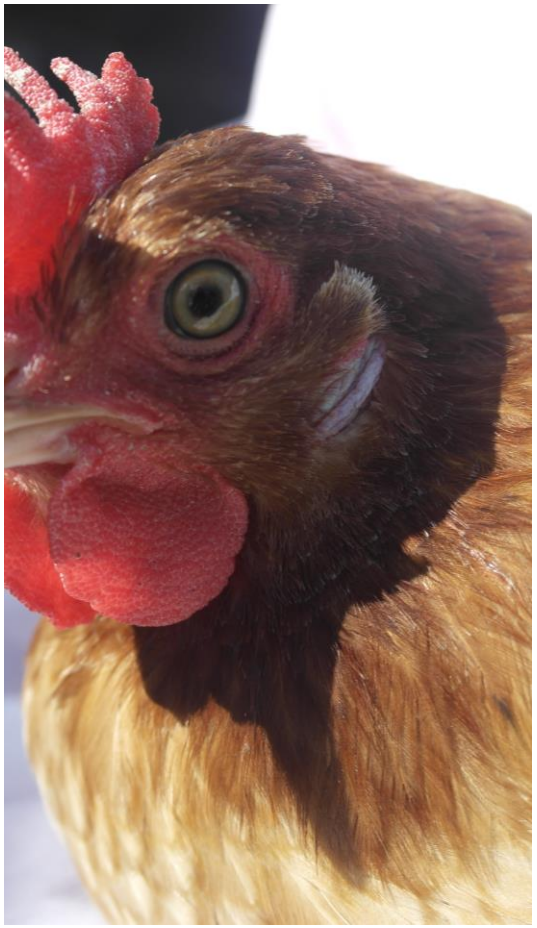
- remnants of the Northern Finncattle was collected to the prison farm in 1990’s
- 60 breeding cattle, total of 160 individuals
- Maintains rare family lines
- Active breeding to improve the economical traits

The Finnish landrace chicken conservation program



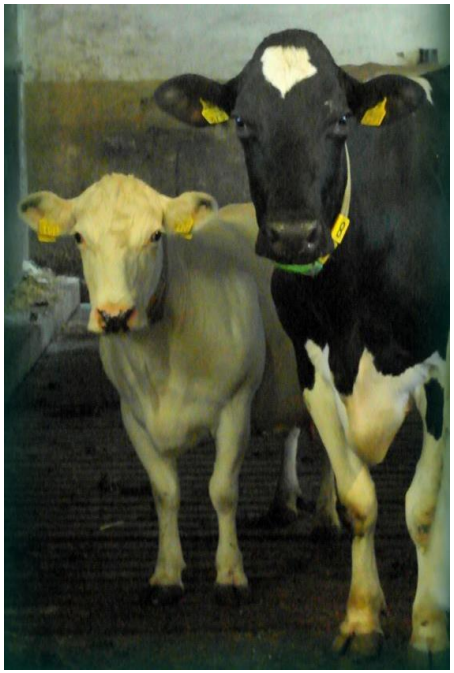
- first conservation actions in the 1960s when two family lines were rescued
- later on, an inventory revealed over 10 populations in 1990’s
- the conservation program was founded 1998

The conservation program in practice



- based on the voluntary network of hobby breeders (>400 keepers, >5000 animals)
- coordinated by Natural Resources Institute Finland (Luke) (former MTT)
- advisory group is supporting the practical actions
- open for new breeders

Niche product and other characteristics



- Finncattle have special characters: high protein and fat contents > good for cheese making (+10 % more cheese)
- Good meat quality (tender, fine texture)
- Other good characters:
  - optimal size
  - good feed efficiency and fertility
  - behaviour

Finncattle in traditional landscaping

Kyyttötila Ylikallio

…in greencare work

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Grazing and landscape seminar

Organizing by Ahlmanin vocational school, Proagria (Rural Advisory services) and Luke 11.1.2018 in Tampere

Presentation “Finnish native breeds in pasture lands” Mervi Honkatukia

Special lecture by Birgit Fag, Jönköping

.

Naturbete

En föreläsning om djur på naturbete
Av
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Hushållningssällskapet Jönköping
11 januari 2018

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Centre for Economic Development, Transport and the Environment

Luke LUONNONVARAKESKUS

ARKTINEN KESKUS Lapin yliopisto

Final seminar for Lappari – project in Rovaniemi 22.2.2018

How to utilize Northern Finncattle‘s milk in local production - exploring possibilities and opportunities

LAPPARI

- **Arctic Centre, University of Lapland & Luke**
- objective is to examine **value chains** and networks for promoting the milk
- to find **innovative milk products** which give added value
- **promote products locally** in Lapland for tourism enterprises

A continuation project: ”Lappari school” for the Northern Finncattle farmers: How to start as a milk producer?

Lapparikoulu - Lapinlehmän maito markkinoille

maaseuturahasto

MAASEUTU 2020

Elinkeino-, liikenne- ja ympäristökeskus

Ajankohtaista

Coming events in the nearest future

SICAMM 2018

Welcome to the dark side! The SICAMM 2018 dark bee conference in Finland

The Finnish Beekeepers' Association is happy to invite you to the SICAMM conference 2018. The conference will be organized at Mustiala agricultural school, southern Finland. This is the oldest agricultural school in the country, where educational activities started already in 1840. More information about the location: HAMK Mustiala campus

Apis mellifera mellifera conference (University of Applied science, Mustiala) 12.7.-18.7.2018

The 120 year anniversary for herdbook of Eastern Finncattle (Seppälä Vocational School, Kajaani) 19.5.2018

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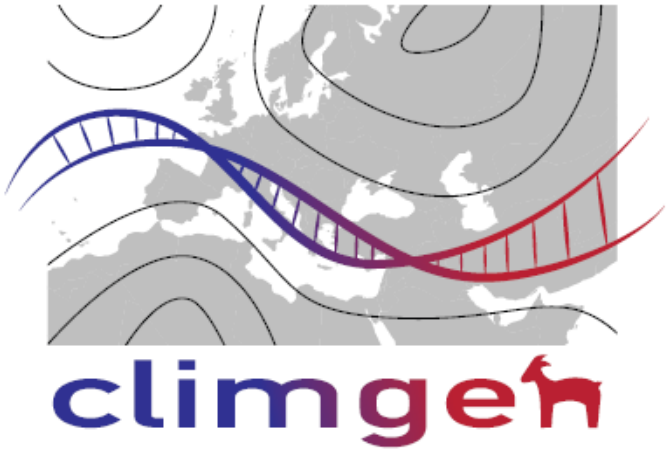
FACCE-ERA-NET + Call on Climate Smart Agriculture

Climate Genomics for Farm Animal Adaptation



ClimGen is a project that focuses on the identification and use of ‘omics technology for building livestock resilience to climate change. Bringing together previous and ongoing efforts to understand livestock adaptation to climatic extremes, the project will seek to identify genomic tools and biomarkers that can be used to predict adaptation in livestock populations to thermal and related challenges.

WP6: Development of Breeding Strategies

1) WP6 will compare methods for bringing about the genetic adaptation that is required to address possible environmental changes. 2) Conservation of genetic resources

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Whole-genome sequencing of modern native and ancient cattle

- Genomes (about 2.8 millard basepairs) of 5 Eastern Finncattle, 5 Western Finncattle and 5 Yakutian cattle have been sequenced
- We managed to partly open genomes of two ancient cattle with low sequencing coverage: one Iron Age cattle from Mulli farm in Raisio and one Medieval cattle from Viipuri (Vyborg).

ARCTIC ARK. HUMAN-ANIMAL ADAPTATIONS TO THE ARCTIC ENVIRONMENT: NATURAL AND FOLK SELECTION PRACTICES (ARC-ARK)

Arctic Ark Consortium[a] from Green Technology, Natural Resources Institute Finland and Arctic Centre, University of Lapland

Academy of Finland decision No. 286074, 01.01.2015 – 31.12.2018

Introduction

In the Arctic, traditional animal husbandry is based almost exclusively on reindeer (*Rangifer tarandus*) but in *Lapland, northern Russia* and *Siberia* also other locally adapted animals, namely cattle (*Bos taurus*) and horse (*Equus caballus*) are used for food production and other societal and cultural needs.

Arc-Ark investigates reindeer, cattle and horse farming in three northern regions.

Arctic Ark project studies animals' adaptation to the Arctic as a complex human-environmental process. As a result of natural and folk selection, reindeer and Arctic cattle and horse breeds show metabolic, morphological and reproductive adjustments.

Northern Finncattle (big photo) and Yakutian cattle (small photo) have higher fat and protein content in their milk but produce less milk than commercial international breeds (K. Stammler).

Work flow and work packages in Arc-Ark.

Objectives

- To combine understanding of biological selection drivers in animal adaptation with human selection traditions.
- To study the ethnic coexistence of herders and 3 pastoral animal species in the Arctic .
- To study the importance of animal traits across field sites and ethnic groups for sustaining socio-cultural diversity and resilience of human livelihoods in the Arctic.
- To understand distinct values of Arctic animal genetic resources.

Methods

- In the animal genomics analyses we focus on animals' metabolic adaptation (rumen microbiota) and structural and functional genome variations using modern genomic approaches.
- In the social-anthropological studies we compare across regions animal farmers' knowledge of the environment, their practices in selection and breeding, and their desired animal characteristics that facilitate a sustainable Arctic livelihood.

The Yakutian horse grazes and drinks without human assistance even at -50°C (K. Stammler).

Joint grazing: Reindeer being led to horses, Eveno-Bytantaj Yakutia (K. Stammler)

Expected results

Arc Ark will produce new knowledge on the distinctiveness of Arctic animal genetic resources, differences between the species in adaptation and the role of "*symbiotic domesticity*" (*Beach & Stammler 2006, Stammler 2010*) in the adaptation process.

Arc Ark will show the importance of diverse pastoral animals for sustainable human livelihoods in the Arctic regions, as well as mapping impact of cultural practices on specific animal populations.

Arc Ark will establish a transdisciplinary understanding of Arctic adaptation as holistic biological-cultural processes by combining scientific and local knowledge. The project contributes new knowledge of the Arctic as a place of biological, social and cultural diversity.

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