



## PhD – Midway seminar

Cow-calf contact (CCC) in dairy farming with emphasis on CCC on pasture

Juni Rosann E. Johansen 19.05.2022

# Supervisors

## Main supervisor:

- Knut Egil Bøe, Norwegian University of Life Sciences (NMBU)

## Co-supervisors:

- Julie Føske Johnsen, Norwegian Veterinary Institute
- Steffen Adler, Norwegian Institute of Bioeconomy Research (NIBIO)

## «Extra» supervisors:

- Kristin M. Sørheim, Norwegian Centre for Organic Agriculture (NORSØK)
- Mette Vaarst, Aarhus University



## Projects and financing

**SUCCEED** *“Establish science based and practically feasible methods to allow increased contact between cow and calf in dairy production”:*

- The Norwegian Research Council, Research funding for the agriculture- and food industry (FFS-JA)

**Kalvelykke** (Calf Happiness):

- Regional Research fund Mid-Norway

**Dairy cow and calf together on pasture:**

- The Norwegian Animal Protection Alliance's Research Fund



Dyrevernalliansen



## My PhD (aug. 2020 - aug. 2023)

- Researcher NORSØK, Tingvoll (2017-)
- PhD-candidate NMBU, Ås (2020-)

### Aim:

- *Acquire new knowledge about dairy farming systems with cow-calf contact, with emphasis on cow-calf contact on pasture*



# Planned scientific articles

1. **Johanssen, J. R. E. et al.** 2022. How Norwegian dairy farmers with cow-calf contact systems practice these systems and how they perceive the interrelationships between cow and calf and human in them
2. Co-author **Johanssen, J. R. E.** 2022. *What has impact on farmers` decision to establish and sustain systems of prolonged cow-calf contact at their farms?*
3. **Johanssen, J. R. E. et al.** 2023. *Behaviour in dairy calves with and without their dams on pasture*
4. **Johanssen, J. R. E. et al.** 2023. *Effects of dairy cow-calf contact on pasture on calf weight gain, cow milk yield and composition of milk*
5. Co-author **Johanssen, J. R. E.** 2023. *Identification of dairy calf suckling behaviour by using automatic surveillance technology on pasture*

## Original plan

A) Activities/Milestones	Gjennomføres	
Planning of PhD, interviews with farmers having CCC and experiment with cow and calf on pasture	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2020	✓
Farm visits, interviews and transcription	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2020	✓
Start seminar (9. february)	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2021	✓
More interviews, transcription, analysis of interviews	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2021	✓
Planning of experiment with cow and calf on pasture	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2021	✓
Conducting experiment with cow and calf on pasture (May-August)	Vår <input checked="" type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2021	✓
Process and analyse results from experiment	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2021	✓
Publish Norsøk-report and article in Buskap from the interviews	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2021	✓
Write scientific article 1 and 2 from interviews	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2021	← Spring 2022
Be finished writing and publish scientific article 1 and 2 from interviews	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2022	← Send July 2022
Be finished analysing results from experiment	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2022	← Autumn 2022
Write scientific article 3, 4 and 5 from experiment	Vår <input checked="" type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2022	← Send 3, 4 dec. 2022 5 spring 2023
Stay abroad Canada, three months (april-july)	<del>Vår <input checked="" type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2022</del>	
Stay abroad Sweden, two weeks (july-august)	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2022	← June 2022
Mid way seminar / evaluation (august)	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2022	← Today ✓
Publish article 3 from experiment	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2022	
Publish article 4 and 5 from experiment	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2023	
End seminar (june)	Vår <input checked="" type="checkbox"/> Høst <input type="checkbox"/> År 2023	
Write and finish thesis (august)	Vår <input checked="" type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2023	← June-Aug?
PhD defense (august)	Vår <input type="checkbox"/> Høst <input checked="" type="checkbox"/> År 2023	← Aug-Oct?

# Old course plan

Course-kode	Course name	Place	Level	Exam	ECTS	OUT
	1. Qualitative interview methodologies in agricultural and veterinary research	Aarhus universitet	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2019	5	<input type="checkbox"/>
PHI401	2. Research Ethics and Philosophy of Science	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input type="checkbox"/> H <input checked="" type="checkbox"/> 2020	5	<input type="checkbox"/>
	3. Scientific analysis of transition and change processes related to animal agriculture	Aarhus universitet	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input type="checkbox"/> H <input checked="" type="checkbox"/> 2020 V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2021	5	<input type="checkbox"/>
	4 Animal emotion	Wageningen University & Research	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2021	1	<input checked="" type="checkbox"/>
HET401	5. Individual PhD Course in Ethology	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input type="checkbox"/> H <input checked="" type="checkbox"/> 2021	10	<input type="checkbox"/>
	6 Animal pain	Aarhus universitet	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2022	5	<input checked="" type="checkbox"/>
VET414	7. Applied statistics for experimental and laboratory oriented studies in veterinary science	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2021	5	<input type="checkbox"/>
<b>Total number of ECTS in ORIGINAL course plan</b>					36	
<b>ECTS OUT</b>					6	

# New course plan

Course code	Course name	Place	Level	Exam	ECTS
	1. Qualitative interview methodologies in agricultural and veterinary research	Aarhus universitet	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2019	5
PHI401	2. Research Ethics and Philosophy of Science	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input type="checkbox"/> H <input checked="" type="checkbox"/> 2020	5
	3. Scientific analysis of transition and change processes related to animal agriculture	Aarhus universitet	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2021	5
HET401	4. Individual PhD Course in Ethology	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2022	10
PVS0170	5. Biology of lactation in dairy systems with cow and calf contact	SLU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input checked="" type="checkbox"/> H <input type="checkbox"/> 2022	5
VET414	6. Applied statistics for experimental and laboratory oriented studies in veterinary science	NMBU	Ph.d. <input checked="" type="checkbox"/> Master <input type="checkbox"/>	V <input type="checkbox"/> H <input checked="" type="checkbox"/> 2022	5
<b>Total number of ECTS in ORIGINAL course plan</b>					<b>35</b>



Sent assignment  
30.April



May-July 2022



Course spring 2021, but  
exam autumn 2022



# Travel abroad

- Nordic ISAE, Sweden - 26.-28.January (on Zoom instead)

Will not go to Canada, but:

- Aarhus University Foulum, Denmark, 3 weeks (30. January - 18. February 2022)
- Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden, 2 weeks (12. - 24. June 2022)
- Ethology congress ISAE, Ohrid, Macedonia, 4. - 8. September

Other travelling:

- Visit Ruralis in Trondheim 25.May and maybe again in June?
- Visit Ås two times in the autumn, work with my supervisors there?

## The interviews (Article 1 & 2)

- 1. Aim:** *Explore and analyze how Norwegian dairy farmers with CCC-systems allowing the dam to be with her own calf for periods between one and four months, practice their CCC-systems and how they experience and perceive the interrelationships between cow and calf and human in these systems.*
- 2. Hypothesis:** *Factors supporting a change to a system of cow-calf contact at the farm level locate across farmers' overall action space, including the presence of factors beyond farmers' control.*  
**Aim:** *To have an in-depth exploration of this change, and identify factors important in that regard, including factors important for sustain such a system.*

## About the interviews

- Interview guide: Autumn 2020
- Interviews carried out: October 2020- March 2021
- 18 farmers, 13 farms, 1 excluded from article 1
- 7 with farm visits and 5 on teams
- 51-130 minutes
- 8 500 – 23 000 transcribed words per interview
- Analysed on NVIVO: Modified grounded theory



## Short version of interview guide

- About the farmer, the farm, the housing, the animals

- Practice with cow-calf contact from before, the beginning and until today

- The change/why they started with cow-calf contact

- Economy questions (for SUCCEED-report)

- Benefits and challenges with cow-calf contact

- If they want any changes, what's important for cow-calf contact, advises for other farmers

- Obstacles and benefits for more farmers to have cow-calf contact

## Ku og kalv sammen i melkeproduksjon

- Intervjuer med melkeprodusenter

NORSØK RAPPORT | VOL. 6 | NR. 15 | 2021



Forfattere: Juni Rosann E. Johansen & Kristin M. Sørheim, NORSØK

annonse:



Nå i Norge — effektivt deteksjonssystem for brannalarm for driftsbygninger og veksthus



SecuriSmoke ASD 535 HD

I samarbeid med  
vår partner:



### Utgave 2 – 2022

#### LEDER

- > Søkelys på grasproteinet

#### AVL

- > Indeks for voksenalder
- > Melkeindekser i utvikling
- > Helgenomsekvensering av eliteokser gir verdifull informasjon

#### REPORTASJE

- > NRF er kua jeg ikke ser

#### ORGANISASJON

- > Avl og god økonomi for storfebonden = SANT

#### AVL

- > Hva slags dyr ønsker jeg å ha i besetningen min i framtida?
- > Genotyping 2021

#### ØKONOMI

- > Kjøttinntektene har løfta økonomien

#### TEMA: GJØDSEL OG GJØDSLING

- > Husdyrgjødsel før og nå
- > Husdyrgjødsel som ressurs
- > Gjødslaer me tidleg nok om våren?
- > Ikke kast bort gjødsla

#### REPORTASJE

- > Lokale grasressurser som grunnlag for Norsk matproduksjon
- > Endret gjødselstrategi med bruk av husdyrgjødsel på eng

#### HELSE

- > Født til suksess?

#### FØR

- > ...

### DYREVELFERD

## Ku og kalv sammen i melkeproduksjon

Norsøk og Rurals intervjuet vinteren 2020–2021 melkeprodusenter som har ku og kalv sammen. I artikkelen kan du lese om hvordan de gjør dette på ti av disse gårdene, og hva de ser som fordeler og utfordringer.

Tekst og foto Juni Rosann E. Johansen

Stipendiat Norsøk

rosann.johanssen@norsok.no



Den ene gården med løsdrift og melkestall har mest vårkalvinger for å kunne ha kyr og kalver på beite sammen.

## About the farmers and farms

Farmer ID code	Age (years)	Type of farming	Animal housing	Cows per year (2020)	Milk Quota (tonnes 2020)	Calving time
1M & 1W	47 & 34	Organic	Free stall, milking parlour	14,1	44 (+cheese)	Spring
2W	52	Conventional	Tie stall	14,4	118	Autumn
3W	38	Conventional	Free stall, AMS	52,8	440	All year
4M & 4W	35 & 36	Conventional	Free stall, AMS	36,0	276	All year
5M & 5W	39 & 39	Organic	Free stall, AMS	24,5	196	Sept.-March
6S & 6F	35 & 61	Conventional	Tie stall	14,7	173	Autumn
7M & 7W	32 & 36	Conventional	Free stall, AMS	14,1	122	All year (focus spring)
8W	39	Conventional	Free stall, AMS	60,0	320	All year
9M	48	Conventional	Free stall, AMS	38,7	365	All year
10M	61	Organic	Free stall, milking parlour	20,7	81 (+cheese)	All year
11M	58	Organic	Tie stall	18,8	137	Spring and late summer
12M	49	Conventional	Tie stall	16,0	99	All year

## Cow-calf contact practice

- From 1 to more than 20 years experience with CCC
- 3 farms started in the 90s and 9 farms between 2015-2019
- CCC: 6 weeks-4 months
- Most had cow-calf alone in calving pen for some days after calving (bonding)
- All farms with CCC in cow area
- 7 farms with CCC on pasture
- 2 farms continued with milk feeding after full separation
- 10 farms had CCC whole milk feeding period
- Separation and weaning: Abrupt, nose flap, gradually with fence line and/or less time together



## Farm 1

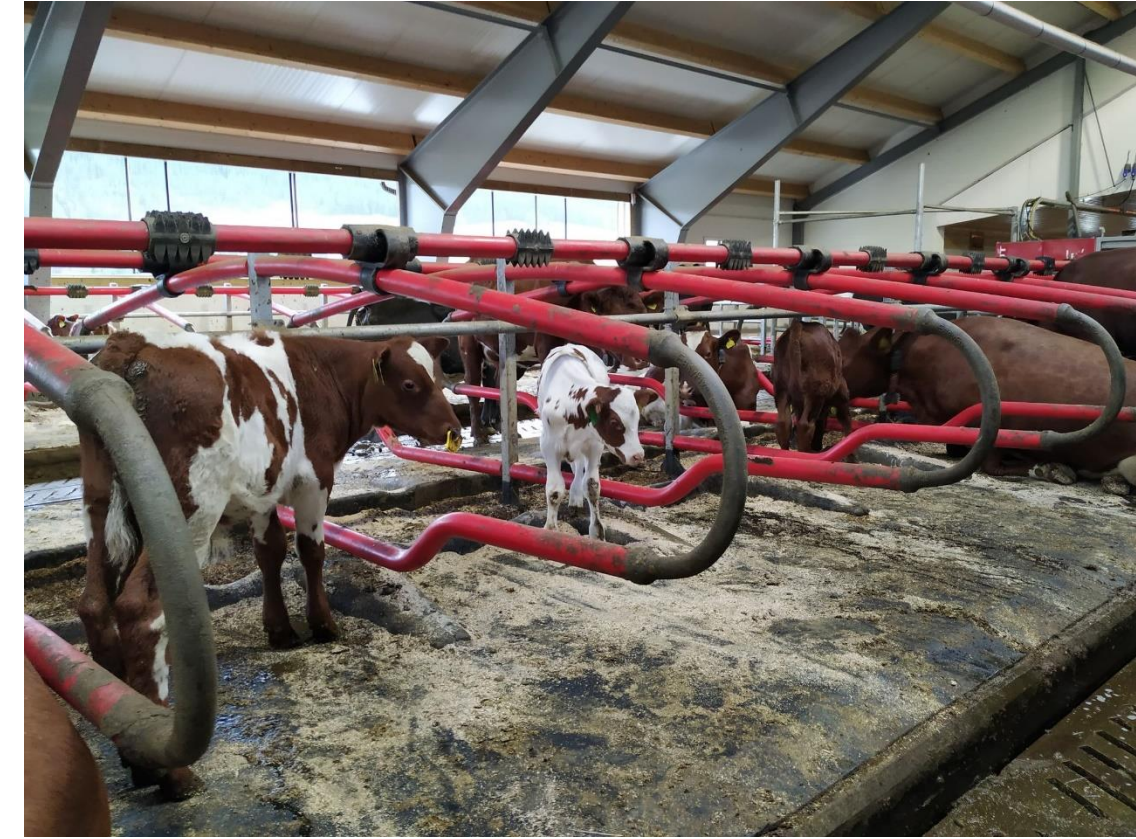
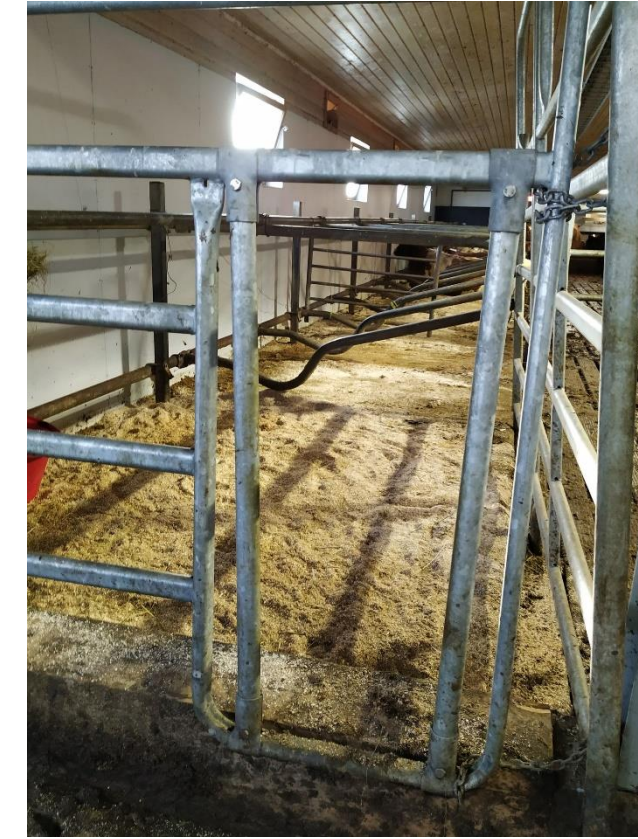
- Organic, 14 cows, free stall, milking parlour
- Started cow-calf 2017 (took over farm)
- Mostly spring calving
- Preferably calvings and CCC on pasture
- Calving pen
- Calf hide
- Together fulltime 3 months
- Gradual separation and weaning till 4 months





## Farm 3

- Conventional, 53 cows, free stall, milking robot
- Cow and calf together since 2019 –
  - New free stall, more space
- Spread calving
- Calving pen 4 days → welfare area for a period from a few days up till 2-3 weeks, depending on the milking → free stall area
- Calf hide
- Together fulltime 10 weeks, 2 weeks with nose flap before separation
- (Not on pasture together yet)



## Farm 5

- Organic, 25 cows, free stall, milking robot,
- Cow and calf together since 2018
- Calvings sep-march
- Calving pen 2-5 days
- Fulltime with mum in free stall till 4 weeks
- 2-4 calves are moved to pen with nurse cow
- Fenceline contact with dam for some days
- Suckle until weaning at 12 weeks
- (Not on pasture together)



## Farm 6

- Conventional, 18 cows, tie stall, calvings autumn
- Father had CCC since late 90s, son continued 2019
- Preferably calvings and CCC on pasture
- Calving pen
- Fulltime 4 weeks – calves loose in tie stall – opened to an own room and a corner with straw
- Period after milking morning and evening till 8 weeks, period evening till weaning 9 weeks



# Themes in article 1 from the interviews

- Provision of colostrum
- Relation between the dam and her calf
- Relation between the cow and the farmer
- Milking of cows (with calves)
- Relation between the calf and the farmer – handling
- Calves learning (from cows and calves)
- Calves suckling or sucking others
- Housing when calves are with cows
- Challenges with calves in cow area
- Cow-calf on pasture (yes or no, experience)
- Natural behaviour and animal welfare
- Working environment and focus
- Separation and weaning



## Farmers perceptions about cow-calf – maternal instincts

10M: *«She came to her calf, and then you saw that face and the eyes and the body of that cow, it was absolutely amazing, it was, the eyes shone and the body, it showed a happiness that I had not seen before»*

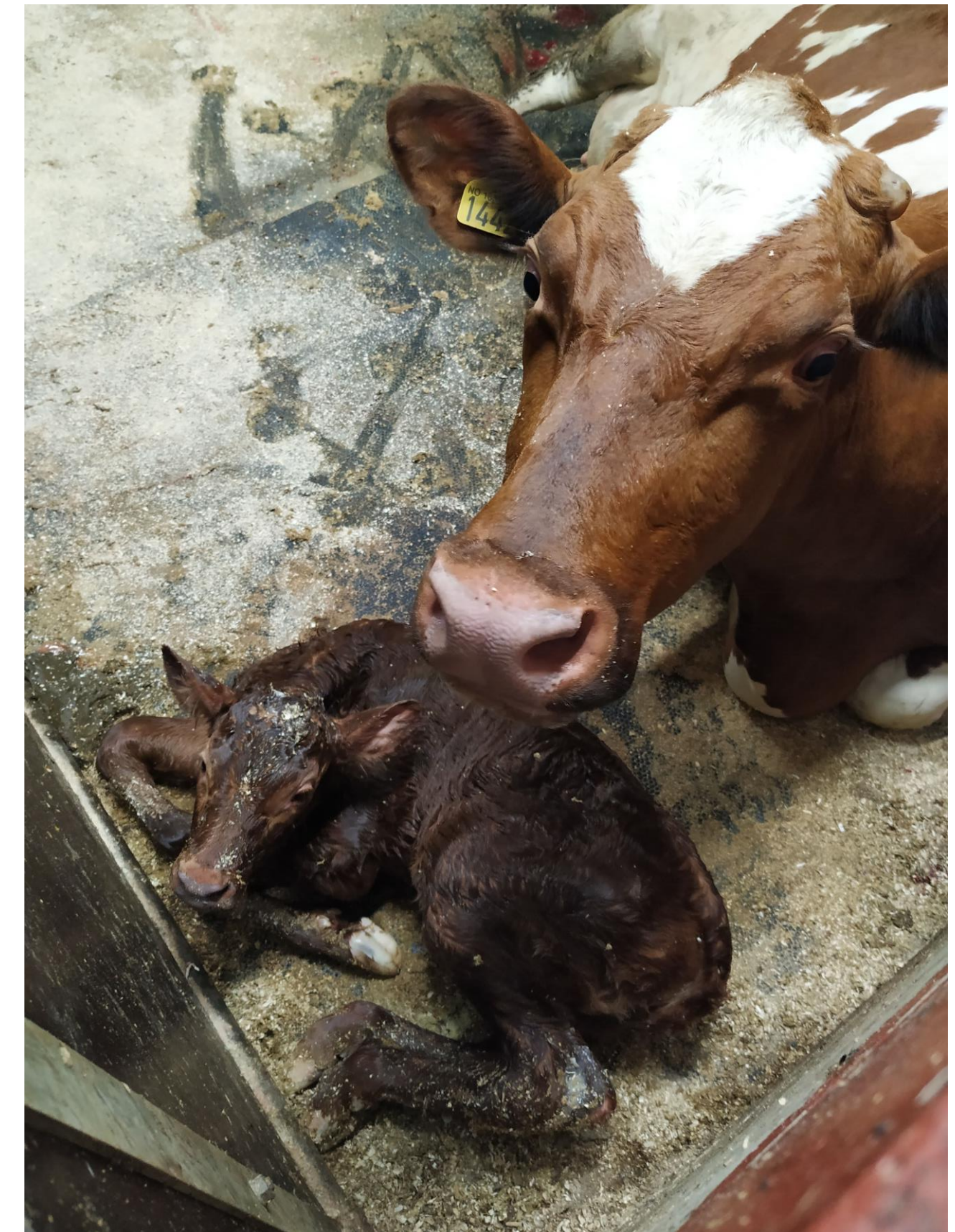
2W: *“I get a little provoked when I see on Facebook that NRF has no maternal instincts. Of course, they have! Like that cow, she doesn't have a bad temper, she just has a strong maternal instinct, out in the free nature, she would have saved her calf. So, that's just nonsense, NRF have more than enough maternal instincts.”*



## Farmers perceptions about cow-human

*10M: «You need to have a good relationship with your cows, the cows need to be used to you and to feel safe around you, and the person that the cow feel safe around, that person, she will not be angry at during and after calving.»*

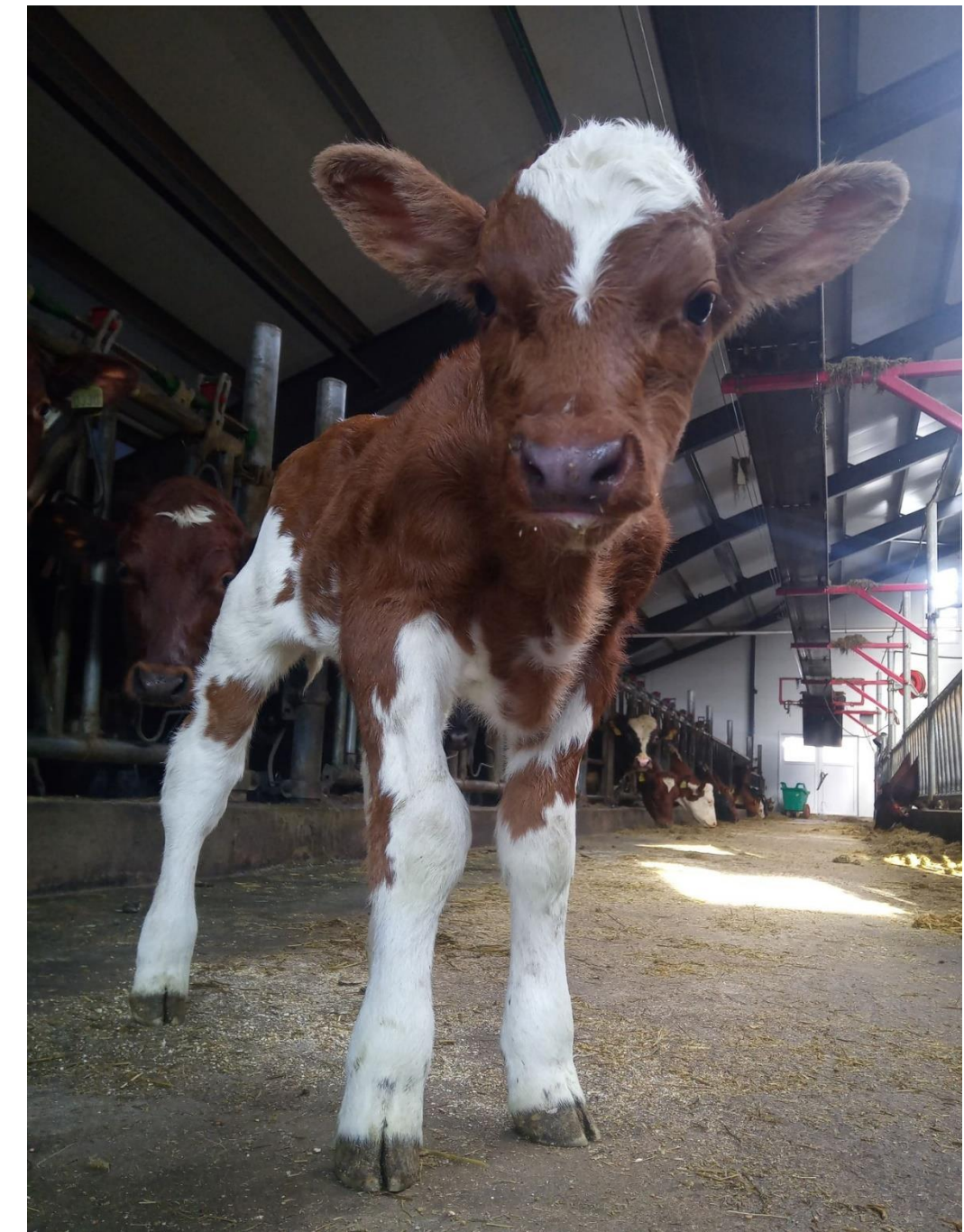
*10M: “If you have a lot of employees working, who the animals don’t know, then it will be much easier to take the calf from the cow immediately, milk the cow and give milk to the calf. You must think about the health risk for the employee. If you, as an employee, shall be there when cow and calf are together, make sure the calf are suckling, be present and pay a lot of attention towards them, this can be a bigger challenge, maybe the biggest.”*



## Farmers perceptions about handling calves

*2W: "I think it's a lot nicer now, to be around the calves, they come to me when I'm milking the cows as well. People say that they don't get any attachment with me now, but that's not true, because now, they don't associate me with food, they come to me when they want to be cuddled, and that's a lot nicer compared to standing there being pushed, eaten on, and butted because they don't get their food."*

*1W: "The first calves we weaned, they were so wild, they were not used to being handled you know. It's something completely different when you're standing there, and the calf know it's you who's giving the food. But here, you are kind of the enemy when you are out there (on pasture). So, we had to do something about that, we had to start socializing them. It was our veterinarian who gave us advises about that we could make sort of a calf hide out there, where they could get some hay and concentrates, a teat, and some water, and then we could take them in there and sort of force them to get cuddled." 1M: "Two times a day, we handle them.».*



## Farmers perceptions of cow and calf on pasture



*5W: "If the small calves should have run far up in the mountains as well, then they wouldn't come back in the evening ever again. The cow wouldn't have any reason to come back in the evening, she could just stay in the mountains with the calf, ah, no.."*

*6S: "The advantage of having calving in the autumn is that then they can be outside and calf outside on pasture, I want to have as much calving outside as possible. When they calve outside the animals are much faster, or healthier and fitter."*

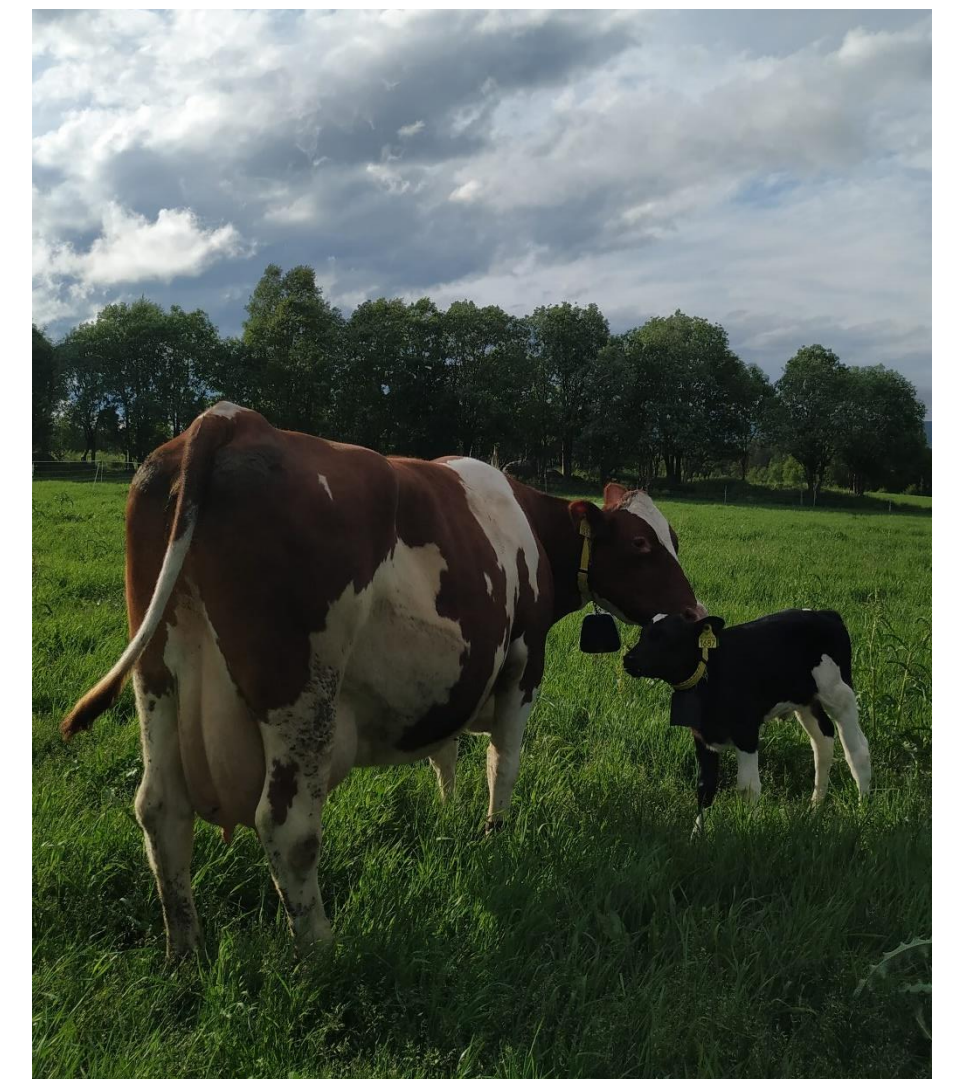
*10M: "All mothers are amazing, the cows are very kind and very good mothers, like most mothers regardless of species. And, if you thrive at home, you will always come back home, it's like that with the calves as well. The calves can be away exploring on their own when they are outside, but they always come back home. So that's not a problem. But it has been many people calling me, saying like "There are some calves here..", it's a problem if they go to the big road or the railway or something like that, but they have never done that."*



## Natural behaviour and animal welfare

*7M: “We think it’s better animal welfare when the calf is together with the cow. This is our way of interpreting animal welfare. Because it’s a bit like a soluble concept. But that the cow can get to express her natural needs because it’s a natural need. When you see how they handle the calf, after calving and how they follow it in the free stall, calling for it and it comes and suckles from its mother. It’s natural instincts, a need that is being covered, that mother role. So that’s what we think is good animal welfare. But it doesn’t mean that we think it’s poor animal welfare to separate them early.”*

*5W: “I feel like the animal welfare has increased. Or, I don’t know, they had very good welfare when we separated them early as well.”*



## Working environment and focus

5W: *“You use the time in a completely different way, you’re often walking around with a plank, which you are going to place somewhere. We use some time on that. Adjustments in the barn, moving animals here and there, look at them. But before you went around carrying buckets, warming milk, carrying buckets, emptied buckets, and all that.”*

4W: *“Now we can, when we have the robot, if we suddenly go to the barn very early in the morning, or if we go there an hour later in the evening, it doesn’t matter for the calves, we don’t have anyone standing and waiting and to feel sorry for because they don’t get their food.”*

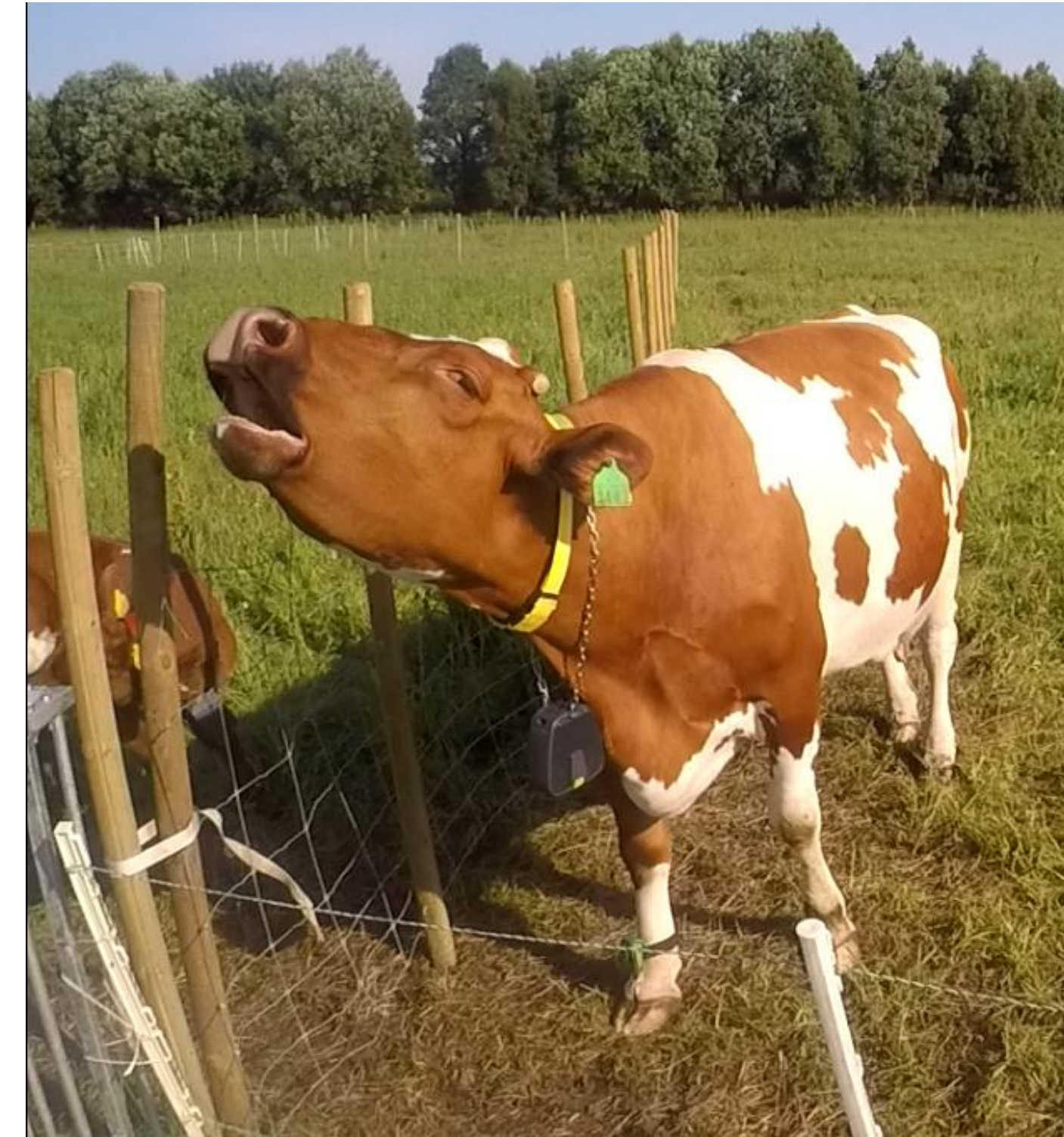
11W: *“I think it’s pleasant, it’s nice to see, they have a good interaction. Instead of having to stand holding the bottle for the calf, I can stand and watch them enjoy themselves together»*



# Separation and weaning

*1W: "It's much easier when you are separating them to separate more calves from the cows together, but we have had some problems with the separation. When they are used to be suckling their mothers, you cannot just stop this abruptly, because then we get a huge drop in the calves' growth, and stomach trouble, and things like that."*

*11W: «It can be a bit noisy at weaning, but it has to do with how you do it, so I have found a method that actually works quite well, for the calf it's not a problem, but the mum, some mothers can make a little noise for a day or something, but now I do it successively and then they are so tired of those bullies that are fooling around with them when they are 3 months old, so they are happy to get rid of them, because they can see them, they pass them and sniff them every day».*



## The experiment (Article 3, 4 & 5)

*- What effects does having cow and calf together on pasture have on the behaviour and health of cow and calf, calf weight gain, cow milk production and composition of milk?*



# About the experiment



- 20 cow-calf pairs, 4 groups

- **Early separation (ES):**

- Separated within 1-3 hours after calving
- Natural milk 4 meals/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





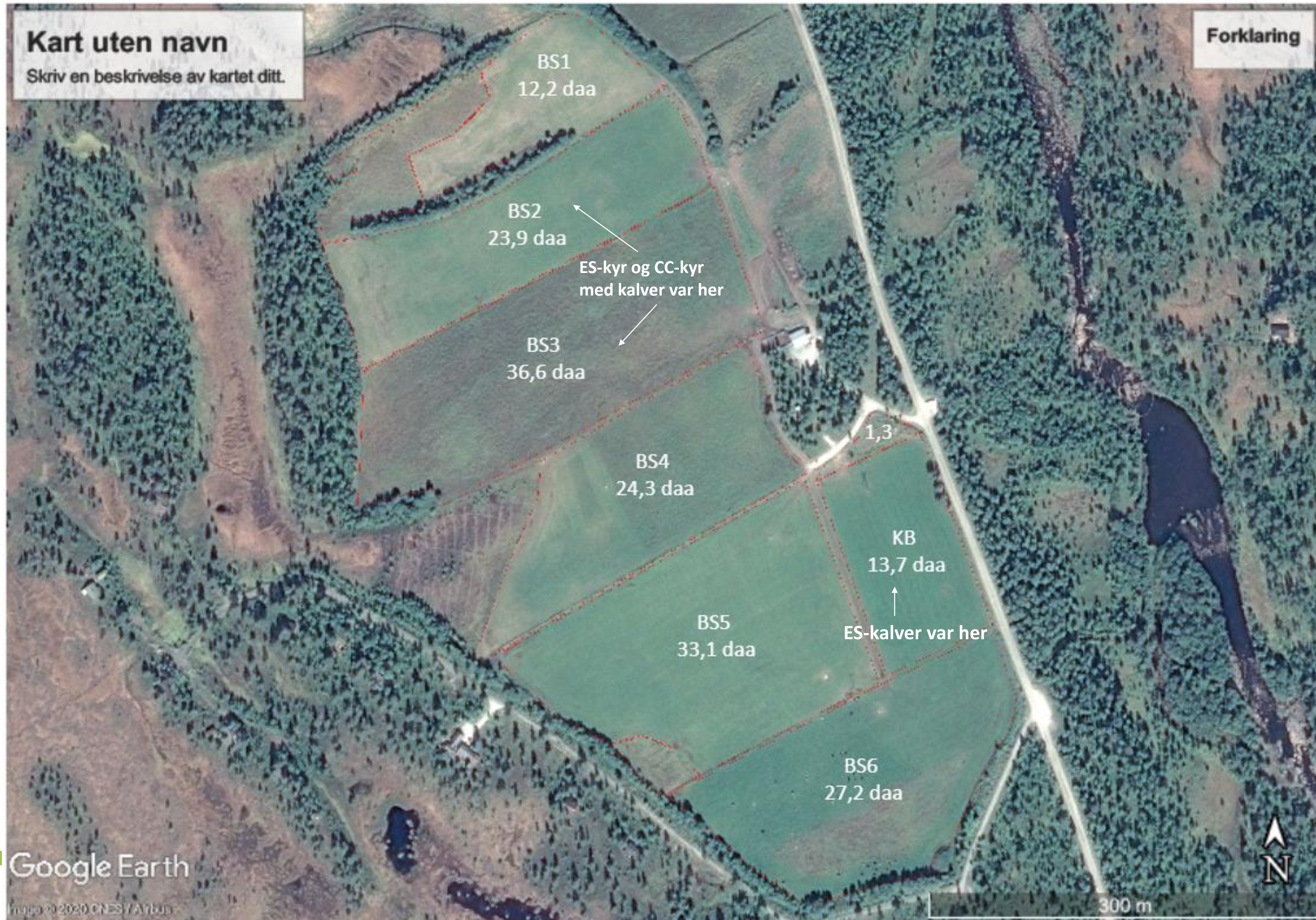
# Animals in the experiment

- 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



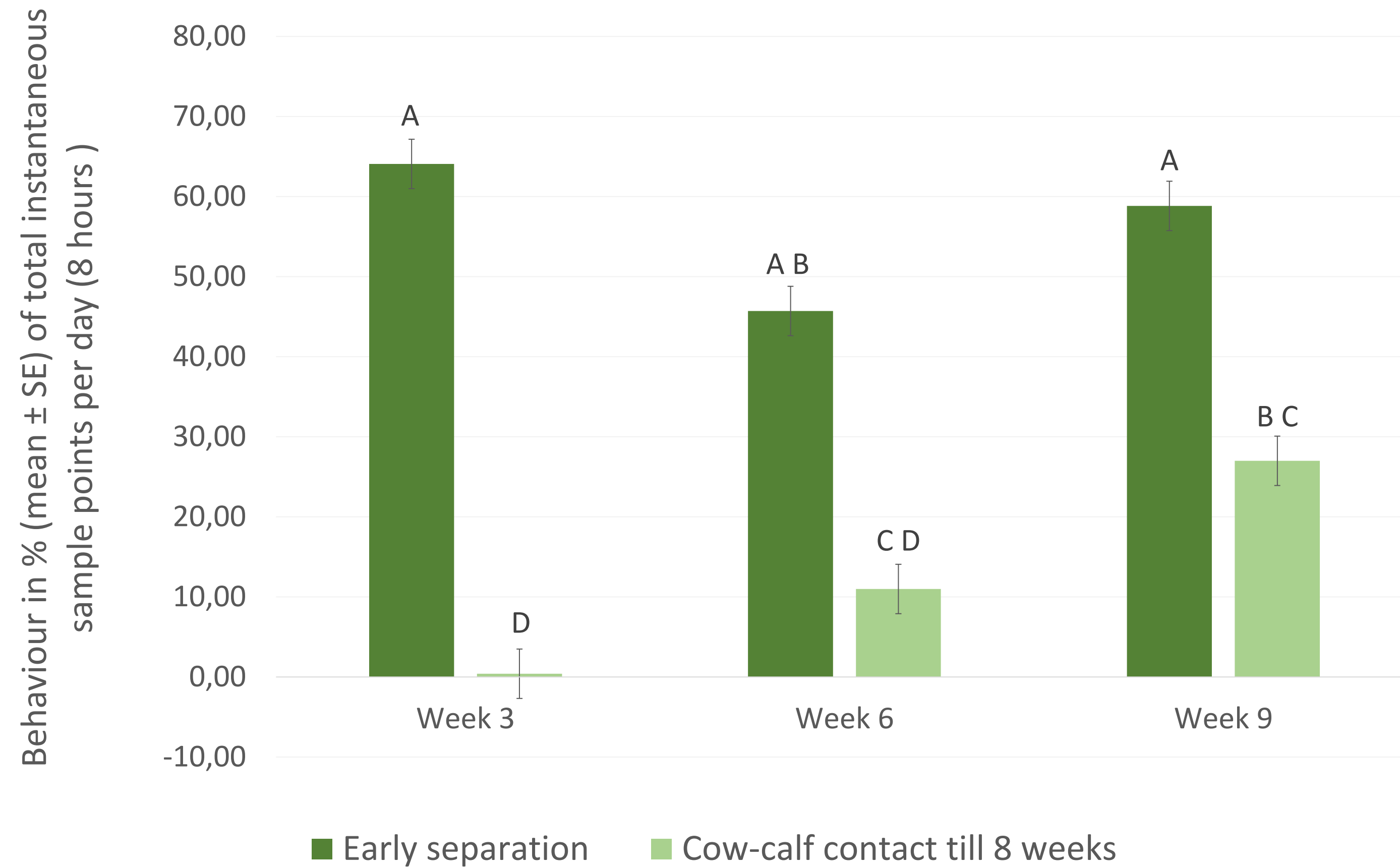
# Behaviour

- Direct observations of calves on pasture - Day 1, week 3, 6 og 9
- Play, suckling/drinking milk, allogrooming, vocalisations (week 9)
- Grazing, lying, standing/moving, eating hay/silage, in calf hide
- Feeding test week 8: 4 buckets:
  - Concentrates, novel feed-hay, novel feed-carrots, empty
- Nofence-collars (cows and calves):
  - GPS-positions
  - Accelerometer-data activity
  - Accelerometer-data suckling CC-calves (compare with beh.reg.)





## Calves use of calf hutch, week 3, 6 & 9

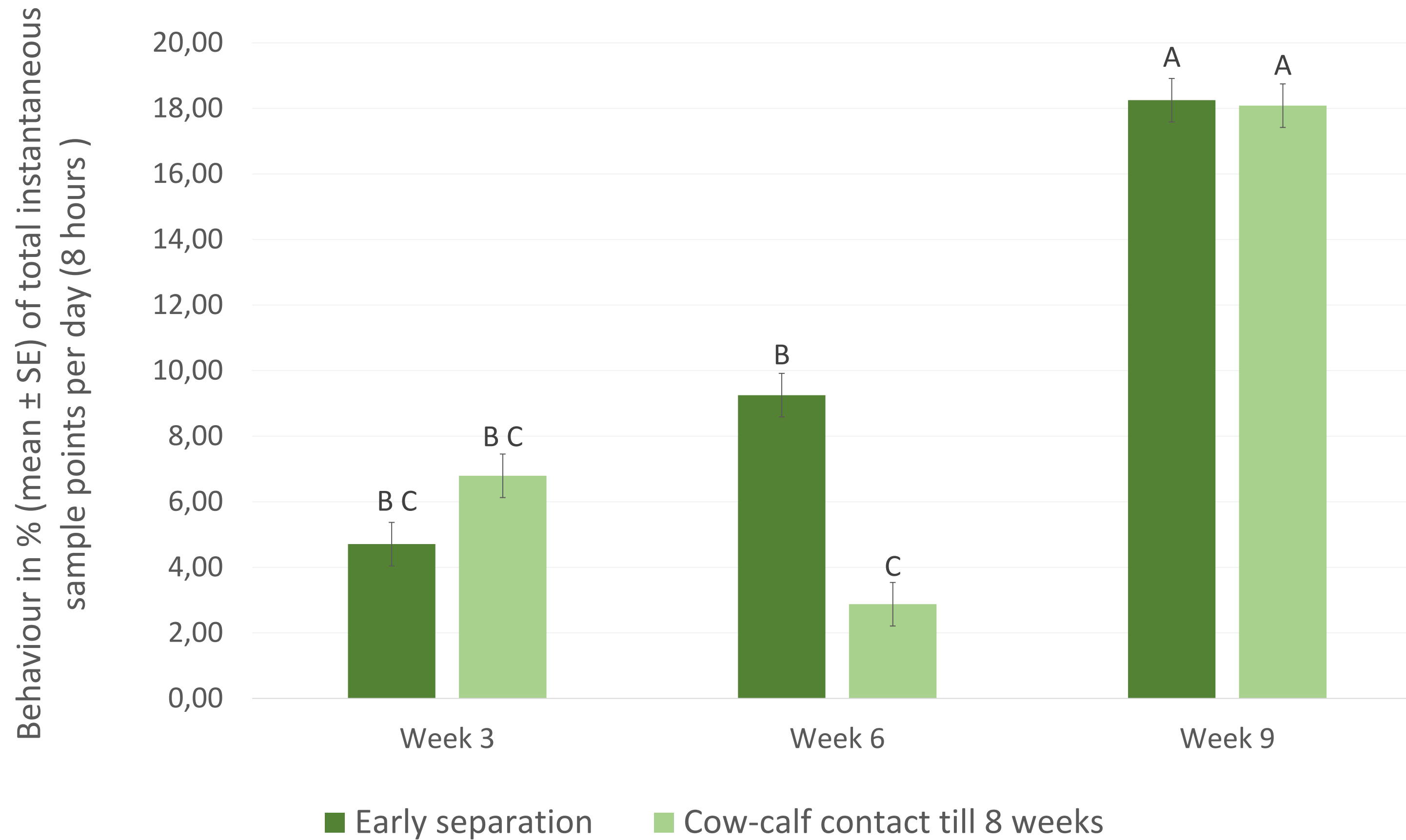


- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test





## Calves grazing, week 3, 6 & 9

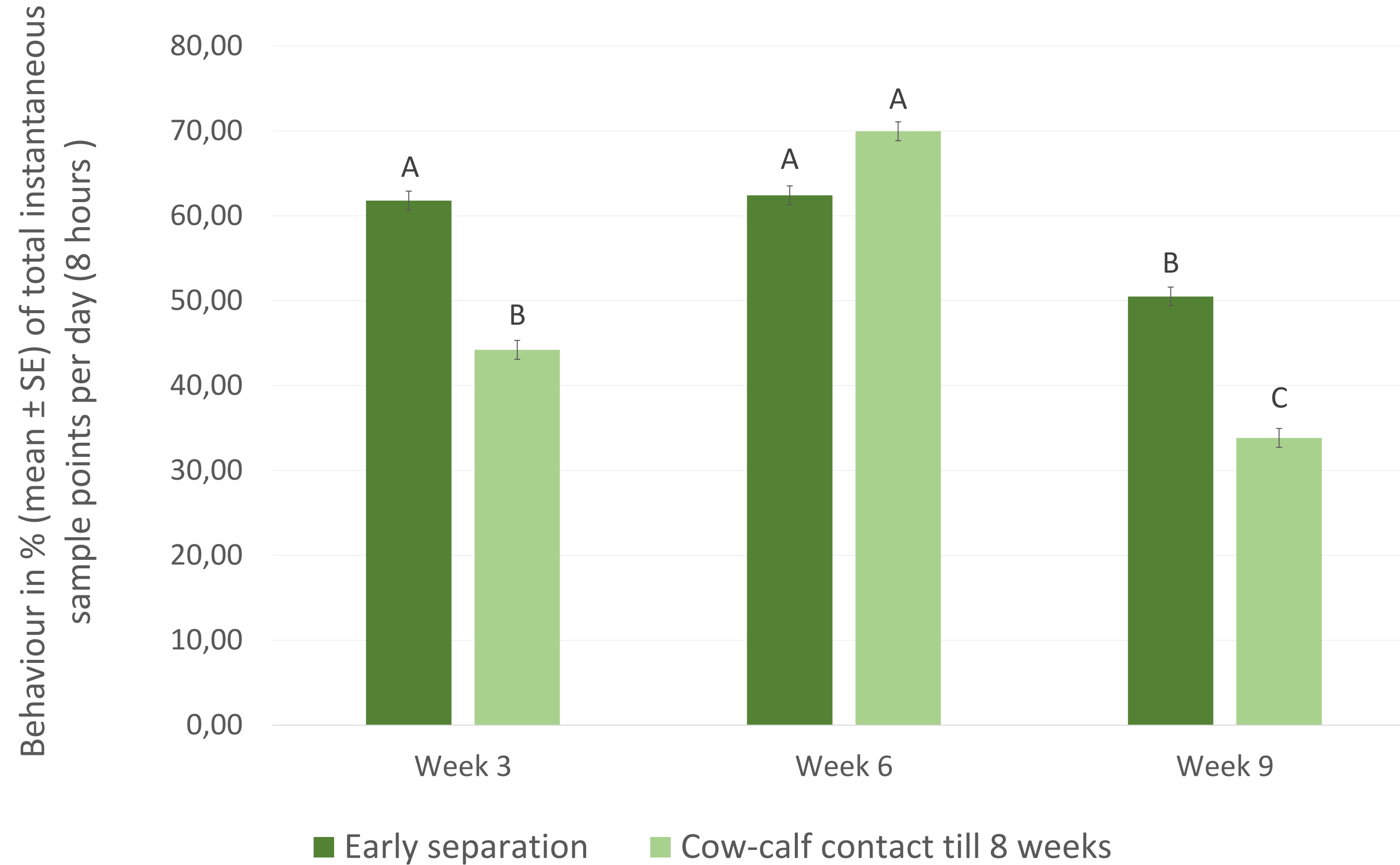


- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test





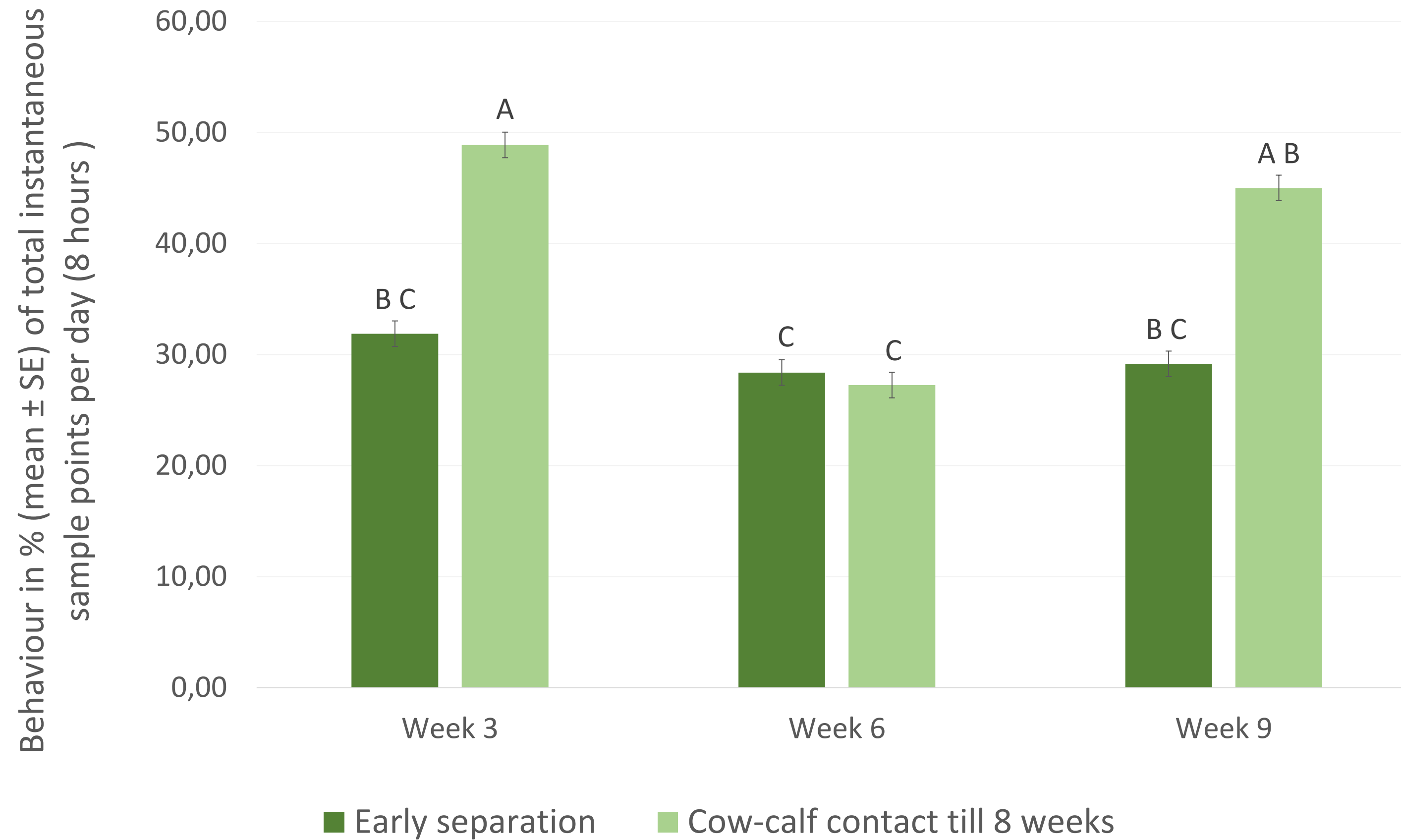
## Calves lying, week 3, 6 & 9



- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test



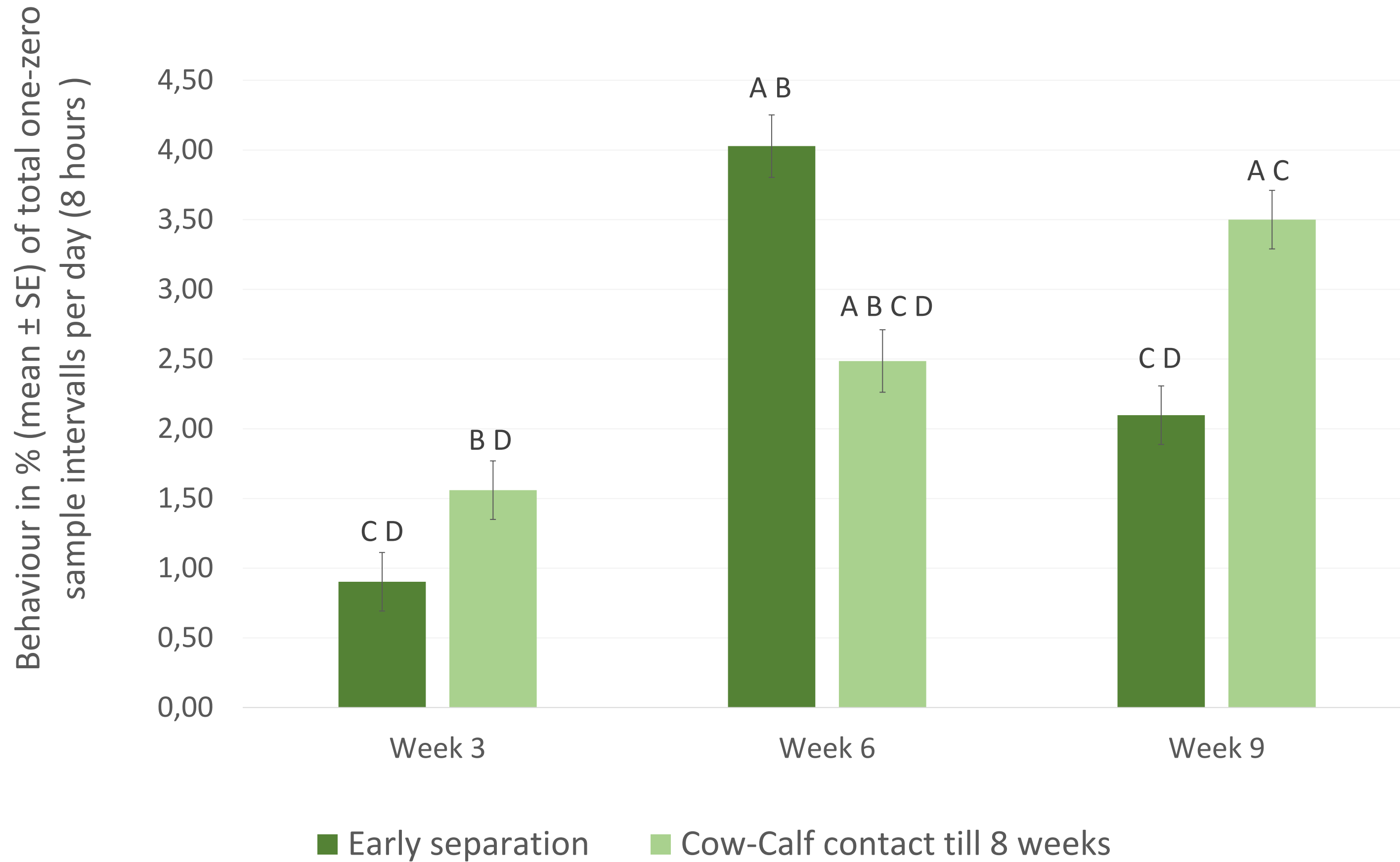
## Calves standing/moving, week 3, 6 & 9



- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test



## Allogrooming calf-calf, week 3, 6 & 9



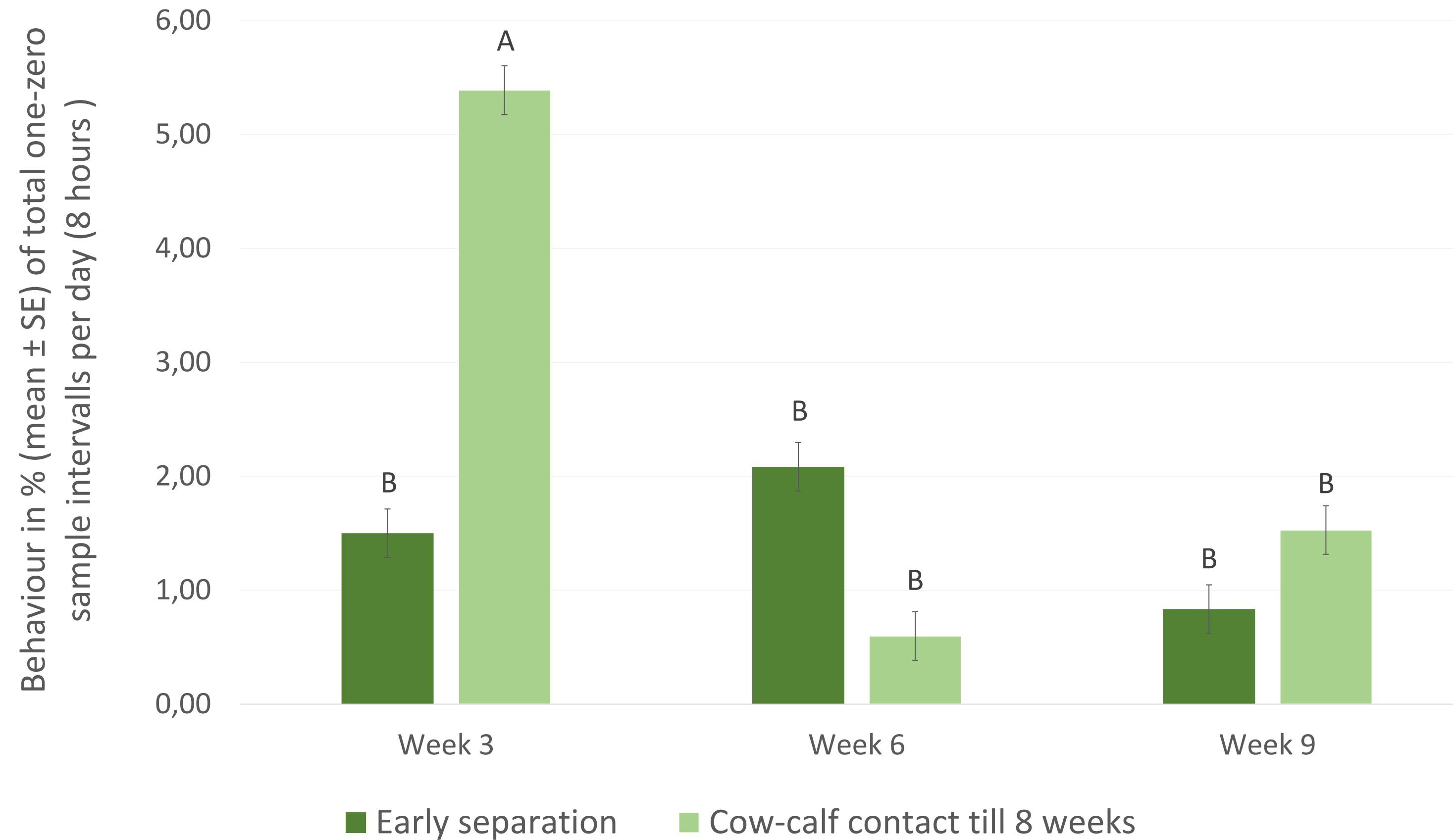
- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test





- Abnormal suckling week 9 (not registered)

## Calves play behaviour, week 3, 6 & 9



- Means with common letters are not significantly different ( $P < 0.05$ ) according to Tukey's test





# Registrations health & performance – cow & calf

- Daily health checks
- Calves: Health assessments: After birth, day 1 pasture, week 3, 6, 9  
Calves: Weighing: After birth, week 6, 9 + some weighings later until 6 months
- Cows: Health assessments, weighing, breast measure, body condition score: day 1 pasture, week 9 (+ breast measure after calving)
  
- Calves: Milk intake ES-calves, ap.4 days/week till week 8
- Calves: Concentrate intake, ap. 4 days/week till week 9
  
- Cows: Daily milk yield (milked), teat samples mastitis bacteria & milk samples chemical composition: week 5 & 9
- Cows: Rests of concentrates morning milking till week 9
  
- Pasture registrations and samples



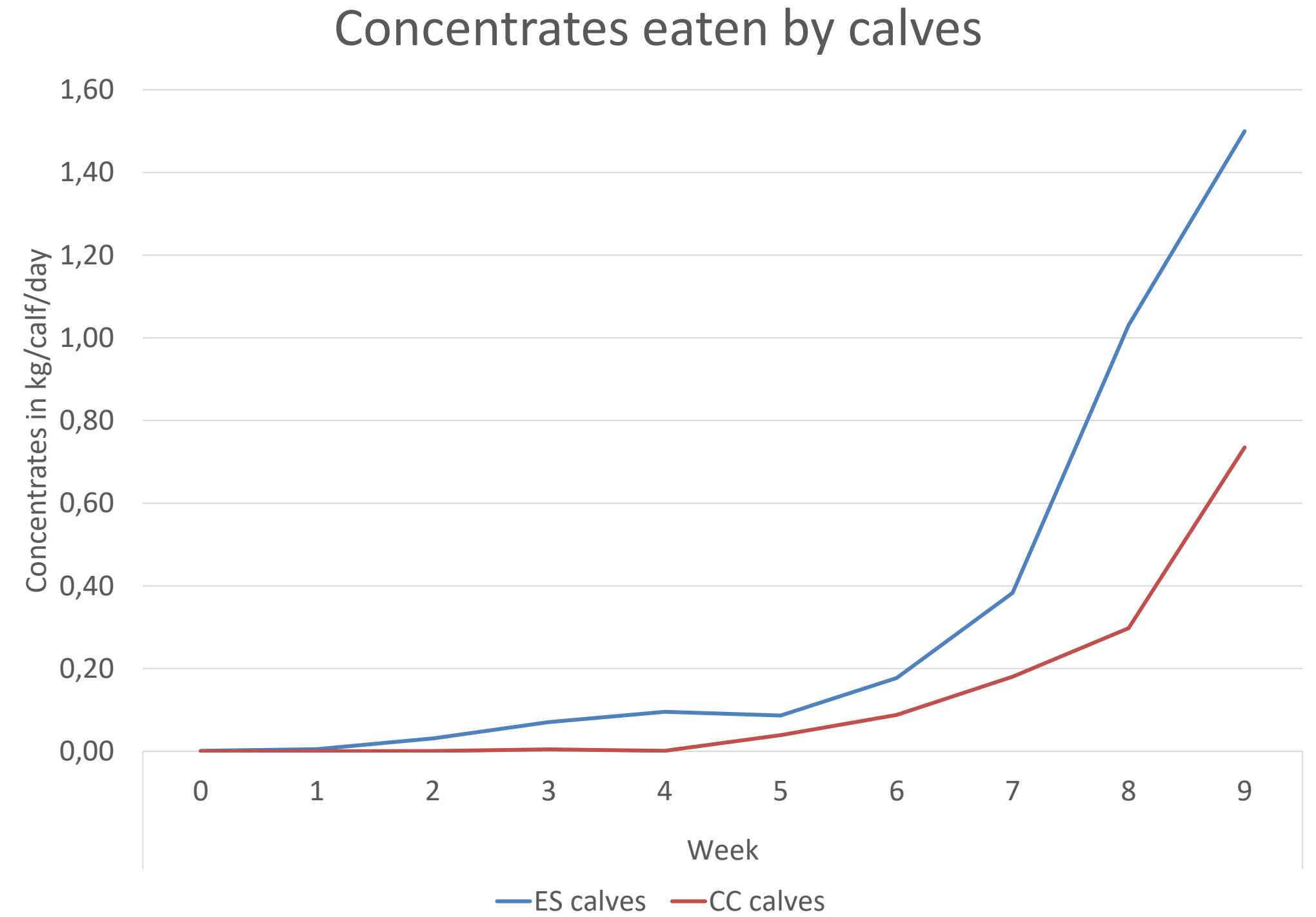
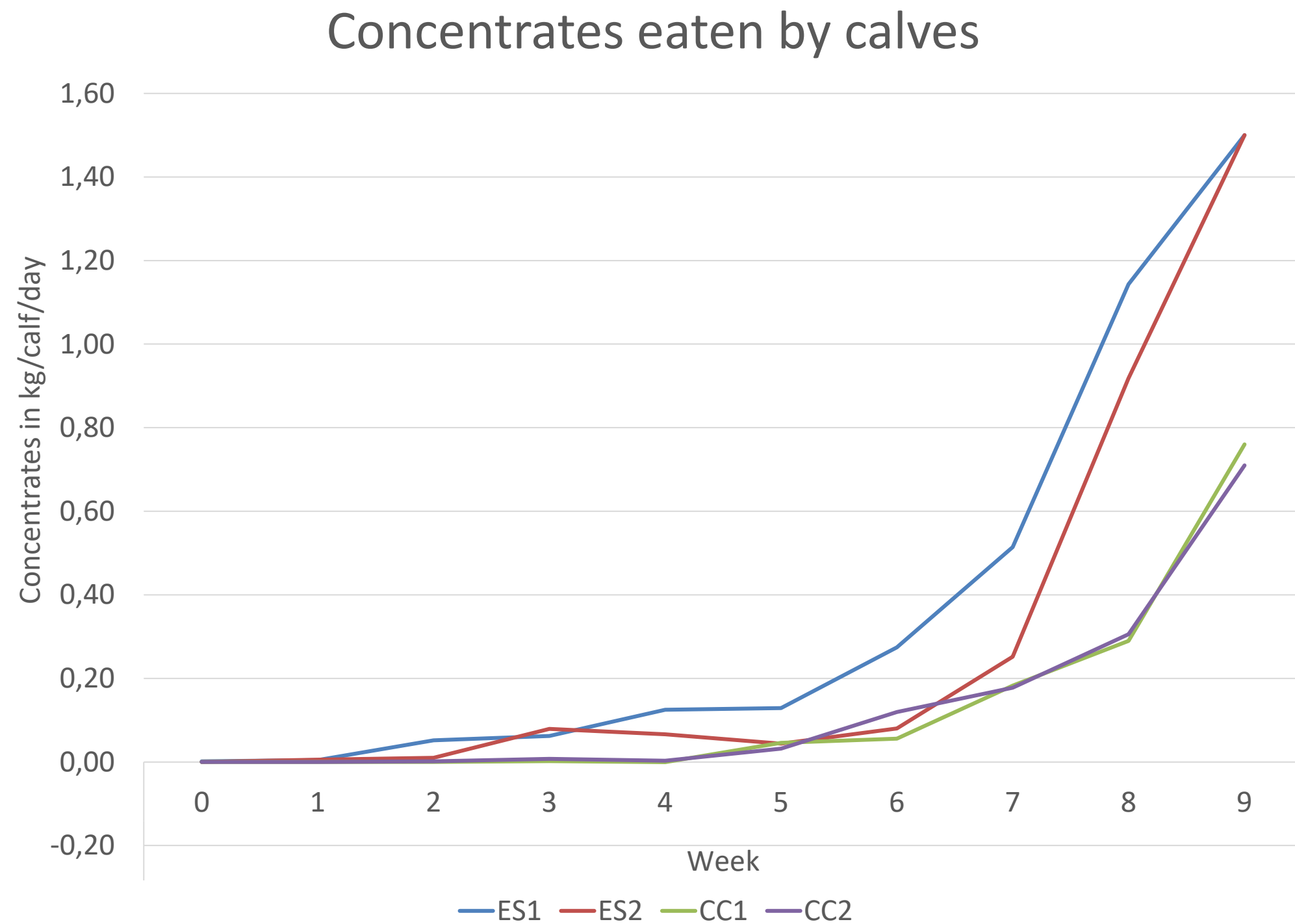
# Preliminary results health and performance



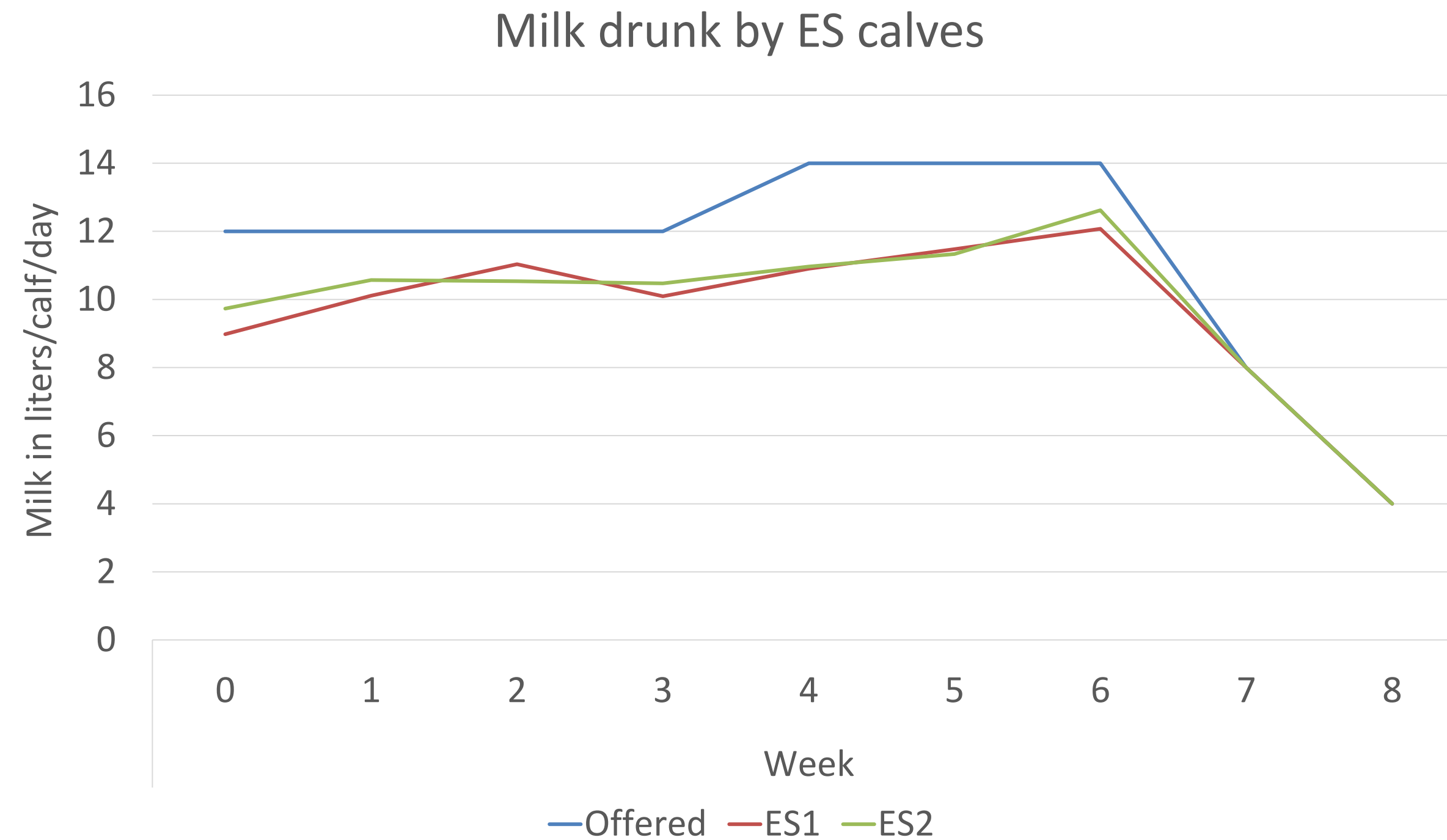
Foto: Marius Stenberg, NRK Møre & Romsdal

# Calves concentrate intake

- Average week 0-9:
  - ES: 0,34 kg/calf/day
  - CC: 0,13 kg/calf/day



# ES-calves milk intake

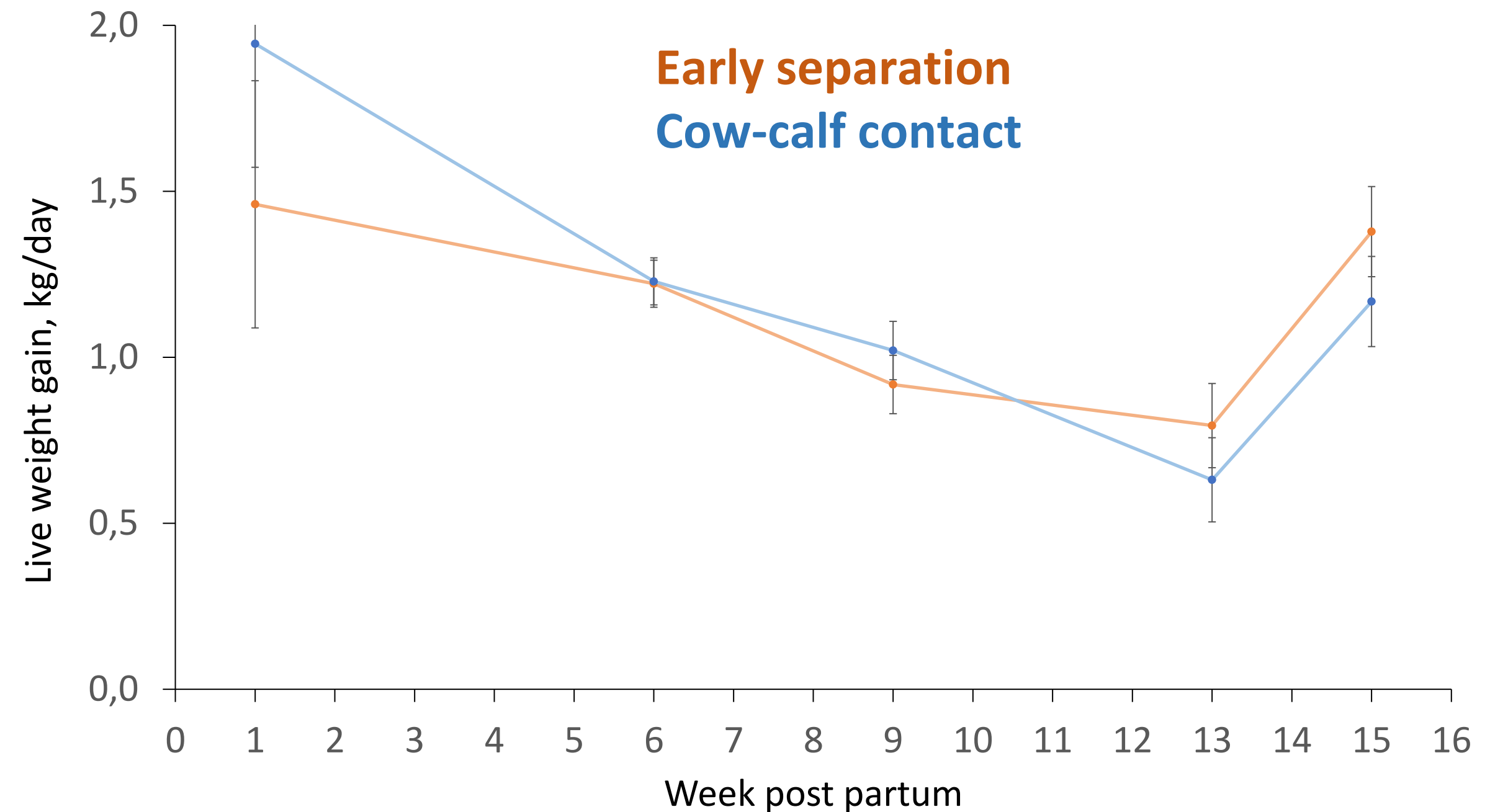


- Average week 0-8:  
- 9,8 l/calf/day
- Average week 1-6:  
- 11,1 l/calf/day
-

# Calves weight gain

- Preliminary analysis: No sign.differences treatment or gender
- Average weight gain birth till 6 weeks:
  - ES: 1,21 kg/calf/day
  - CC: 1,25 kg/calf/day
- Birth till 9 weeks:
  - ES: 1,13 kg/calf/day
  - CC: 1,17 kg/calf/day

treat	calfgen	BWG		week 0-1	week 1-6	week 6-9	week 9-13	week 13-15
		week 0-15	ES					
				1	6	9	13	15
ES	ES	1,06	ES	1,46	1,22	0,92	0,79	1,38
CC	CC	1,03	CC	1,94	1,23	1,02	0,63	1,17
ES	M	1,15		1,43	1,29	0,98	0,85	1,50
ES	F	0,97		1,49	1,16	0,85	0,74	1,26
CC	M	1,03		2,19	1,15	1,03	0,69	1,22
CC	F	1,03		1,70	1,31	1,01	0,57	1,11



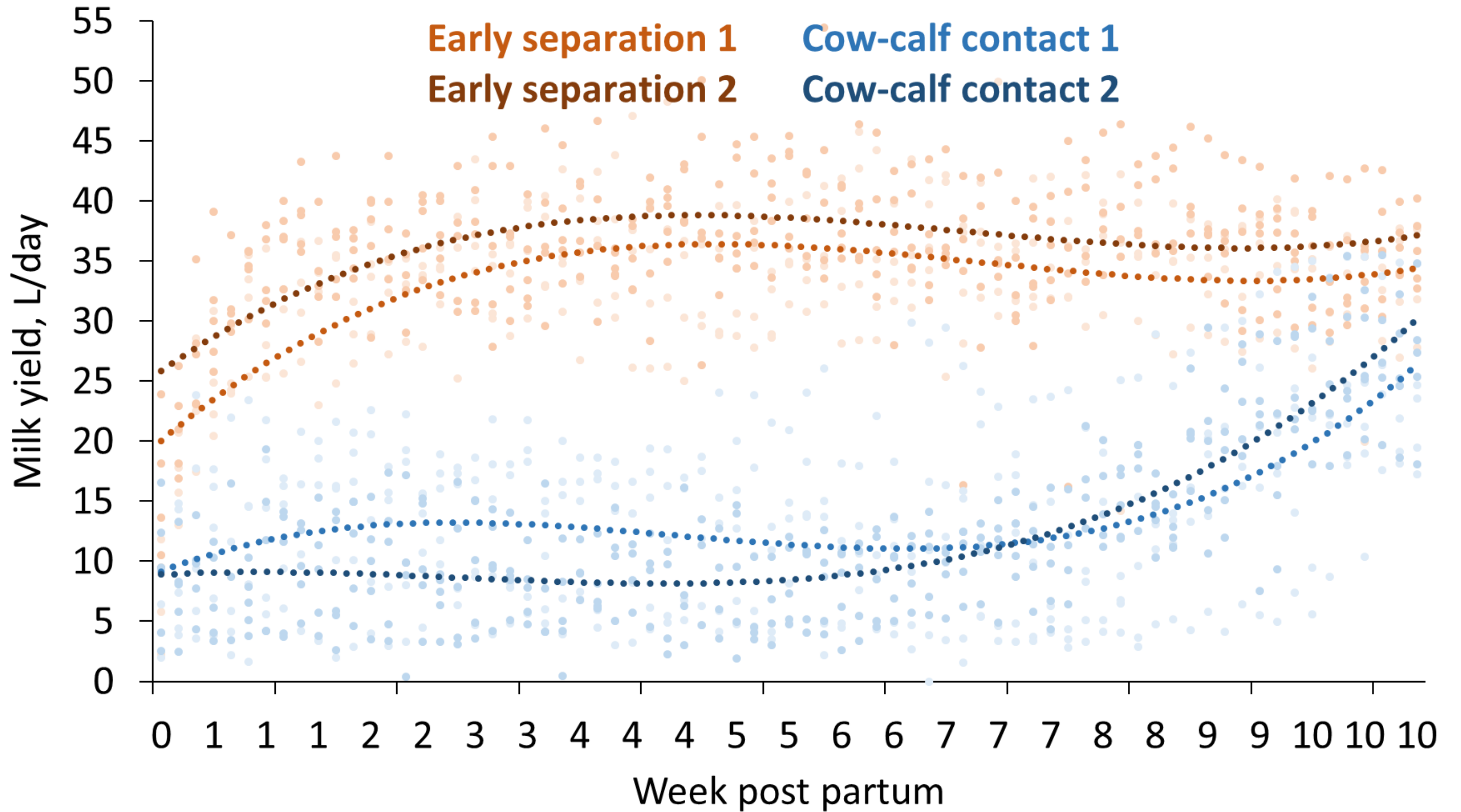
## Calves with highest weight gain week 0-15: Grim & Georg (ES-groups)

- Grim: 117,5 kg around 7 weeks
- Georg: 111,5 kg around 6 weeks



# Cows milk yield

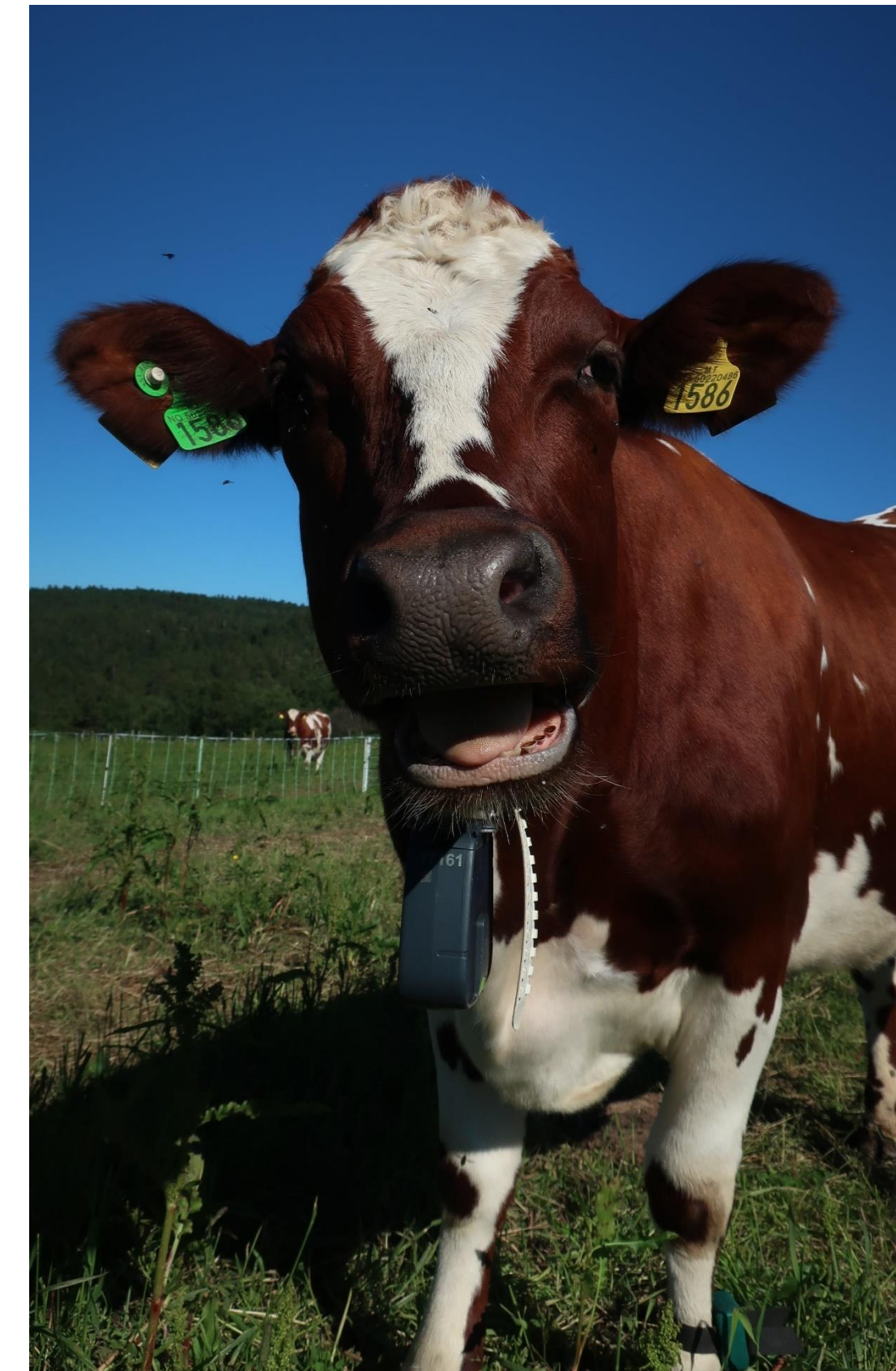
- Average delivered milk/cow/day week 0-8:
  - ES: 34,5 l/cow/day
  - CC: 10,7 l/cow/day





## The cows with most and least milk til week 8

- ES-cow 1474 (third lactation) 40 l/day
- CC-cow 1586 (first lactation): 5 l/day
- All 4 CC-primiparous cows: 5-6,5 l/day
- ES-primiparous cow: 27,9 l/day



## Cows milk quality – chemical composition

	ES				CC			
	5 weeks		9 weeks		5 weeks		9 weeks	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Protein	3,37	3,24	3,26	3,26	3,22	3,19	3,31	3,27
Fat	3,89	3,68	3,31	3,49	2,55	2,63	3,99	3,92
Urea	3,56	2,58	3,28	3,41	2,32	2,22	4,60	3,95
FFA	0,29	0,24	0,27	0,28	0,15	0,16	0,33	0,26

- Sign. diff. in fat, urea, fatty acids week 5 (lower in CC)
- No sign. diff. in protein

# Cows health

Groups	Poor milk let down	Diarrhea	Mastitis	Mastitis bacteria	Mastitis bacteria, glands	Teat wounds	Udder injury	Ketosis
ES1	0	4	1	2	2	0	0	1
ES2	0	2	1	2	4	1	1	0
CC1	3	0	1	2	5	0	1	0
CC2	5	1	2	1	1	2	0	0



Foto: Rosann Johanssen

Number of cows with clinical diagnosis through the experiment, and with mastitis-bacteria in samples week 5 and 9

- 1417 ES1: Mastitis bacteria sample 15.7, treatment later in same gland
- 1482 ES2: Teat wound and mastitis bacteria in gland, treatment
- 1558 CC1: Incipient mastitis, oxytocin
- 1537 & 1575 CC2: Treatment mastitis
  
- Milk let down problems with CC-cows through the whole experiment, problems with 8 of 10 cows, especially 4 primiparous cows
  - Farmers and veterinarians were worried
  - Oxytocin given to some cows on 21 different days

## Calves health

- Good health on all calves through the experiment
- Some coughing in 2-3 calves ES2
  - General condition or appetite not reduced
  - Blood samples to check for virus



Foto: Rosann Johansen

Thank you! 😊

