Behaviour in dairy calves with and without their dams at pasture

27.01.2022 – Juni Rosann E. Johanssen
My PhD (aug 2020-aug 2023)

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- PhD-candidate at the Norwegian University of Life Sciences, Ås, Norway

- Three cow-calf projects

SUCCEED (2020-2023), aim:
- Establish science based and practically feasible methods to allow increased contact between cow and calf in dairy production

Aim with my PhD:
- Acquire new knowledge about dairy farming systems with cow-calf contact, with emphasis on cow-calf contact at pasture
Research question

• **Experiment:** What effects does having cow and calf together at pasture have on the behaviour and health of cow and calf, calf weight gain, cow milk production and composition of milk?
Preliminary titles for scientific articles from the experiment

Johanssen, J. R. E. et al. 2022. *Behaviour in dairy calves with and without their dams at pasture*

Johanssen, J. R. E. et al. 2023. *Effects of dairy cow-calf contact at pasture on calf weight gain, cow milk yield and composition of milk*

Co-author Johanssen, J. R. E. 2023. *Identification of dairy calf suckling behaviour by using automatic surveillance technology on pasture*
About the experiment

- 20 cow-calf pairs, 4 groups

**Early separation (ES):**
- Separated within 1-3 hours after calving
- Natural milk 4 times/day till week 6: (offered 12-14 l/calf/day)
- Week 7: Milk 2 meals/day, 8 l/calf/day
- Week 8: Milk 2 meals/day, 4 l/calf/day
- Week 9: Weaned from milk

**Cow-calf contact (CC):**
- Together fulltime for 6 weeks (free suckling)
- Week 7 and 8: Physical contact through fenceline (without suckling), except:
  - Week 7: 2 hours together after milking 2 x day
  - Week 8: 1 hour together after milking 2 x day
  - Week 9: Separated and weaned, cows moved to another pasture (could still hear each other, maybe see each other)
Animals in the experiment

- Calvings 7-May-14-June, birth weight 30-56 kg
- Divided into groups by calving date
- Age variation for calves: 6-8 days within each group
- Norwegian red cattle, except 3 pairs with Holstein crosses in separate groups
- ES-cows: 1 primiparous- and 9 multiparous cows
- CC-cows: 4 primiparous- and 6 multiparous cows
- ES-calves: 6 bulls, 4 heifers
- CC-calves: 2 bulls, 8 heifers
- Out on pasture when youngest calf in group was 3-4 days
Summer farm in Nerskogen, ca 720 moh
Calf behaviour

- Individual direct observations and registrations on pasture
- Collars with colours, same colour for calf and dam in each pair
- First day on pasture
  - Two observers
  - One period of 4 hours
- Days in week 3, 6 and 9
  - One day each week per group
  - One observer
  - 2 periods of 4 hours (06-10 & 16-20)
  - 8 hours per day
- Instantaneous sampling
- One-zero sampling
Instantaneous sampling

• Sample point every 2. minute

Behaviours:
• In calf hutch
• Grazing
• Lying
• Standing/Moving
• Sometimes for CC-calves: Eating silage
• + in week 9: Eating hay
One-zero sampling

- 30 seconds sample intervals for 1.5 minute, 30 seconds break (inst.s. in break)
- Registered if behaviour happened of not in each sample

**Behaviours:**

- Allogrooming calf-calf
- Allogrooming calf-cow/cow-calf (CC-calves) (ex.week 9)
- Suckling (CC-calves) (ex.week 9)
- Drinking milk (ES-calves) (ex.week 9)
- Play

**In addition in week 9:**

- Number of incidents in each sample int. for:
  - Vocalisations high pitched
  - Vocalitations low pitched
Feeding test calves week 8

- Three days for each group in week 8
- Group test, 30 min per day
- Familiar area 6*6 m outside the calf hutch with electric sheep-fence
- Four 90 l buckets, 2 cameras
- Buckets: Empty, 1,5 kg hay (novel feed), 5 kg carrots (novel feed), 5 kg concentrates (familiar feed)
- Weighing of feed before and after each test
- Continuous registrations:
  - Latency to approach buckets
  - Latency to eat feed
  - Time spent eating feed or manipulating empty bucket
- We don’t have the results yet...
Nofence-collars

• 20 cattle collars - cows
• 20 sheep/goat collars – calves
• Did NOT use fence function
• GPS-positions cows and calves
• Accelerometer data activity cows and calves
• Accelerometer data suckling CC-calves
  (Compare with behaviour registrations)
Preliminary statistical analysis of calf behaviour week 3, 6 & 9

- Mixed Effects Model on Minitab
- Model:
  \[ y = \text{intercept} + \text{treatment} + \text{Group(treatment)} + \text{Calf(treatment; Group)} + \text{week} + \text{treatment*week} + \text{error} \]
- Fixed factors: Treatment, Week
- Random factors: Group, Calf ID
- Responses: The behaviours:
  - Use of calf hutch, Grazing, Lying, Standing/moving,
  Allogrooming calf-calf, Play
- Will do more analysis later....
Calves use of calf hutch, week 3, 6 & 9

Behaviour in % (mean ± SE) of total instantaneous sample points per day (8 hours)

- Early separation
- Cow-calf contact till 8 weeks

Means with common letters are not significantly different (P< 0.05) according to Tukey’s test
Calves grazing, week 3, 6 & 9

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Project financing

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  • SUCCEED

Regional Research fund Mid-Norway
  • Kalvelykke (Calf Happiness)

The Norwegian Animal Protection Alliance's Research Fund
  • Dairy cow and calf together at pasture
To be continued....