

SHORT TERM SCIENTIFIC MISSION (STSM) – SCIENTIFIC REPORT

The STSM applicant submits this report for approval to the STSM coordinator

Action number: FA1308

STSM title: “Exploring the potential of automatic calf feeder data in the context of keeping cow & calf together”

STSM start and end date: 22/01/2018 to 23/02/2018

Grantee name: Kristine Piccart

PURPOSE OF THE STSM

Separating calves from the cow shortly after birth, and housing them in individual hutches or pens, is a common practice in most North-American and European dairy farms. Recently though, there has been some debate about this issue (Ventura et al., 2013; Busch et al., 2017). There is a growing body of research suggesting that keeping cows and calves together for a certain period of time can have a beneficial effect on the feed intake, weight gain, and social development of calves (Flower and Weary, 2001; Von Keyserlingk et al., 2009). Yet, weaning and separation can be a challenge with this rearing system. Separating the two stressful events - weaning off milk and separation from the dam- is suggested as the key management strategy (Weary et al 2008), and providing supplementary milk to the suckling calf from an automatic milk feeder (AMF) may be an alternative (Johnsen, et al., 2015). More research is needed to understand calf feeding behaviour in a setting where cow and calf are housed together with calf access to an AMF. Adaptations to current management conditions should also be investigated to support dairy farmers willing to shift away from the status quo.

The aim of this STSM was to evaluate feeding behaviour of dairy calves surrounding weaning and separation from the dam using data from AMF. The overall goal of the STSM, however, was to create an opportunity for knowledge exchange regarding the feeding behaviour in calves, and the applicability of housing cow and calf together.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

1. Existing dataset on providing supplementary milk to suckling dairy calves

Kristine Piccart compiled a new dataset based on the automatic milk feeder (AMF) data from a previous study in Canada (Johnsen et al., 2015; Johnsen et al., 2017). AMF data are currently being analysed to characterize the feeding behaviour in Holstein dairy calves (n = 20) with and without access to suckling. In the first 6 weeks during the day, all calves were housed in a calf creep next to the cow pen, allowing visual and auditory contact with the dam. During the night, all calves had access to the adjacent cow pen. Ten calves could suckle the dam (AMF + dam), while the other 10 calves could not (AMF only) because access

to the dam's udder was blocked using an udder net. All calves had 24h/d access to 12L of milk from the AMF. After 6 weeks, the calves were moved to an adjacent separation pen. The separation period was divided into 2 phases: partial separation from day 43 to 46 (i.e. nose-to-nose contact with dam still possible, without suckling) and total separation from day 47 to 50 (i.e. no more contact with dam). All calves continued to have access to the AMF 24h/d during this period. At day 51, the calves were gradually weaned by reducing milk allowance by 1.5L per day.

A mixed-effects Poisson regression model was used to study the effect of the treatment and phase on counts of rewarded and unrewarded visits to the automatic milk feeder (R 2.3). A linear mixed model (PROC MIXED, SAS 9.2) was used to evaluate the daily milk intake. Calf was always included as a random effect.

2. Trial on concentrate-dependent weaning in Norwegian Red calves

Kristine Piccart also participated in a pre-planned trial on concentrate-dependent weaning at the Animal Production Experimental Centre (Senter for husdyrforsk, Ås). This study investigates the effects of a more individualized approach to weaning in Norwegian Red calves, based on their individual concentrate intake. Kristine Piccart assisted in the day-to-day operations in the calf barn, such as health checks, sampling, weighing sessions, checking and calibrating the automatic milk feeders (DeLaval calf feeder CF1000), collecting the data, etc..

On February 16th, the team also visited Grøndalen Gård, a historic farm with Norwegian Red cattle owned and maintained by Hans Arild Grøndahl and his family. The farm management is highly focused on animal welfare, and cows are housed together with their calves in a deep bedded pack barn during the first 2 months.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

1. Existing dataset on providing supplementary milk to suckling dairy calves

In accordance to the work of Johnsen et al. (2015), we found no significant difference in body weight between the 2 groups of calves (interaction treatment x age $P = 0.78$). During the dam phase, calves from the "AMF + dam" group preferred suckling with their mother, although they were quick to switch to the AMF during the partial separation phase, evidenced by the increased number of rewarded AMF visits (0.6 visits in phase I vs. 3.0 visits in phase II, $P < 0.05$) and increased milk intake at the AMF (1.1 L/d in phase I vs. 6.9 L/d in phase II, $P < 0.05$). The number of unrewarded visits also increased during the separation and weaning phases for both groups of calves. This is in agreement with previous research, showing that the number of unrewarded visits increases with weaning (Nielsen et al., 2008; de Passillé et al., 2011), which could be an indication of hunger (Jensen, 2006). The number of unrewarded visits was also significantly ($P < 0.05$) lower in sick calves (regardless of treatment group), which supports the work of Svensson and Jensen (2007), stating that the number of unrewarded visits to the feeder is a sensitive indicator of clinical disease in dairy calves. Further analysis on the diurnal drinking behaviour is still required.

2. Trial on concentrate-dependent weaning in Norwegian Red calves

Seeing that the trial at the Animal Production Experimental Centre in Ås is still ongoing, we cannot draw any conclusions yet.

FUTURE COLLABORATIONS (if applicable)

The results of the STSM will be presented at the final DairyCare conference in Thessaloniki on March 19th. We aim to publish the results obtained during the STSM as a short communication in a relevant scientific

journal. Practical implications of the STSM will be disseminated to European dairy farmers through the H2020 thematic network “4D4F” (Data Driven Dairy Decision for Farmers”).