



# "Kalvelykke " & "GrazyDaisy"

# Background

NORSØK is cooperating with NIBIO, Landbruk Nordvest and Solem Sag on a project in which we are studying cow-calf contact systems in dairy production that allow dam and calf to be together indoors and on pasture for several weeks. Under natural conditions, bovine calves spend up to several months together with their mothers. In dairy production, however, calves are usually separated from their mothers right after birth and reared on milk replacer and concentrates. In organic dairy production, calves should spend at last three days together with their mother and given natural milk for three months.

The reason for separating calves so soon is to prevent them from suckling their mothers and thus avoiding the loss of marketable milk. A calf can drink 10-15 litres per day, which would reduce farm income and require having a larger herd to meet the milk quota. It is also generally believed that cow-calf contact systems require more work, and that calves are more susceptible to injuries and diseases if they are allowed be together with the cows.

NORSØK also participates in the GrazyDaisy project, in which we cooperate with other international partners to study systems for co-grazing cows and calves. The first year of GrazyDaisy we made some interviews with farmers practicing co-grazing. In 2020 we coordinated the follow-up in GrazyDaisy with this pilot study in Kalvelykke. The Bergtun farm had not practiced co-grazing before but was very interested to test out a system with co-grazing between cows with two calves – their own calf and a foster calf. This could fit very well this year for this farm because of the milk quota, and the farmers also plan to redo the barn to let the calves stay with their mother for a longer period.

This leaflet is a summary of the 2020 activities in "Kalvelykke" and "GrazyDaisy" in Norway.



- Rest period (Photo: Kristin Sørheim)

## Barn designs

In the project's first year, we considered possible solutions for modifying or extending existing barns to enable cow-calf contact. Bjørn Steinar Skarbø of Landbruk Nordvest worked out two proposals, based on a barn in Rennebu. One of the proposed changes calls for extending the barn with an area in which cows and calves can be kept together. The other proposal involves making a few modifications of the existing barn.

Proposed barn layouts, drawn by Bjørn Steinar Skarbø, Landbruk Nordvest Investments if extending the barn, about 70 000 EU; if inside modifications about 15 000 EU.









#### **Grazing trials**

On the Bergtun farm in Rennebu, we conducted a trial using five nurse cows (crosses between Norwegian Red and Limousin). Each of the nurse cows was given a foster calf in addition to its own, and we studied their behaviour in the barn and on the pasture. The cows and their respective calf pairs (own + foster calf) were kept in separate pens for two-three days before being moved to a group pen with calf shelters. The cows and calves were transported to summer pasture in mid-June.

We compared health and weight gain of these calves with a control group, i.e., calves that were separated from their mothers and fed with milk replacer and concentrates.

We also tried to detect any differences between the cows' own calves and foster calves.

While grazing, all animals were equipped with a Nofence<sup>™</sup> collar and an accelerometer. The behaviour of both cows and calves was studied throughout the grazing season.

One of the goals of the project was to find out if the collar can transmit the type of activity being performed by the animal at any given time, such as grazing, suckling, ruminating, resting, etc. Video recordings and observations were made on the first day on pasture (June 18<sup>th</sup>), and repeated on the following dates: July 10<sup>th</sup> and 17<sup>th</sup>, and August 23<sup>rd</sup> and 24<sup>th</sup> 2020.

Pasture inventories were carried out on June 18<sup>th</sup>, July 10<sup>th</sup> and August 23<sup>rd</sup>.

The quality of the pasture was generally poor. Three foster calves were removed from the pasture on July 10<sup>th</sup> as they seemed undernourished.

We used five Norwegian Red control calves. These were separated from their mothers right after birth and fed with milk replacer, concentrates and roughage.

All calves were weighed at birth, turnout and housing. Cows were also weighed and their chest circumference measured on the same dates.



Co-grazing cows, calves and foster calves (Photo: Kristin Sørheim)



> The quality of the pasture was generally poor (Photo: Kristin Sørheim)

## **Results – Grazing trials**

## Nofence collar:

For both cows and calves, it seems to be difficult to distinguish between different types of relatively similar activities, especially since the category "other" overlaps considerably with "grazing", among others. On the positive side, the distinction between being "active" and "passive" can be made quite reliably.

For "suckling", there are indications that it is possible to distinguish this activity from others. However, to obtain more reliable predictions we need a larger dataset than what is available after this first year. The need for more data includes data to train the models, and to validate and calibrate the predictions more thoroughly against actual observations.



Fig. 3: Accelerometer data showing activity (red line) and manual observation of activity (green line).



*Fig. 4: Accelerometer data showing activity in suckling period (red line) and manual observation of suckling (green line).* 



Own calf and foster calf suckling. Suckling behaviour may be distinguished by accelerometer data (Photo: Kristin Sørheim).

# Results - Weight gain and behaviour

At housing, body condition scores of the nurse cows were between thin (BCS 2) and medium + (BCS 6). Weight loss from turnout to housing varied between 15 and 120 kg (average 68 kg). Three cows had their foster calves removed on July 10<sup>th</sup>, and spent the remaining grazing season only with their own calves. Two of these three cows had the least weight loss of all, while the third one lost 116 kg. Of the two cows that kept both calves throughout the entire grazing season, one had a weight loss of 120 kg, whereas the other only lost 47 kg. Observations showed that several of the calves suckled other cows than their own mothers/foster mothers.

Calf weight gain:

Standard weight gain for calves of different breeds in Norway:

- for Charolais, Simmental and heavy breed crosses (Limousin)

Age	
200 days (weaning)	1040 g/day
365 days	900 g/day
455 days	600 g/day

- for Aberdeen Angus, Hereford and light breed crosses

Age	
200 days	955 g/day
365 days	690 g/day
455 days	500 g/day

Table 1: Daily weight gain for the calves up to the age of app. 120 days:

Own calves	Foster calves	Control group calves	Calves in loose-
Limousine crosses	NRF	NRF	housing
1131 g/day	784 g/day	1036 g/day	931 g/day

The three foster calves that were removed from the pasture had lower weight gain than the others right from birth, and especially showed poor weight gain after turnout. However, they improved after being moved indoors. One of them had a weight gain of 1204 g/day after housing.

The results are not corrected for breed and gender, but we observed that the cows' own crossbred calves showed weight gains well above the standard. This was achieved without any extra feed, they only had access to milk and relatively poor pasture. Weight gain of the foster calves (NRF) was also good, but we observed very high weight gains among the control group. The host farmer reported that they have had some cases of diarrhoea and coughing, and they were advised to reduce the amount of milk fed to the calves. The health of the calves has improved since.

Throughout the milk feeding period (3 weeks) calves in the control group drank 280-443 litres of milk each and were fed an average of 25 kg of concentrates.

#### Health:

There were a few cases of diarrhoea and coughing in the herd, including several of the control-group calves, however, there was no need for treatment. We did not observe any symptoms among the calves in the trial. Two cows (mothers of control-group calves) were treated for mastitis and cystic ovarian disease, respectively. No other diseases were observed among the cows.

# Weaning:

The calves were weaned abruptly and moved to group pens together with other calves. Milk production decreased rather quickly after the cows were fed restrictively for a few days. The calves ate well right after weaning, but had difficulties in finding the drinking nipple. One calf did not learn how to use the nipple drinker. Cows and calves bawled for the first 3-4 days before calming down.

#### Behaviour on pasture:

The cows and calves could exercise natural behaviour during the grazing period. In the beginning the calves followed their mother. As they got older, they more often played and rest together with the other calves. The foster calves seemed to suckle both their foster cow and other cows, while the own calves mostly preferred their mother. Both the cows and calves were calm and relative tame to people, even if they had not been handled daily.

## Summary

In this pilot study we investigated weight gain, health and behaviour of five calf pairs (own calf plus foster calf) that spent about nine weeks on pasture together with their respective (foster) mothers. Neither the cows nor the calves were given concentrates in the period.

The cows were Limousin crosses. They were not milked, only suckled by their calves. Three foster calves were removed from their foster mothers because they obviously did not get enough milk. The other calves showed good weight gain and health, and the cows' body condition remained fairly stable even though the pasture quality was poor. Weaning was abrupt, but cows and calves stopped bawling after 3-4 days.

The control-group calves kept indoors had a higher weight gain, but these were also fed more intensively.

We tested a collar with an accelerometer to see if it is possible to use the data to distinguish between different types of behaviour. Preliminary results show that it is easy to tell the difference between being "active" and "passive", and there are indications that it is possible to distinguish suckling from other activities. These results can contribute to developing systems for monitoring grazing livestock.



> Own calf nearest the mother, foster calf from another cow behind (Photo: Kristin Sørheim)