

nucleotide polymorphism (SNP) has been discussed as a very promising class of molecular markers. Efforts are needed to develop a standardized set of SNP markers for future biodiversity studies within FAnGR species.

In conclusion, improvement of our knowledge about mechanisms underlying genetic diversity may assist in the reconstruction of domestication events, determination of relationships between populations, and assessment of genetic variation within populations. In the near future, new technologies such as high throughput SNP typing or even whole-genome sequencing are likely to revolutionize our insight into the diversity and uniqueness of breeds, with the ultimate objective of gaining a fuller understanding of the molecular basis of functional diversity. Molecular genetic tools will provide information that is an essential prerequisite for effective conservation and management of genetic diversity within farm animal species.

The breed of the month - Finnsheep: A Northern Speciality

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The Finnsheep is the native sheep breed of Finland. Because of its special characteristics, the breed is a globally important genetic resource.

History of Finnsheep

Evidence on the Neolithic animal husbandry in Finland during the period of the Corded Ware Culture (in Finland 5000 - 4200 BP) is still incomplete but other younger archaeological findings clearly indicate that the sheep has belonged to the Finnish domestic fauna at least since the Bronze Age (in Finland 3500 BP). We can assume, however, that these oldest sheep stocks once brought to Finland are the ancestors of the native sheep breed of Finland, the Finnsheep.

Finnsheep has a unique domestication history. Recent studies show that sheep entered to Europe from the original domestication sites in the south-western Asia via more than one migratory episode. Finnsheep, like several other North European native sheep breeds, originates from the earliest domesticated sheep imported to Europe. During the prehistorical times, the earliest sheep populations were nearly entirely replaced by the later importations and a great majority of the present-day Eurasian sheep breeds descend from these younger stocks.

The genetics of Finnsheep has been investigated by comparing molecular genetic data of this breed with that of several European and Asiatic ones. These studies have indicated that the genetically closest relatives to the Finnsheep are the Karelian landrace populations in western Russia. Analyses of mitochondrial DNA (mtDNA) sequences have in turn showed that the most common ovine mtDNA haplogroups A and B are present in the





Figure 1. A flock of Finnsheep.

Finnsheep and several mtDNA haplotypes in the group A may have been "imported" to Northern Europe from the East. In addition, the Y-chromosome data suggest that the Finnsheep breed displays haplotypes which are not common in other European sheep breeds

Breed characteristics

The Finnish Sheep Breeders Association was established in 1918. Animals from eastern parts of Finland were mainly used as founders for the breed because sheep in the eastern parts of the country were considered heavier and bigger than those originating from the western regions. Originally, the Finnsheep was used mainly for serving domestic needs for wool and fur, but since the 1950s the main use has shifted to a multipurpose use of the breed mainly for meat, but also for handicraft wool, furs, and landscape management.

The Finnsheep is one of the most fertile sheep breeds, exhibiting several favourable fertility traits, such as early sexual maturity, high ovulation rate and large litter size. Finnsheep ewes may have quadruples or quintuplets, and the record is eight lambs. Finnsheep ewes have excellent mothering instincts and it is very rare for a ewe to reject her lambs. They also have a



remarkable milk production. Unlike most sheep breeds, the Finnsheep can breed any time of the year. In accelerated lambing systems, ewes lamb three times in two years.

The largest Finnsheep rams weigh over 120 kg and large ewes weigh almost 100 kg. The Finnsheep has a short tail, and no docking is needed in order to avoid hygiene problems. The animals are nowadays typically polled.

The meat of Finnsheep lambs is tender, fine-textured and has a mild taste. Finnsheep lamb carcasses do not easily become fat because the body fat reserves are held around the internal organs. From there, fat is easily removed, resulting in a very lean carcass.

Finnsheep wool is considered medium quality wool. It is typically soft, lustrous and elastic, and the fibre is highly crimped. Finn-wool is available in a variety of natural colours including white, black, brown and grey. It is considered to be one of the best wools for felting.

Different from many other sheep breeds, the Finnsheep is not very sensible to copper toxicity.

A low level of inbreeding

The demographic trends in the Finnsheep breed in terms of the status of inbreeding, effective population size, and coefficients of relationships between individuals have been explored. The study showed that average inbreeding



Figure 2. Finnsheep grazing.



coefficients by birth year for animals born between 1989 and 2005 ranged from 0.63% to 2.95%. Based on the rate of increase in inbreeding per generation and average generation interval (2.85 yr), an effective population size of 119 animals (overlapping generations not considered) or 122 animals (overlapping generations considered) was estimated for Finnsheep.

These results suggest that the Finnsheep breed has a healthy population structure and potentiality for continued genetic gain. Also molecular genetic data have indicated that the breed displays relatively high within-population diversity.

Important genetic resource

Because of its special traits, Finnsheep breed has been exported to over 40 countries in five continents. Used either as sire-breed or dam-breed in crosses and in the formation of new synthetic breeds, the gene pool of Finnsheep has improved the profitability of sheep farming in the world. The Finnsheep is the best-known Finnish breed globally and Finland has a national responsibility to conserve this multi-purpose breed.

Finland actively supports the conservation of Finnsheep genetic resources. For example, a living gene bank (comprising 270 ewes) for Finnsheep has been established on the Pelso prison farm in northern Finland. A cryo-banking of genetic materials has also been started.

GLOBALDIV EVENT

Livestock Biodiversity Workshop - FAO, Rome, May 5-6, 2010

Which policies and strategies are required to successfully maintain our European Farm Animal Genetic Resources? What are the opportunities of the latest methodologies to characterize and prioritize livestock breeds? During the past two years, the GLOBALDIV and EURECA projects have been focused on these questions. GLOBALDIV and EURECA are both GENRES projects which are co-funded by the EU AGRI GENRES program. This program aims to contribute to a better characterization of farm animal genetic resources and to strengthening of conservation efforts.

The GLOBALDIV and EURECA projects are pleased to announce a joint 2-days workshop for policy makers, scientists, NGO's and representatives of industry. Outcomes and recommendations from GLOBALDIV, EURECA and other GENRES projects will be presented. Lecture topics will span from genomics to socio-economic issues in biodiversity conservation.

More information is available:

www.globaldiv.eu/Livestock_Biodiversity_Workshop/index.html

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