

## **Institutional and legal framework for ex situ conservation at national level, Norway**

### **Historical overview of gene bank development in Norway**

Norway has cryo gene banks for cattle, sheep, goats and boars, they are all run and owned by the native breeding associations. The gene banks were established during the 1960s (cattle) and 1980s.

#### *Cattle*

The GENO Breeding and A.I. Association GENO is the only agency operating AI centres for cattle in Norway. One hundred semen doses are taken from every bull at a Norwegian AI centre for long-term storage, independent of its breed or owner.

1. Since 1979, GENO has routinely taken blood samples of all purchased bull calves of the native commercial breed Norwegian Red and their mothers. The blood samples are frozen and stored, since 2005 the samples have been stored in Biobank AS.
2. Since 1985, one hundred semen doses have been taken from all progeny-tested bulls of Norwegian Red and for all bulls from the native endangered breeds (six breeds) for long-term storage. The semen is stored in liquid nitrogen under conditions fulfilling EU standards.

#### *Pigs*

The Norwegian Pig Breeders Association, Norsvin, organizes all pig breeding in Norway on two commercial native breeds: Norwegian Landrace (L) and Norwegian Duroc (D). Norsvin also carries out all freezing of boar semen. Since about 1990, some semen doses of the best elite AI boars have been frozen for long-term storage. Since 1998, 20 semen doses from each elite boar have been routinely frozen for long-term storage. This implies that all family lines are represented in the long-term storage facilities. Each year there are about 50 elite AI boars per breed, which are young boars selected according to breeding value, conformation and relationship. In the long-term gene bank, semen doses from 15 Landrace boars and 12 Duroc boars are stored every year. The intention of the gene bank is purely long-term storage, and not any kind of use (in active breeding).

#### *Sheep*

Norwegian Sheep and Goat Breeders' Association (Nsg) organizes sheep breeding activities in Norway, mainly on the native commercial Norwegian White Sheep. A subsidiary, NSG Semin A/S (jointly owned by Nsg and GENO) is responsible for AI service. Since the early 1980s the routine collection of 100 semen doses from each ram for long term storage, independent of breed, has been established.

#### *Dairy goats*

Breed: Norwegian Dairy Goat, a native and commercial breed. NSG Semin A/S is responsible for AI service. Each year, four to seven of the country's best progeny-tested bucks of Norwegian Dairy Goat are used for the collection of semen. Since 1977, semen doses from these bucks have been put into long term storage banks. The oldest frozen semen doses are from bucks born in 1970.

### Objective(s) of national cryopreservation programme/policy

As the gene banks are run and owned by the breeding associations, there is no official national cryopreservation program other than a general agreement between the Genetic Resource Centre and the breeding associations about the amount of males from the endangered breeds that should be taken in for cryopreservation, this is 1-3 males per breed per year, independent of breed size for the native endangered breeds. For the commercial native breeds (dairy cattle, pigs and fish) the breeding associations may have defined their own cryopreservation programmes.

#### Status 2012, cryo bank native cattle breeds:

Native Cattle Breed	Number of AI-bulls	Number of stored semen dozes
Døla	39	37 500
Telemark	69	39 500
Western Red Polled	48	45 000
Western Fjord	50	40 000
Eastern RedPolled	29	20 300
STN	104	68 500
NRF	2 973	*

\*long term storage of 100 dozes pr bull.

#### Status 2012, cryo bank native sheep breeds:

Sheep Breed	Number of AI-rams	Number of dozes for purchase	Number of dozes for long term storage (appr 50 dozes/ram)
Norwegian White Sheep (NKS)	440	31 000	20 000
White short tailed (spæl)	128	13 000	5 500
sjeviot	34	4 300	1 500
pelt	28	3 300	1 200
dala	6	900	300
rygja	18	2 000	850
steigar	21	500	1 000
blæset	8	650	400
fuglestadbrogete	6	1 000	300
old norse	7	400	300
Old short tailed (spæl)	22	2 800	1 000
grey trønder	14	3 000	700

## **Participation of stakeholders: responsibilities/roles by stakeholder/actor**

The breeding associations buy the males from the farmers and thereby own all rights to the genetic material.

### **Decision making process (1/15)**

The commercial breeds: The breeding associations buy the males based on breeding and relationship indexes. The males from the native endangered breeds are selected based mainly on pedigree status, breed characteristic and mothers' production. The breed society, the breeding association and Norwegian Genetic Resource Centre decide jointly which males to take in for AI-service. GENO covers all the costs (buying the calf, testing it, semen production, storage, distribution etc) for the bulls of the native endangered breeds whereas Norwegian Genetic Resource Centre subsidizes the rams of the native endangered breeds that NSG Semin A/S buy for AI-service by appr 2000 EURO per ram.

### **Storage and documentation (2/15)**

All AI sires have an ID number and thereby pedigree information is available in the breeding associations' pedigree database. However, this information might be insufficient for the first/oldest samples stored decades ago, especially for the endangered breeds.

For the native commercial breeds breeding and relationship values are also available, however, this kind of information is often insufficient for the native endangered breeds.

The three Norwegian AI-service companies (GENO, NORSVIN and NSG Semin A/S) have duplicates of the cryo gene banks, stored at two different places.

### **Sanitary arrangements/regulations**

All the cryopreservation gene banks in Norway fulfil the EU regulation requirements for sanitary issues.

### **Legal issues (related to genetic material and data) (5/15)**

The breeding associations own the genetic material. Anyone can buy cryopreserved genetic material from the breeding associations, except the material that is allocated for long term storage. This material from the endangered breeds are being sold or used only in agreement between the breeding association and the Norwegian Genetic Resource Centre. For the commercial native breeds the breeding associations have their own routines and requirement that shall be fulfilled to use the long term stored material.

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