

# Improvement of meat production capacity in reindeer farming

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*Abstract:* The poster describes the main activities in a joint Swedish-Norwegian research project. The ultimate purpose is to develop tools for individual production control and flock management in domestic reindeer production.

**Key words:** identification system, recording, culling, selection, production parameters, flock dynamics

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## Purpose

Meat production with free-ranging semi-domesticated reindeer (*Rangifer tarandus*) is practiced in the northern forest and mountain areas of Scandinavia and Finland. The animals are kept in large flocks with little individual handling. Due to the management conditions mating and calving cannot be controlled.

The objectives of this joint Swedish-Norwegian research and development project are to:

- (a) develop identification, handling and production recording systems to enable improvement of the animal stock and the production ability of the flock through culling and selection
- (b) provide information in the biological pro-

duction parameters of farmed reindeer on Scandinavia

- (c) develop a simulation model for optimization of reindeer flock structure with respect to long range production capacity.

## Identification system

Traditional ear marks (cuts) show only the ownership of the animals. A new system with a unique ID-code for every animal has been introduced. The code includes:

- (a) country and district as a two-letter combination
- (b) owner number within the district
- (c) birth year both as letter and tag colour
- (d) identity number (ID) within birth year
- (e) sex given by even or odd ID-number

Table 1. Example on simulation results; meat production in three different flock structures:

A = mainly slaughter of 1.5 year old adults

B = mainly slaughter of calves

C = mainly slaughter of calves, less males in the flock.

|                          | Flock structure |       |       |
|--------------------------|-----------------|-------|-------|
|                          | A               | B     | C     |
| No. of animals           |                 |       |       |
| males                    | 400             | 400   | 250   |
| females                  | 600             | 600   | 750   |
| Total losses             |                 |       |       |
| males                    | 65              | 64    | 63    |
| females                  | 85              | 84    | 105   |
| No. slaughtered          |                 |       |       |
| males                    | 112             | 116   | 163   |
| females                  | 79              | 96    | 120   |
| Meat production, kg/year |                 |       |       |
| males                    | 3 884           | 3 958 | 4 804 |
| females                  | 2 497           | 3 007 | 3 759 |
| totally                  | 6 381           | 6 965 | 8 563 |

The code is intended for identification in the field and for use in computerized production recording. Totally 25,000 reindeer calves are tagged every year in Norway and Sweden at special gatherings in July-August at an age of 2-3 months.

A difficulty is that calf and dam cannot be caught together for identification. Therefore calves are first given provisional ID-collars and observed in the flock in order to identify the dam. After all calves (200-400 in each batch) have had their dams identified they are gathered again and given the permanent ear tag.

Females intended for breeding are given an additional marking with a plastic collar at 1.5 years of age. The collars are labelled with their identity code in reflective material, which allows identification from long distances. The collars are vital for the identification of dams of calves.

### Production recording

Important information for selection and management decisions are calving rates, weight gains of calves, weights of adult females and survival.

Data are collected in the summer gathering and slaughter gatherings in September and during November-December.

The information is assembled and stored in computerized data bases, allowing life-time production records to be retrieved for females, including the performance of their calves. For calves and young animals their growth performance and the dam's producing ability will be displayed.

Weighing equipment suitable for reindeer has been developed for the weight recording in field.

## **Culling and selection**

High-producing winter flocks are maintained by culling at slaughter in the late autumn. Females are culled according to their predicted production ability the following year.

A culling index, that will include fertility, mothering ability and growth ability will be introduced for practical application. The information used is the previous calf crops and calves' survival and growth rates. Proper adjustments for female's (dam's) age and weight is required.

Calves are selected for production and breeding purposes on their own and dam's results.

For practical application the information will be summarized in a selection index.

The objective of the culling and selection is to achieve a high phenotypic production ability and generate long term genetic improvements in vitality, fertility, mothering ability and growth capacity. The ability to build up enough body fat reserves for the winter is important.

## **Production parameters**

The available information on the production biology of the reindeer is scarce compared with ordinary farm animals. However, efforts to improve this are being made by analysing data from the production recording. Vital information is for example:

- (a) age effects on survival rates, weight gains and calving rates
- (b) within age class relationships between female's weight and calving rate as well as the calf's size, survival and weight gain
- (c) "genetic" and phenotypic variations in various production characters
- (d) effects of flock structure (e.g. number and age of males) on calving rate in various female age classes.

## **Simulation of flock producing ability**

A dynamic simulation model for the reindeer flock has been developed on the basis of preliminary production parameters.

The main purpose is to optimize sex and age structure with respect to the production capacity of the flock under different production conditions. The optimal structure determines the culling and slaughter policy.

Other questions of interest are the dynamic behaviour of a reindeer flock after changes in, for example, slaughter and management policies or due to severe losses during a hard winter season.

The simulation model also enables economic assessment of changes in production components, for example due to selection.

The model will allow the development of computerized calculation tools for future prediction of flock production. Such tools could be useful in the advisory service or for the reindeer owners themselves.