

ACTIVITY PROGRAMME FOR NORDIC GENE BANK FOR FARM ANIMALS

1994-1996

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The aim of the conservation of animal genetic resources in the Nordic countries was initially defined in "REGULATIONS FOR NORDIC GENE BANK FOR FARM ANIMALS" laid down by NEJS (Nordic Committee of Government Officials for Agriculture and Forestry) on 3rd April 1992, in the following way:

Nordic Gene Bank for Farm Animals is established for the purpose of documenting and conserving animal genetic variation, primarily in farm and ranch animals, in the Nordic countries.

Conservation of farm animal populations may have the short term aim of safeguarding them from extinction over a short period of time. Generally, however, genetic conservation must have a long term goal. Three motives have been defined for conservation of animal genetic resources, i.e. economic, scientific and cultural. Conservation activities which are initiated are often based on all three motives.

GENETIC MATERIAL TO BE CONSERVED

Three types of genetic material have been defined as being in need of conservation, i.e. traditional breeds, active breeding populations facing pressure from cross breeding, and wild relatives to the farm animals. The traditional breeds which are no longer in use form an important part of the cultural heritage of the Nordic countries. Substantial efforts have been made to save these breeds from extinction in the Nordic countries. These conservation activities have attracted much media attention, and have solid national support.

The active Nordic breeding populations are another genetic resource in need of conservation. The best guarantee for long term conservation of genetic resources is to keep many active breeding populations. The Nordic Gene Bank for Farm Animals (NGH, Nordisk Genbank - Husdyr) therefore strongly recommends continued development of the active Nordic breeding populations, with their special structure, in order to maintain them as economically competitive alternatives. This will prevent them from being replaced by other populations, and an important genetic resource will be conserved for the future.

The farm animal species in the Nordic countries which have living relatives in the wild are deer (reindeer and deer), fur animals, pigs, poultry and fish species. Conservation and documentation of genetic resources of the wild species is the responsibility of the environmental authorities,

and falls outside the task of the NGH. The Nordic Gene Bank, however, strives for close cooperation with the environmental authorities within this field, and will keep abreast of conservation efforts concerned with the wild relatives of farm animals.

CONSERVATION METHODS

The two main types of conservation of living populations are conservation without change, and conservation combined with utilisation. Conservation without change consists of conserving the variation within the breed without change as far as possible, both allelic variation and genotypic values. This has been used for landraces in the Nordic countries. Appreciable fluctuations are nevertheless expected in gene frequencies in small populations, and loss of individual alleles are likely due to random fluctuations and inbreeding.

Conservation and utilisation of genetic resources are compatible concepts. This is what occurs in an active breeding population. The conservation aspect then consists of carrying out selection in such a way that no characteristics are negatively affected, and that the genetic variation in selected characteristics remains unaffected.

For long term conservation purposes, deep frozen sperm and embryos are kept in gene banks. Large gene banks exist in the Nordic countries, containing sperm from all dairy and dual purpose bulls which have been used in artificial insemination (AI). The sperm stores are owned and administered by the AI-organisations. Organised collection of semen and embryos has not been carried out for species other than cattle. DNA samples will be isolated from all animals entering the Nordic research project "Genetic profiles of Nordic breeds of farm animals". These samples will be stored in duplicates, one at NGH at The Norwegian Agricultural University, and the other within the respective countries.

CONSERVATION ACTIVITIES

Conservation activities, as defined here, are measures which aim to conserve genetic resources for a limited or prolonged time period. The Nordic steering group for NGH initiates and coordinates the input in the Nordic countries, and follows up on the activities. The physical conservation activities are carried out nationally, both the conservation of living populations and deep freezing of materials. This work is carried out under the auspices of the national conservation committees.

The national committees shall keep records of all genetic resources within individual countries. The Nordic Gene Bank for Farm Animals (NGH) at the Agricultural University of Norway has established a central Nordic data bank which will eventually contain information on all species and breeds of Nordic intensively and extensively farmed animals. The database ORACLE has been chosen for this purpose. Information from the national committees will be the basis for the centralised Nordic data bank on farm animal genetic resources.

The NGH data bank can be accessed directly by the national committees for entering and retrieving gene bank information. Data on individual animals within conserved populations may thus be entered directly into the data bank, and further work on this information may be carried out between countries via an international data communication network.

Ensuring continuity in the conservation efforts is a prerequisite for success. The data bank at NGH will play a central role for maintaining continuity. New data from a particular country will be entered into the data bank. They will be combined with previous data within the same field. By simple routines a survey of the situation within a specified area may be obtained, as well as

changes with time. This is of particular value in small populations, where inbreeding coefficients of individual animals are of interest, as well as the expected inbreeding coefficients of future progeny from selected parents.

EDUCATION - TRAINING OF RESEARCHERS

Information and education are important aspects in conservation activities (biological diversity, genetic resources, the meaning of conservation, how conservation is carried out, short term and long term effects, etc.).

Within the farm animal sector, many individuals and breed societies will influence the activities to be carried out. There is therefore an intense need for information.

NGH has emphasised that education at several levels is necessary for effective conservation of genetic resources in the Nordic countries. Within the farm animal sector, many individuals and breed societies influence the activities to be carried out, and it is therefore important that these people are supplied with accurate information. All levels of academic education also require additional instruction in conservation of genetic resources. NGH is encouraging the Nordic Agricultural Universities to offer courses within the area, and also to add genetic resources units to current courses in genetics/animal breeding. These courses in subjects on genetic resources will also be offered to all established research workers, and as repetition courses for farm animal from our agricultural universities.

RESEARCH - AREAS AND ORGANISATION

NGH has identified the following important areas of research in connection with genetic resources:

- * Evaluation of genetic distances between populations
- * Minimising inbreeding in small populations
- * The effect of internationally available breeding material on the active breeding populations in the Nordic countries
- * Status and trends in heterozygosity in small populations with respect to their ability to survive.

Most of the research projects within this area will be highly dependent on cooperation between the Nordic countries. NGH is therefore aiming to initiate research projects within this area and coordinate activities of current interest in cooperation with research institutes within the Nordic countries. International cooperation on development and utilisation of genetic resources is a rapidly developing field. Trade of highly developed breeding material across country borders has grown into a large scale industry. There is a large demand for such material in many countries. The demand is determined by increased productivity in the short term. In the long term, the expectations are not always met. It is a matter of course that NGH keeps up to date on the development of international trade in genetic material.

LIMITS FOR THE ACTIVITY PROGRAMME

The current activity programme on cooperation in conservation of animal genetic resources applies for the period 1994-96, and will continue thereafter in revised form every three years. The activities of NGH will be revised in connection with the general revision in 1996, possibly in connection with the evaluation of "Nordic Activity Programme in Agriculture and Forestry" in 1995.

Nordic Gene Bank for Farm Animals presumes that the activities described in the programme and which are presupposed to be financed by the Nordic Council of Ministers can be carried through within a budget of 1.2MDKK (approx.171 000 US\$) per year. This will cover the running costs of the secretariat and the funding of one major research project each year. In addition to this comes finance for educational programmes to improve general competence in the field.

(The above Activity Programme was ratified by NEJS, the Nordic Committee of Government Officials for Agriculture and Forestry, at a meeting on November 8, 1993)

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