

Norsk senter for økologisk landbruk

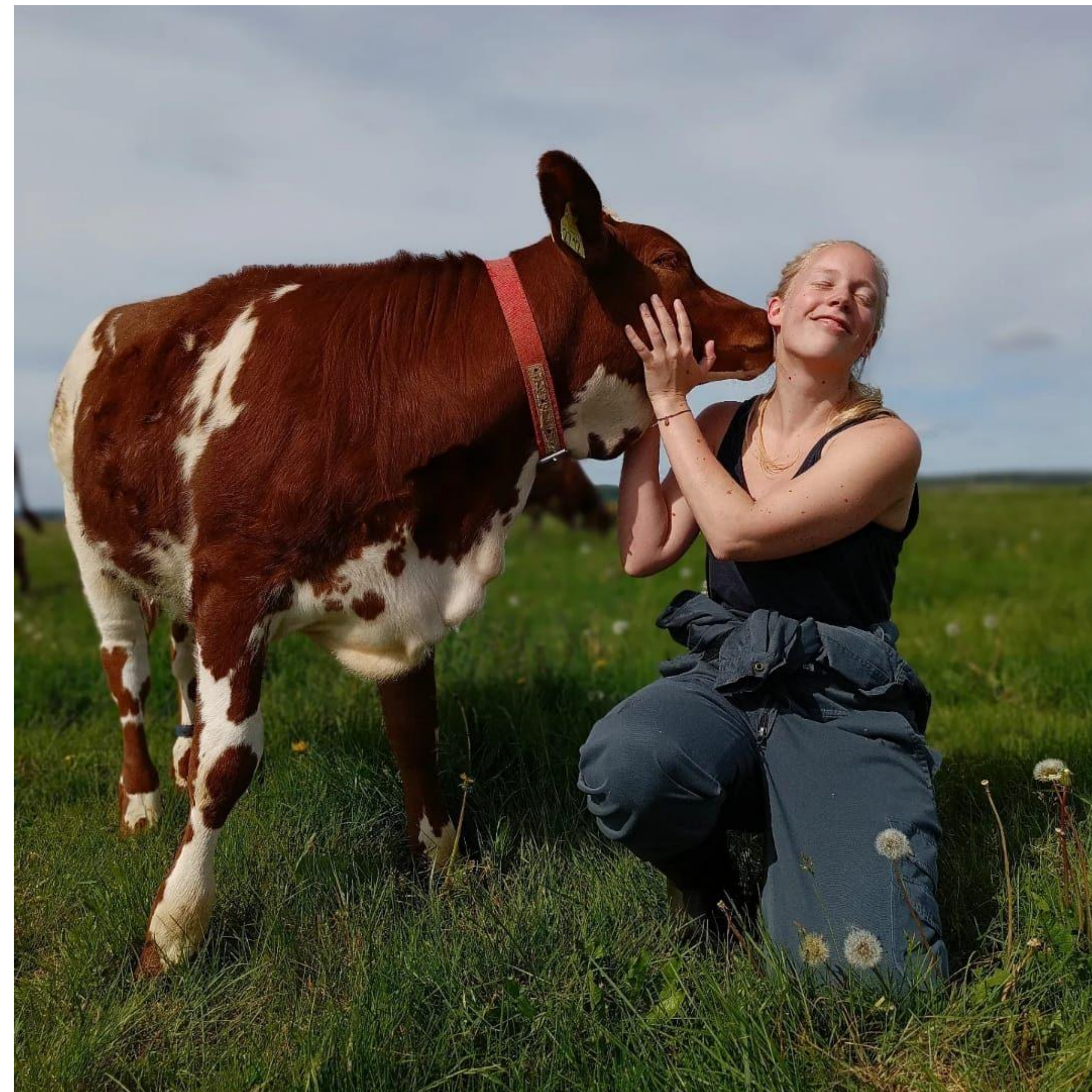
Ku og kalv sammen

24.05.2024 – Juni Rosann E. Johansen

Juni Rosann Engelien Johanssen

- Sivilagronom og etolog, master i husdyrvitenskap, NMBU 2016
- Dyrevelferdsforsker hos NORSØK siden 2017

- **PhD:** August 2020-Februar 2024
- **PhD mål:** Skaffe ny kunnskap om norske melkeproduksjonssystemer med ku og kalv sammen, gjennom intervjuer et forsøk på beite



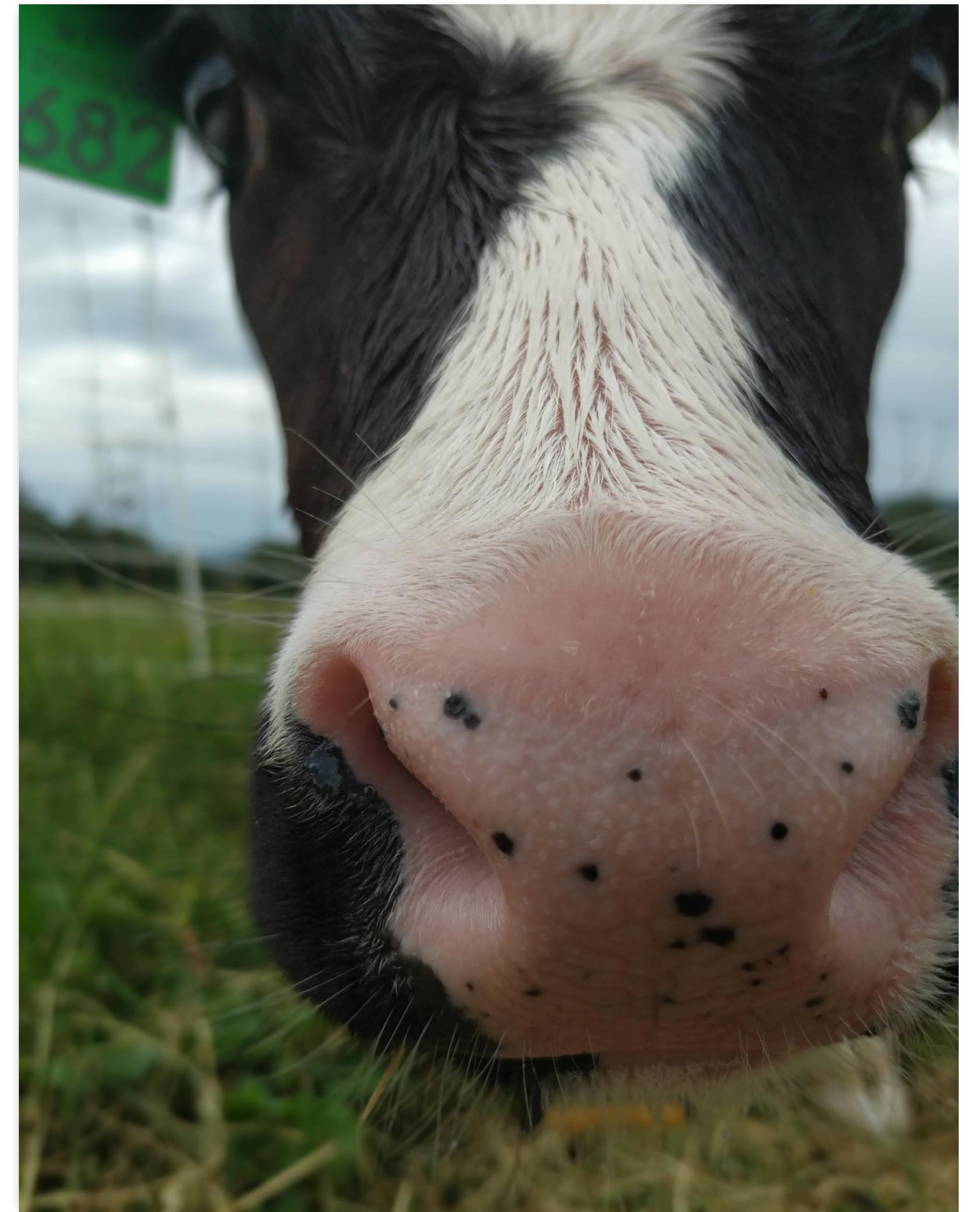
Hold av kalver i melkeproduksjon – Norsk regelverk

Konvensjonelt:

- Ingen krav om ku-kalv kontakt (CCC)
- Melkefôring: Ingen krav om mengder eller hvor lenge
- Kalver kan holdes alene opptil 8 uker

Økologisk:

- Naturlig atferd viktig
- Kalven skal die minst 3 dager
- Drikke fra kunstig spene minst 1 mnd
- Naturlig melk minst 3 mnd
- Skal være med andre kalver etter en uke



Hva er naturlig atferd for ku og kalv?

- Kua alene før kalving
- Kan danne bånd innen 5 minutter
- Kalven gjemmer seg i noen dager før den følger mora
- Dier 4-10 ganger per dag
- 7-10 minutter per dieperiode
- Naturlig avvenning ved 7-14 mnd
(men vet ikke med dagens melke-storfe)



Økende interesse

Norsk undersøkelse blant 1036 melkebønder (2022):

- 3% (31) hadde ku og kalv sammen minst 2 uker
- 15% planla eller ønsket det

Forbrukere:

- Økende opptatt av dyrevelferd
- Ønsker ku og kalv sammen, og storfe på beite (naturlig)

Undersøkelse i Canada 2019:

- Kalver alene, kalver i grupper, kalver med ammetanter
– rangert likt og «dårligere» enn å ha kalv med egen mor
- Ønsker ikke at kua skal skilles fra egen kalv!



Bønders bekymringer

- Senere separasjon → økt stress
- Mindre levert melk
- Fettinnhold i levert melk
- Nedgiing av melk
- → Lavere lønnsomhet
- Råmelksinntak
- Bygninger ikke tilpasset
- Morsegenskaper hos melkekyr
- Aggresjon mot folk
- Håndtering av kalver
- Økt og mer stressende arbeid
- Beite-relaterte utfordringer





Norwegian University of Life Sciences
Faculty of Biosciences
Department of Animal and Aquacultural Sciences

Philosophiae Doctor (PhD)
Thesis 2023:78

Cow-calf contact in dairy farming - Norwegian cow-calf contact (CCC) farmers' practice and perceptions, and effects of CCC on behavior and performance on pasture

Ku-kalv-kontakt i melkeproduksjon – Norske ku-kalv kontakt (CCC)-bønders praksis og oppfatninger, og effekter av CCC på atferd og ytelse på beite

Juni Rosann Engelen Johansen



Interrelationships between cows, calves, and humans in cow-calf contact systems—An interview study among Norwegian dairy farmers

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ABSTRACT

In recent years, the common dairy farming practice of early separation of dam and calf has received increased attention. Our aim was to explore how Norwegian dairy farmers with cow-calf contact (CCC) systems apply these systems in practice, and how they experience and perceive the interrelationships between cows and calves and humans within these systems. We conducted in-depth interviews with 17 farmers from 12 dairy farms and analyzed responses inductively, inspired by the grounded theory approach. The farmers in our study practiced their CCC systems differently from each other and had varying as well as common perceptions about these systems. Calves' intake of colostrum was not seen as a challenge, regardless of practice. The farmers generally perceived that any aggression shown by cows toward humans was merely an exhibition of cows' natural protective instinct. However, when the farmers had good relationships with their cows and the cows felt safe around them, the farmers could handle the calves and build good relationships with them as well. The farmers experienced the calves learning a lot from their dams. Most of the farmers' dairy housing systems were not adapted for CCC, and CCC systems could require modification in terms of placing greater emphasis on observing the animals and making adjustments in the barn and around milking. Some thought having CCC on pasture was the best and most natural, while others were reluctant to have CCC on pasture. The farmers encountered some challenges with stressed animals after later separation, but several had found methods to minimize stress. Generally, they had different opinions about workload, but agreed they spent less time on calf feeding. We found that these farmers were thriving with their CCC systems; they all described positive emotions around seeing cows and their calves

together. Animal welfare and natural behavior were important to the farmers.

Key words: semistructured interviews, dam-rearing, farmers' perceptions

INTRODUCTION

Separating dairy cows from their calves immediately or shortly after birth is a common practice in dairy farming (Hötzel et al., 2014; Pempek et al., 2017; Abuelo et al., 2019). For many decades, most farmers have not questioned the practice. They base their arguments mostly on lower volumes of saleable milk (see review by Meagher et al., 2019), more stress around separation after more time together (Weary and Chua, 2000; Berge and Langseth, 2022), and potential risk of transmitting infection between cows and calves (see review by Beaver et al., 2019). Others have argued that calves would become "wild" when in the cow group and not fed by humans (Vaarst et al., 2020). Another concern has centered on possible aggressive behavior of mother cows as they attempt to protect their calves, thus creating a less safe working environment (Berge and Langseth, 2022; Neave et al., 2022). Last, the adaptations required to create housing systems that would allow accommodating calves together with dairy cows can be costly (Knierim et al., 2020; Berge and Langseth, 2022).

However, the early separation of dairy cows and their calves has received increased attention recently from stakeholders concerned about this practice (Busch et al., 2017). This concern is apparent from animal welfare organizations' emphasis on this topic (Dalgaard, 2020; Dyrevernalliansen, 2022), and within the scientific community, for example, in the article by Brombin et al. (2019), with the title "Are we ready for the big change in dairy production?" The big change they refer to is stopping early separation of dairy cows and calves. Surveys carried out in different countries show that many citizens' knowledge about common animal husbandry practices, such as the early separation of a cow and her calf, is limited (see review by Placzek

Mål: Undersøke og analysere hvordan norske melkeprodusenter med ku-kalv kontakt-systemer praktiserer disse systemene og hvordan de erfarer og oppfatter relasjonene mellom kyr og kalver og mennesker i disse systemene.

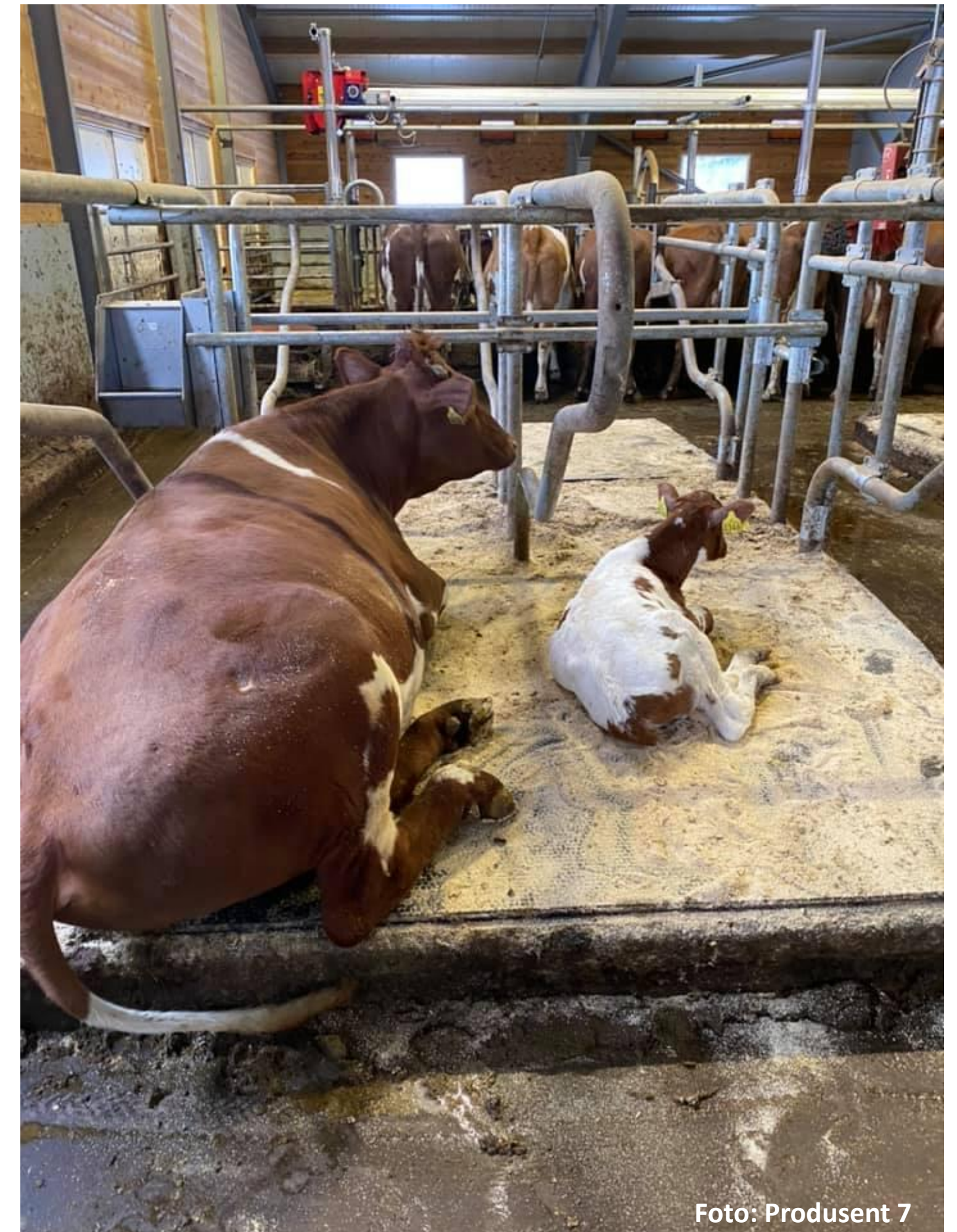
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Intervjuer vinter 2020-2021

- Minst 1 års erfaring med CCC
- Kalv med egen mor i minst 4 uker
- 17 bønder, 12 gårder
- Økologiske: 4, konvensjonelle: 8
- Båsfjøs: 4, løsdrift og melkestall: 2, løsdrift og melkerobot: 6
- Årskyr: 14-60
- Melkekvote: 75 – 420 tonn
- Kalvingstid: Spredt: 7, vår: 1, høst: 2, to perioder: 1, halve året: 1



CCC praksis

- Ku kalv sammen siden: 1995-1999: 3, 2015-2019: 9
- Alle gårdene: CCC inne på kuområde
- 7 gårder: CCC på beite
- CCC: 6 uker til 4 mnd
- Fulltid CCC: 2 døgn til 3 mnd
- 10 gårder: Diing hele melkeførringsperioden (2-4 mnd)
- 2 gårder: Fortsatte gi kalvene melk etter separasjon
- Separasjon og avvenning: Brått, noseflap, gradvis med fenceline og/eller mindre tid sammen



Gård 4



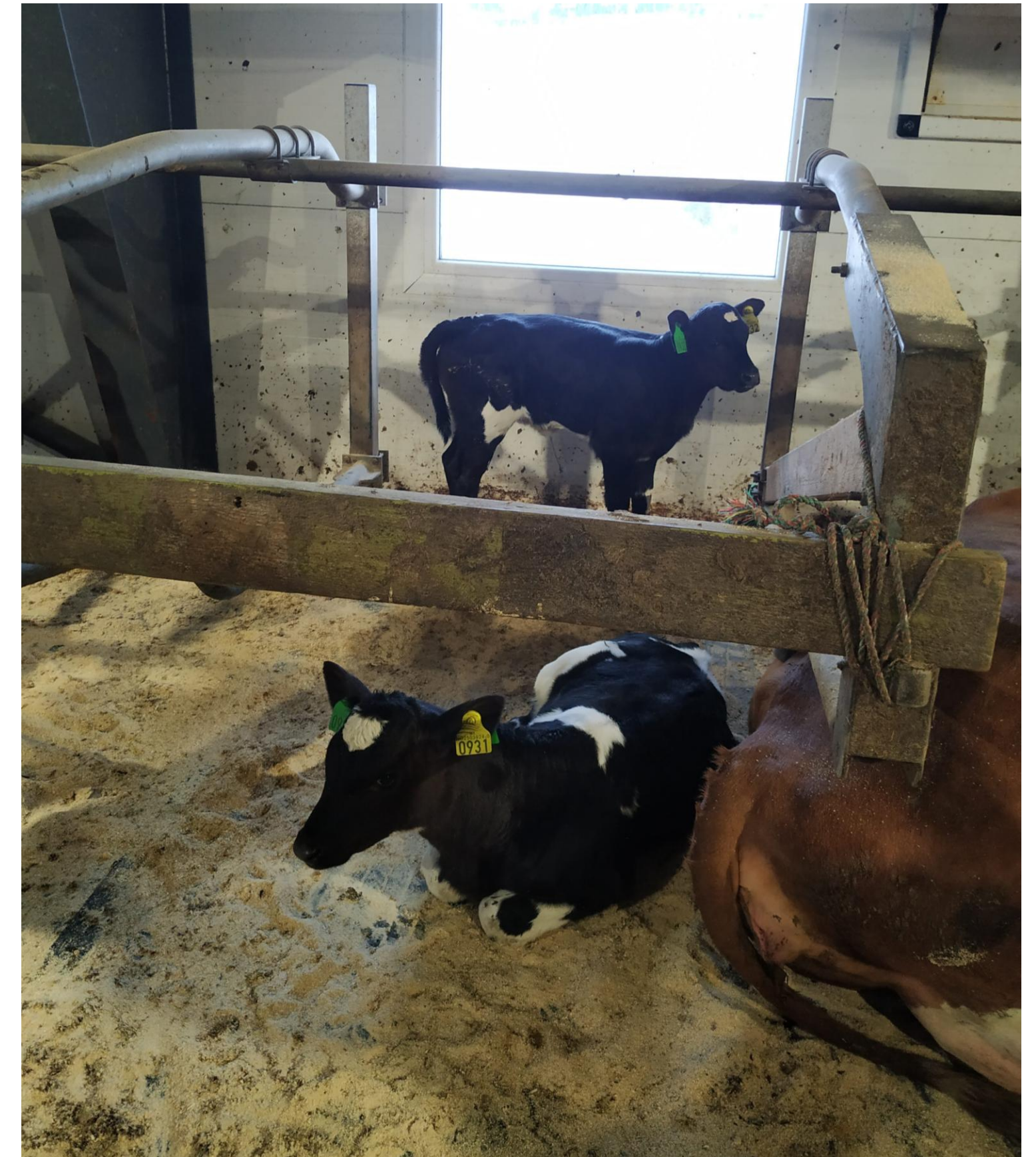
Foto: Rosann Johansen



Gård 5



Foto: Rosann Johansen



Gård 6



Foto: Rosann Johansen

Oppsummering fra intervju-artikkel

- Ulik praksis og oppfatninger, men og en del felles
- Råmelk - ikke utfordring, men ulik praksis
- Melkekyrne – gode mødre, tar vare på kalvene
- Enkeltkyr – stressa/bryr seg ikke – trenger tid?
- Kalvene lærer fra kyr, men og andre kalver
- Bonden og dyra kjenner hverandre - trygghet
- Kyr kan vise aggresjon – men sjeldent
- Økt risiko med folk kyrne ikke kjenner
- Ku-kalv – krever annerledes praksis
- Mer fokus på observasjoner, tilpasninger
- Håndtering kalv – viktig, men ulik praksis og oppfatninger



Oppsummering fra intervju-artikkel

- Stress ved senere separasjon – variasjon, ulike oppfatninger
- Flere har funnet metoder for å minimere stress
- Opptatt av dyrevelferd og naturlig atferd
- Ku og kalv sammen på beite – best og mest naturlig ifølge noen
- Andre torte ikke ha kalvene på beite med kyrne
- Ulike meninger om arbeidsmengde
- Enighet om mindre tid brukt på kalvefôring
- Enklere og mer fleksibelt system
- Bøndene trives med å ha ku og kalv sammen!





A pilot study of the behavior of dairy calves with or without their dams on pasture

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ARTICLE INFO

Keywords:
Dair rearing
Cow-calf contact
Animal welfare

ABSTRACT

Dairy calves are usually separated from their dams immediately post-partum and kept inside during the milk feeding period. Conversely - keeping them on pasture with their dams can promote natural behavior and be more accepted by the public. Our aim was to compare the behavior of dairy calves with or without their dams on pasture. Our pilot study included four groups of cow-calf pairs, 17 Norwegian Red (NRF) and three NRF x Holstein crossbreds allocated to each of two treatments: cow-calf contact (CC, n=10 pairs) and early separation (ES, n=10 pairs). The CC pairs were kept together on pasture for 6 weeks after calving with free suckling except during milking; calves were gradually weaned with part-time suckling in weeks 7–8 and were separated from the cows in week 9. The ES cows and calves were separated one to three hours after birth and kept on pastures without any contact; calves got access to 12–14 L milk/calf/day until week 6 and were gradually weaned in weeks 7–8. Observations of calf behavior were done once weekly in weeks 3, 6, and 9 and a food neophobia test was done in week 8. For the observations, the analyzed behaviors had a treatment*week interaction ($P < 0.005$). The CC calves used the calf hide less than the ES calves, but more so with increasing age. Before weaning, the CC calves were lying less than the ES calves in week 3, and the CC calves played more and were lying less in week 3 than in week 6. The ES calves grazed more than the CC calves in week 6, and unlike the CC calves, the ES calves grazed more in week 6 than in week 3. Allogrooming between peer calves was similar across the treatments. In week 9 (post-weaning), all calves increased their time spent grazing, and the CC calves spent less time lying and vocalized more than the ES calves. Descriptively, our food neophobia test showed numerically lower latencies to approach all buckets for the CC calves on the first test day. Our pilot study indicated that the calves behaved differently with and without their dams on pasture during our observations and that for most behaviors, the difference was dependent on age. However, the study was limited mainly by sample size and limited replication. Future studies should investigate how calf development may be affected through social facilitation by the cow.

1. Introduction

Cow-calf contact (CCC) systems in dairy farming are receiving increased attention from different stakeholders (Sirovica et al., 2022; Vaarst et al., 2020; Ventura et al., 2013). In contrast to the early separation of cow and calf, this practice is more supported by the public (see review by Placzek et al., 2021). Also, farmers practicing CCC on pasture have reported several benefits, such as the calves and their dams having access to more space and thus being enabled to express their natural behavior (Johanssen et al., 2023). However, there is limited knowledge about how CCC affects dairy calves' behavior on pasture.

Natural behavior for a calf is to suckle 4–10 times per day depending on age, whereas a suckling bout will last for around 7–10 minutes (de Passillé, 2001). After a milk-feeding period, the transition to solid feed is considered a main stressor for both CCC and artificially reared calves (Weary et al., 2008). Yet there is a lack of studies comparing dairy calves' behavior on pasture in response to weaning from suckling versus artificial milk feeding.

Studies have shown that pastured cattle prefer to stay inside or seek shelter under certain environmental conditions, such as relatively low (Sawalhah et al., 2016) or high (Van Laer et al., 2015) ambient temperatures, during windy conditions alone or in combination with

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1 Performance in dairy cows and calves with or without cow-calf contact on pasture – A pilot study

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10 Abstract

11 Interest in dairy cow-calf contact (CCC) systems is growing, but few CCC studies have been performed in a
12 pasture setting. Our aim was to evaluate performance in pastured dairy cows and calves with or without CCC
13 through machine milk yield and composition, and calf daily weight gain. Additionally, our aim was to describe
14 cow body weight and condition, calf intake of concentrates, artificially reared calves' milk intake, and cow
15 and calf health. The study was conducted on a commercial dairy farm from May to August 2021 in Norway.
16 Twenty cow-calf pairs, 17 Norwegian Red and three Norwegian Red x Holstein crossbreds, were allocated to
17 one of two treatments: cow-calf contact (CC, n=10) or early separation (ES, n=10). Each treatment had two
18 groups of five cow-calf pairs. The CC pairs were kept together on pasture with free suckling for 6 weeks
19 postpartum and had part-time contact in weeks 7–8 (weaning). The ES pairs were separated one to three hours
20 after birth and kept on separate pastures without contact between the ES cows and the ES calves. The ES
21 calves' daily milk allowance was 12–14 L during weeks 0 to 6 and was reduced to 8 L in week 7 and further to
22 4 L in week 8. From week 9, all calves were denied access to any milk (ES) or cows (CC). In weeks 0–6, daily
23 machine milk yield for CC cows was 23.7 kg lower per cow than for ES cows. Differences in machine milk

Forsøket og dyra (2021)

- Bergtun gård i Rennebu – 80 kyr, AMS
- Seter i Nerskogen
- 20 kalver født 7.mai til 14.juni
- Cow-calf contact (CC) og early separation (ES)
- Delt i fire grupper etter kalvingsdato
- Aldersvariasjon 6-8 dager/gruppe
- CC-kyr: 4 førstegangs- og 6 flergangskalvere
- ES-kyr: 1 førstegangs- og 9 flergangskalvere
- CC-kalver: 2 okser, 8 kviger
- ES-kalver: 6 okser, 4 kviger

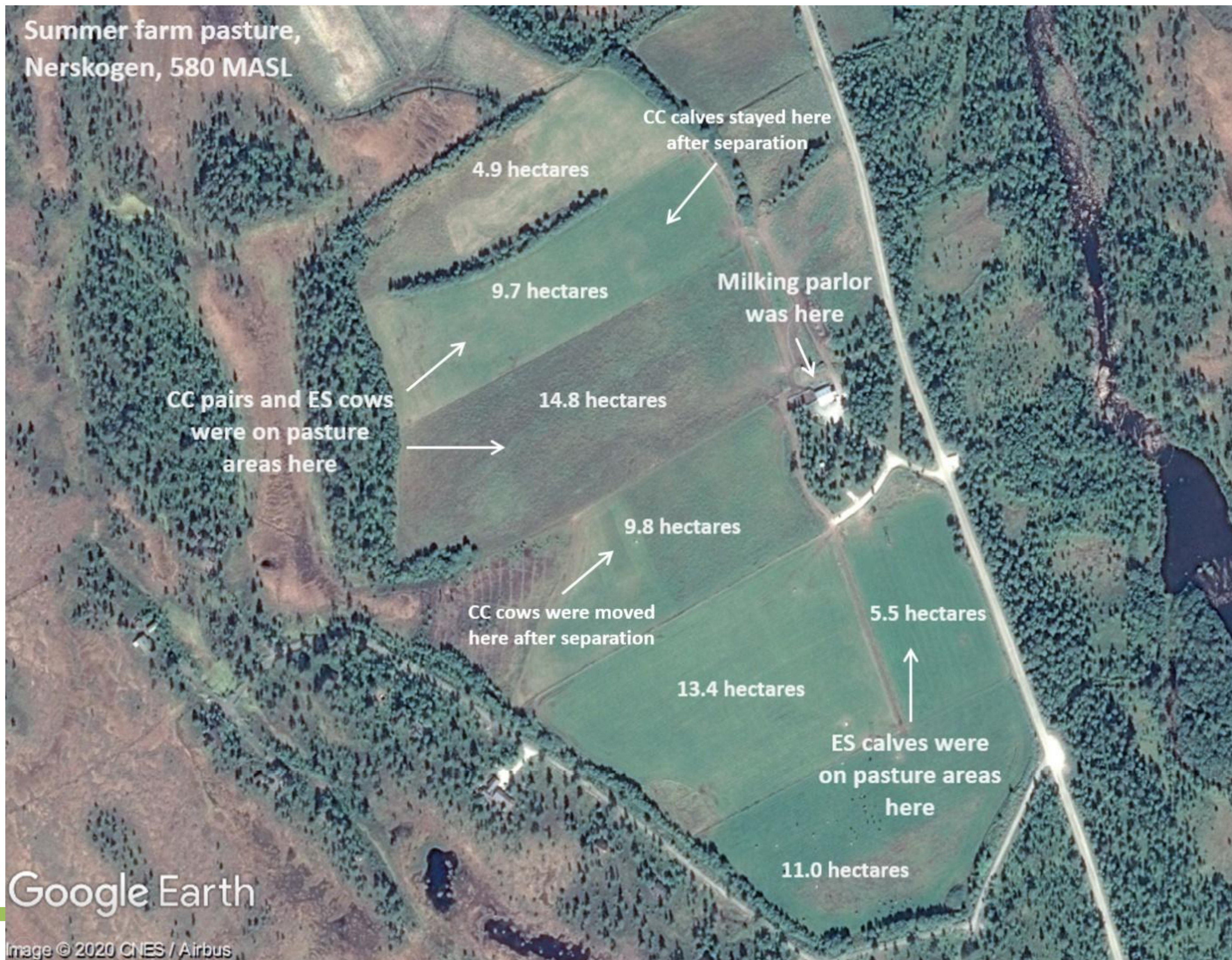


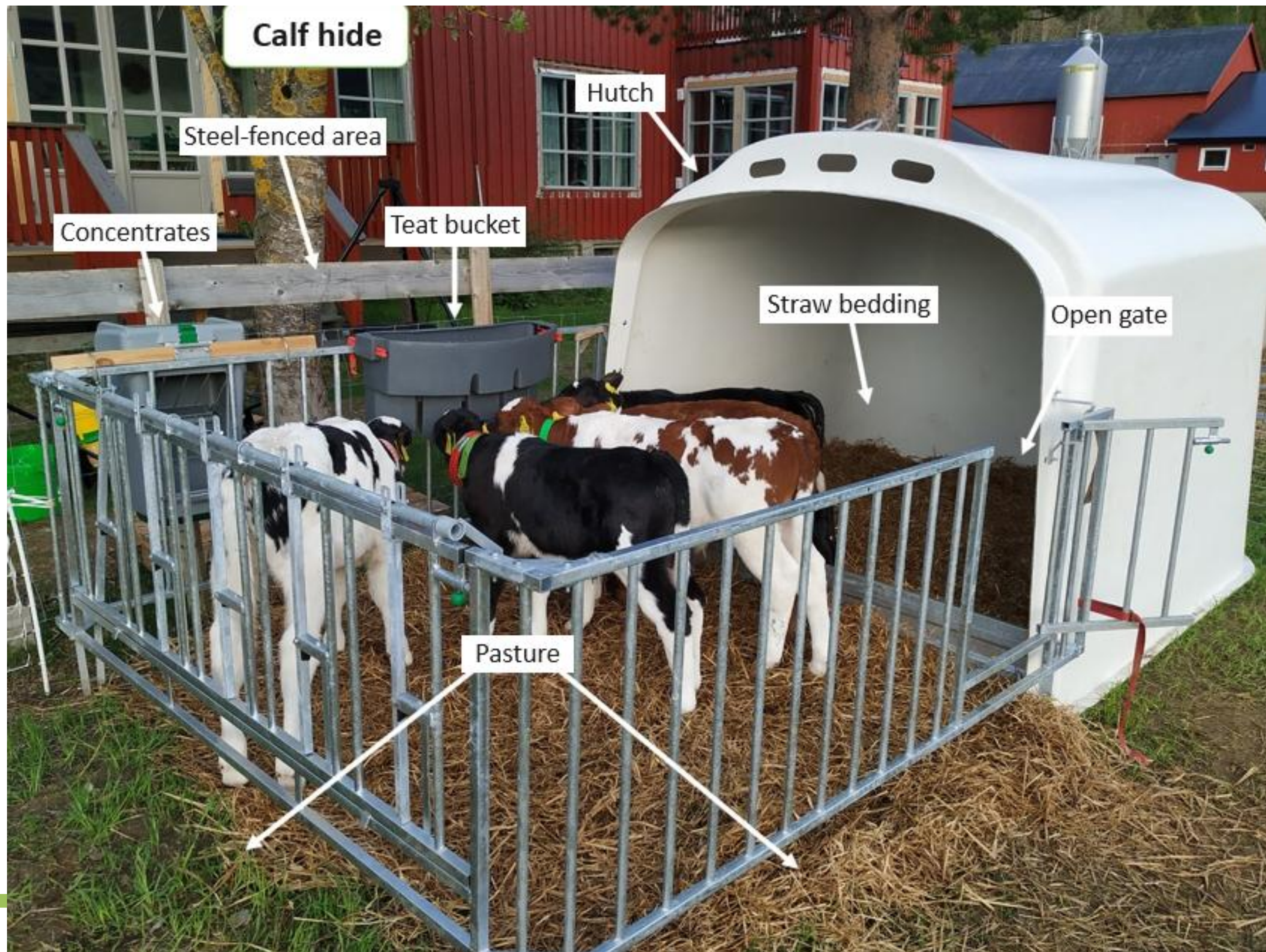
Om behandlingene



Behandling	CC (n=10 par delt i to grupper)		ES (n=10 par delt i to grupper)	
Uker etter kalving	Ku-kontakt	Dietilgang	Ku-kontakt	Melketilgang
0-3	Heldags	Fri, utenom under melking	1-3 t på kalvingsdagen, så ingen	12 L/kalv/dag (fire måltider)
4-6	Heldags	Fri, utenom under melking	Ingen	14 L/kalv/dag (fire måltider)
7	Deltid	Fence-line, utenom etter melking: 2 t morgen, 2 t kveld	Ingen	8 L/kalv/dag (to måltider)
8	Deltid	Fence-line, utenom etter melking: 1 t morgen, 1 t kveld	Ingen	4 L/kalv/dag (to måltider)
9	Full separasjon (hørbar og visuell kontakt)	Ingen (kyr flytta 120 m unna)	Ingen	Ingen

Setra i Nerskogen









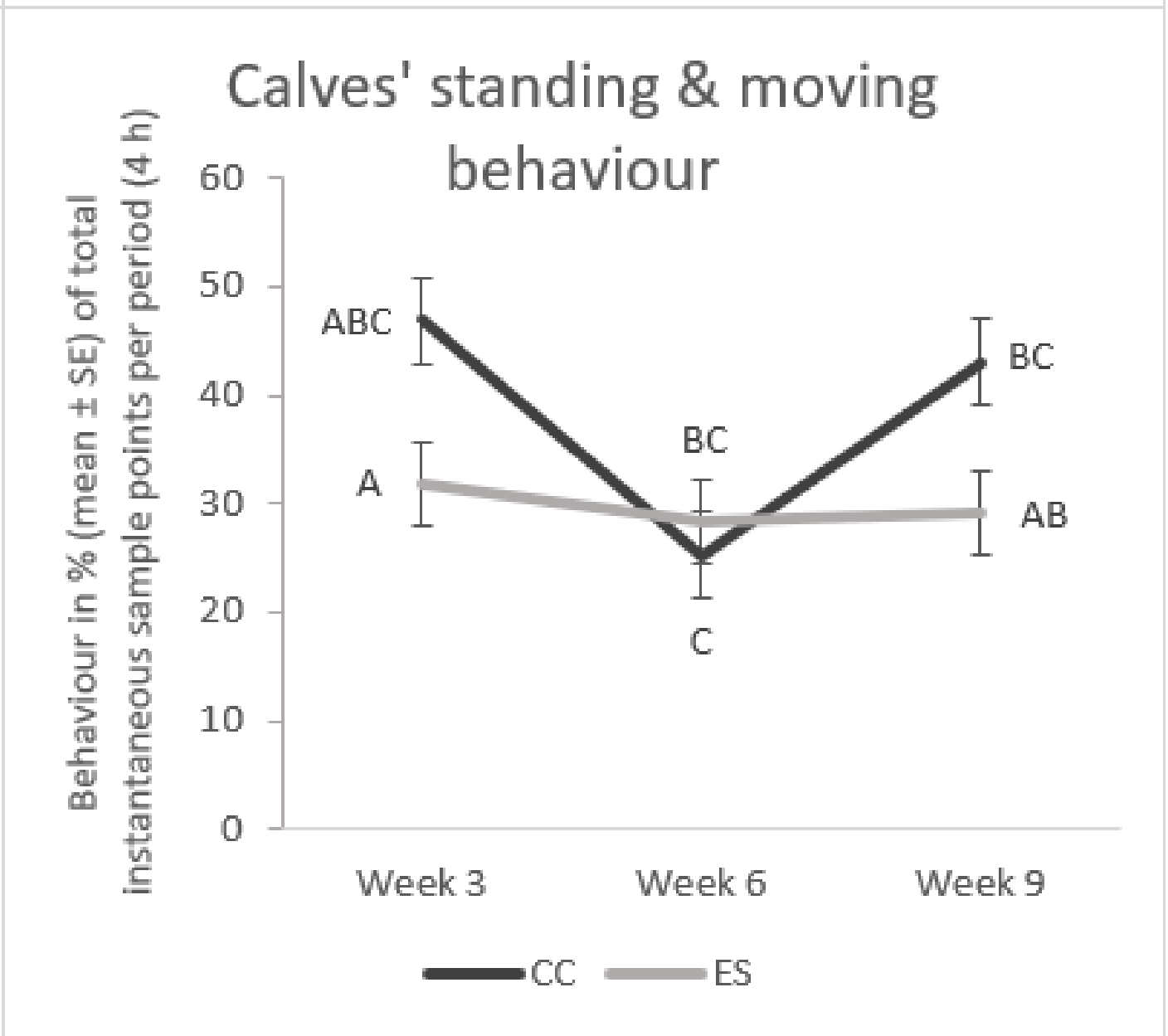
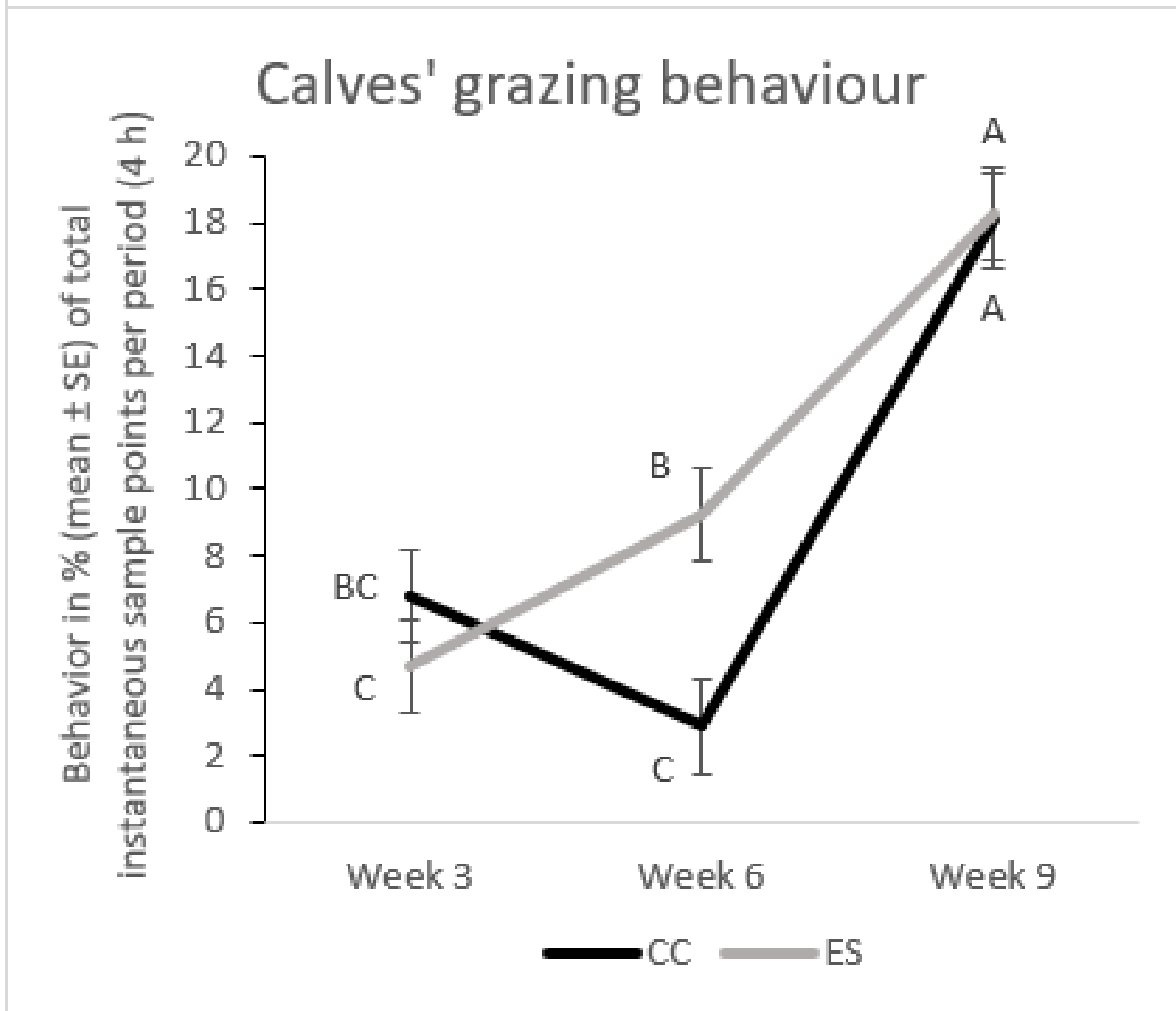
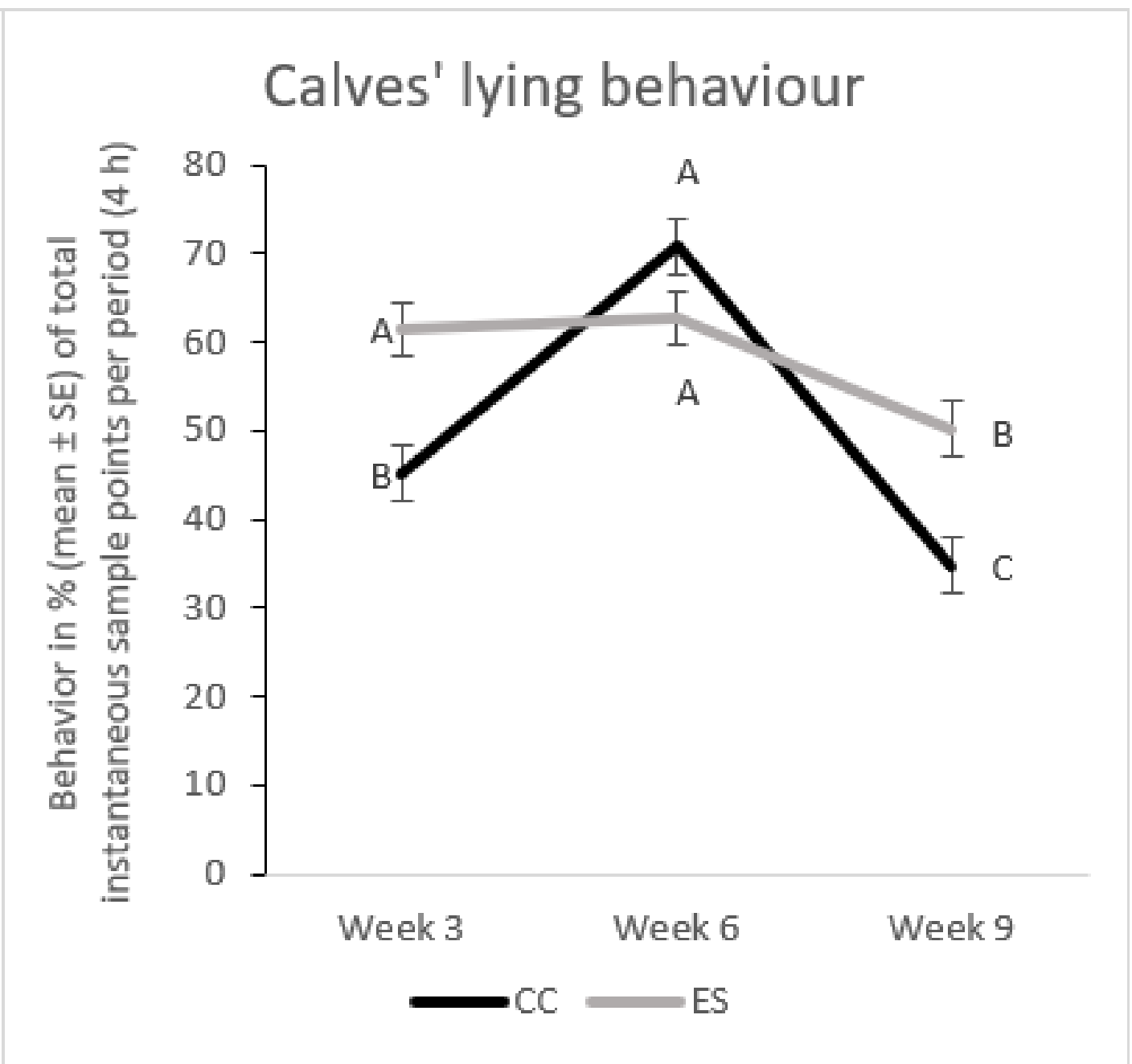
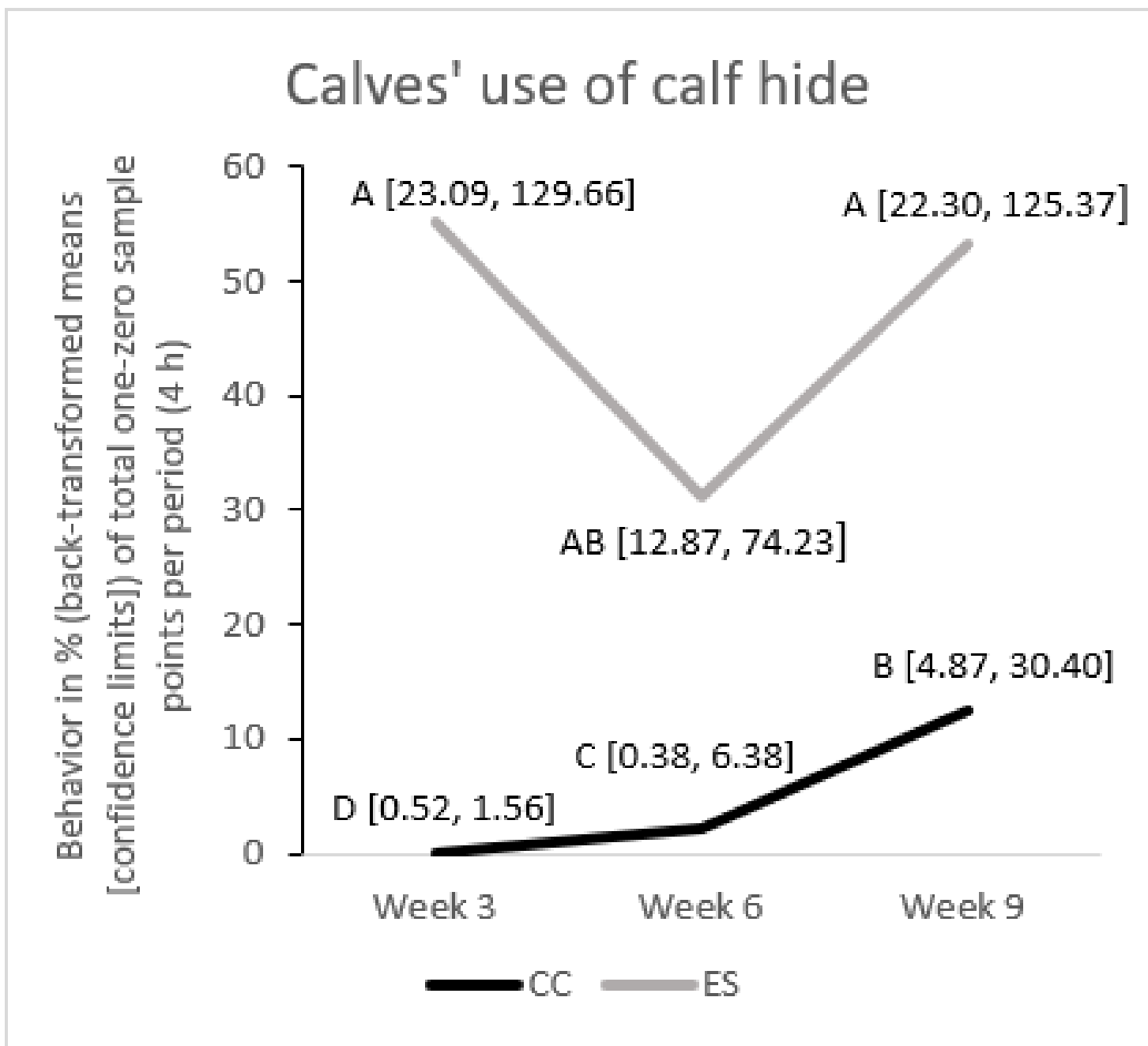


Resultater: Kalveatferd



Kalveatferd

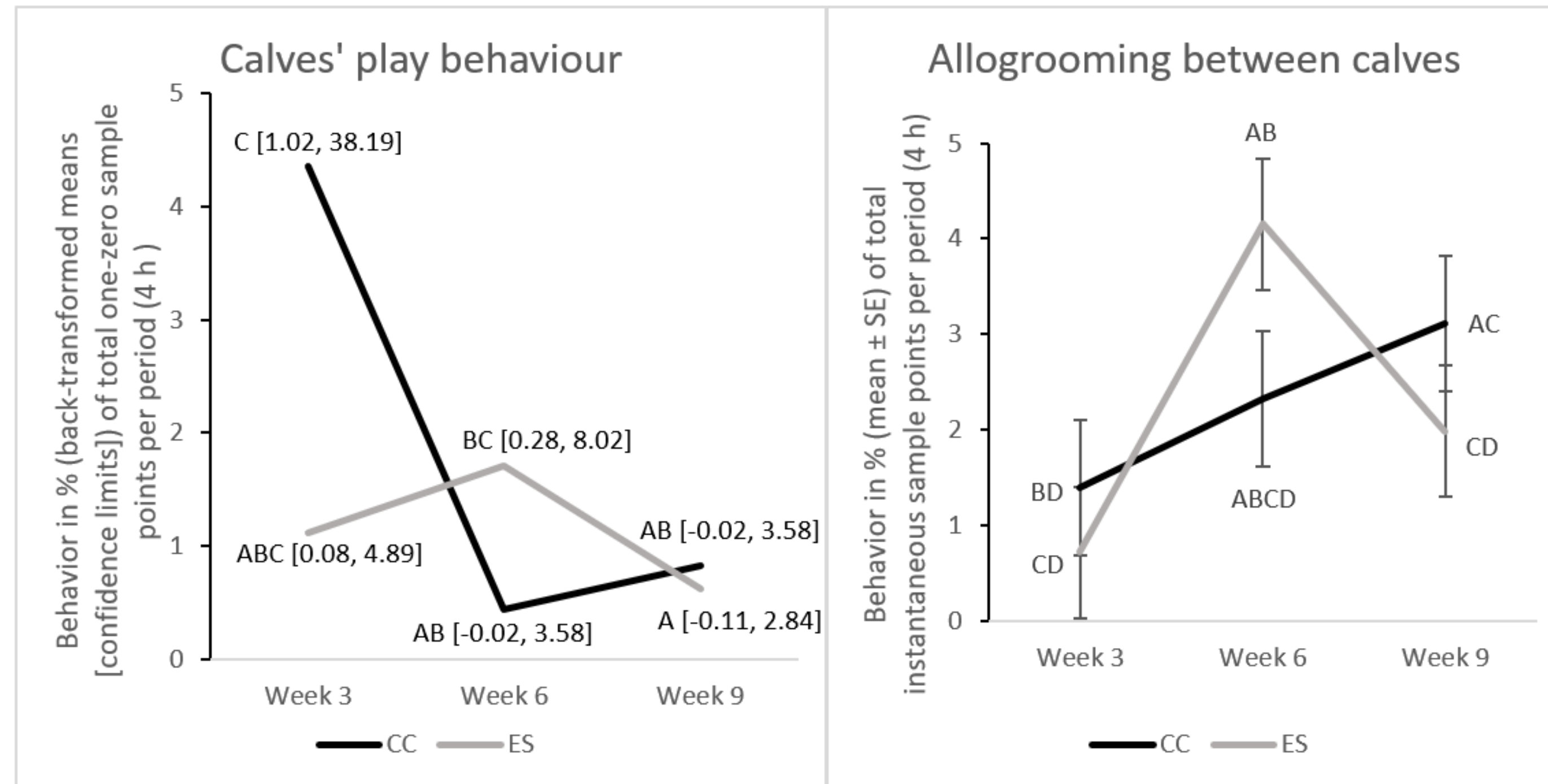
- CC brukte kalvehytta mindre, mer med alder
- Ligging: Ikke forskjell uke 6
- CC lå mindre enn ES uke 3 og 9
- Alle beita mer uke 9
- Ikke forskjell beiting CC og ES uke 9 og 3
- ES beita mer enn CC i uke 6



Kalveatferd

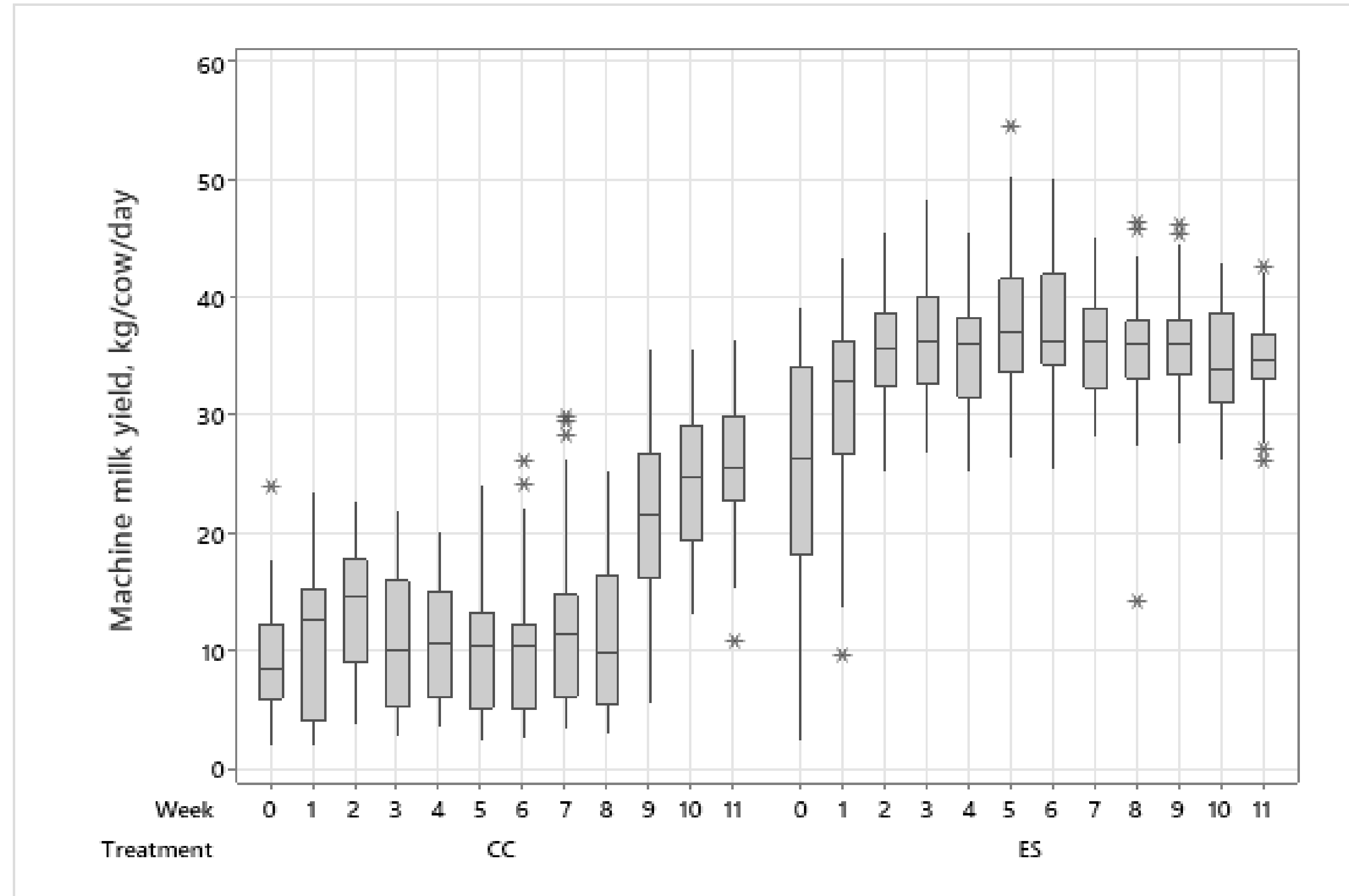


- Mest lek CC uke 3
- ES mer lek i uke 6 enn uke 9
- CC mer stell mellom kalver i uke 9 enn uke 3
- ES mer stell mellom kalver uke 6 enn 3 og 9
- Sosialt stell mellom ku og kalv (CC) likt i uke 3 og 6
- CC og ES brukte opptil 13 min på en periode med diing eller «drikker melk»
- CC vokaliserte mer enn ES etter avvenning



Maskinmelket ytelse hos kyr

- Uke 0-6: 11 vs 35 kg/ku/dag
- Lavere hos CC alle perioder



Sammensetning av kyrnes maskinmelkede melk

Uke 5:

- Forskjell fett men ikke sign.
- Forskjell på laktose og EKM

Etter forsøket (uke 14-18):

- Ingen forskjeller, men fortsatt lavere EKM hos CC

a. Variable	Treatment		Test statistics for treatment	
	CC (n=10)	ES (n=9)	DF Num, DF Den, F-value	P-value
Fat, g/kg	25.3 ± 2.22	32.3 ± 2.59	$F_{1.00, 2.43} = 4.48$	0.146
Protein, g/kg	31.3 ± 0.660	32.0 ± 0.756	$F_{1.00, 2.70} = 0.26$	0.500
Lactose, g/kg	43.8 ± 0.659	47.1 ± 0.814	$F_{1.00, 16.00} = 10.88$	0.005
ECM, kg/day¹	7.74 ± 2.11	33.8 ± 2.32	$F_{1.00, 2.18} = 72.32$	0.010
FFA, mEq/L	0.144 ± 0.0579	0.120 ± 0.0651	$F_{1.00, 2.36} = 0.07$	0.810
Urea, mmol/L	2.19 (0.675 ± 0.0373)	2.36 (0.650 ± 0.0402)	$F_{1.00, 2.07} = 0.21$	0.693
SCC, 10 ³ /mL	24.4 (3.23 ± 0.458)	47.8 (3.89 ± 0.565)	$F_{1.00, 16.00} = 0.89$	0.360
b. Variable	CC (n=8)	ES (n=8)		
Fat, g/kg	38.7 ± 2.51	38.4 ± 2.59	$F_{1.00, 1.98} = 0.01$	0.944
Protein, g/kg	34.4 ± 0.764	35.1 ± 0.888	$F_{1.00, 13.00} = 0.40$	0.536
Lactose, g/kg	47.3 ± 0.756	46.8 ± 0.807	$F_{1.00, 1.78} = 0.24$	0.675
ECM, kg/day ¹	23.2 ± 2.27	26.2 ± 4.54	$F_{1.00, 1.98} = 0.89$	0.447
FFA, mEq/L	0.505 ± 0.107	0.703 ± 0.124	$F_{1.00, 13.00} = 1.64$	0.222
Urea, mmol/L	5.19 ± 0.365	5.57 ± 0.375	$F_{1.00, 1.98} = 0.55$	0.535
SCC, 10 ³ /mL	39.6 ± 84.44	167.6 ± 98.03	$F_{1.00, 13.00} = 1.10$	0.313

Kyr – Hold og kroppsvekt

- Nedgang hos alle
- Sign. større nedgang i kroppsvekt hos ES-kyr

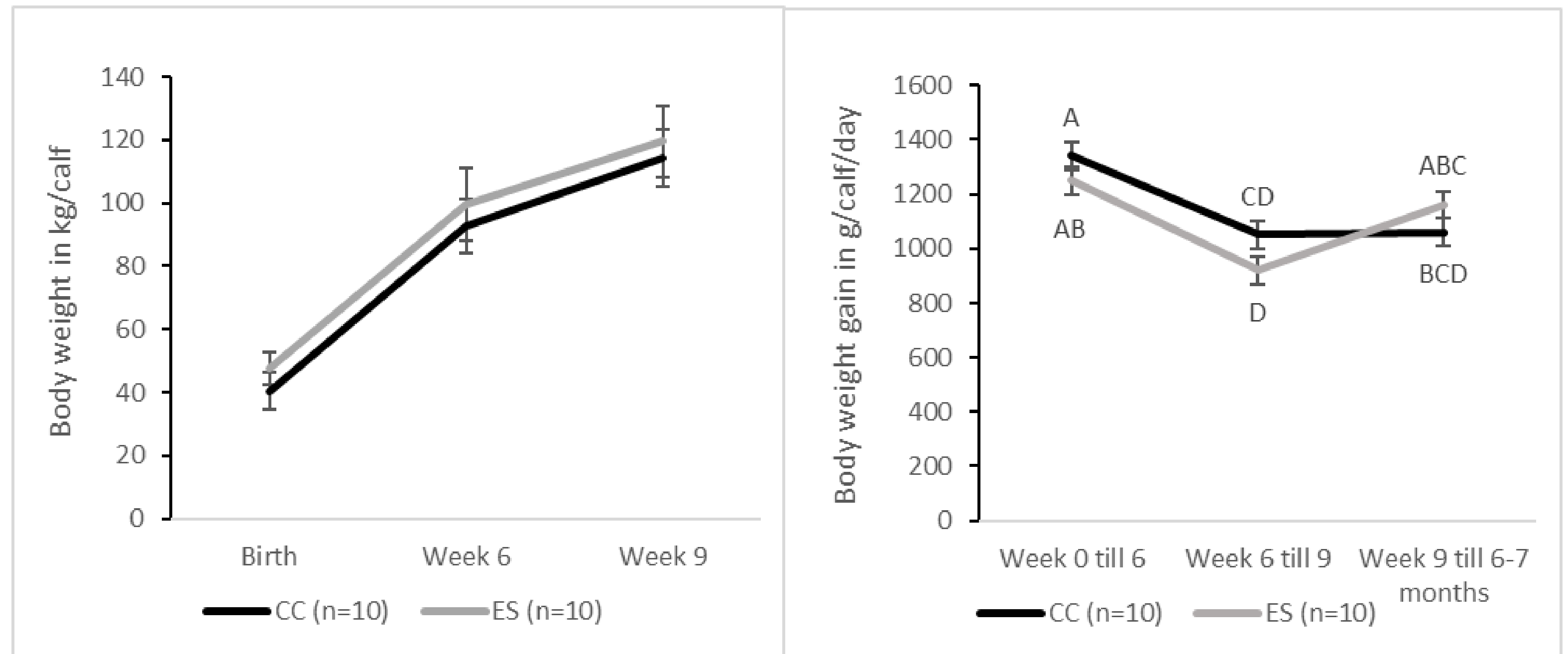
	Treatment		Test statistics for treatment	
	CC (n=10)	ES (n=9)	DF Num, DF Den, F-value	P-value
Cow BCS decrease	0.016 ± 0.003	0.023 ± 0.004	$F_{1.00, 16.00} = 2.16$	0.161
Cow BW decrease	913 ± 143.5	1415 ± 177.2	$F_{1.00, 16.00} = 5.32$	0.035



Kalver – Kroppsvekt og tilvekst

Tilvekst:

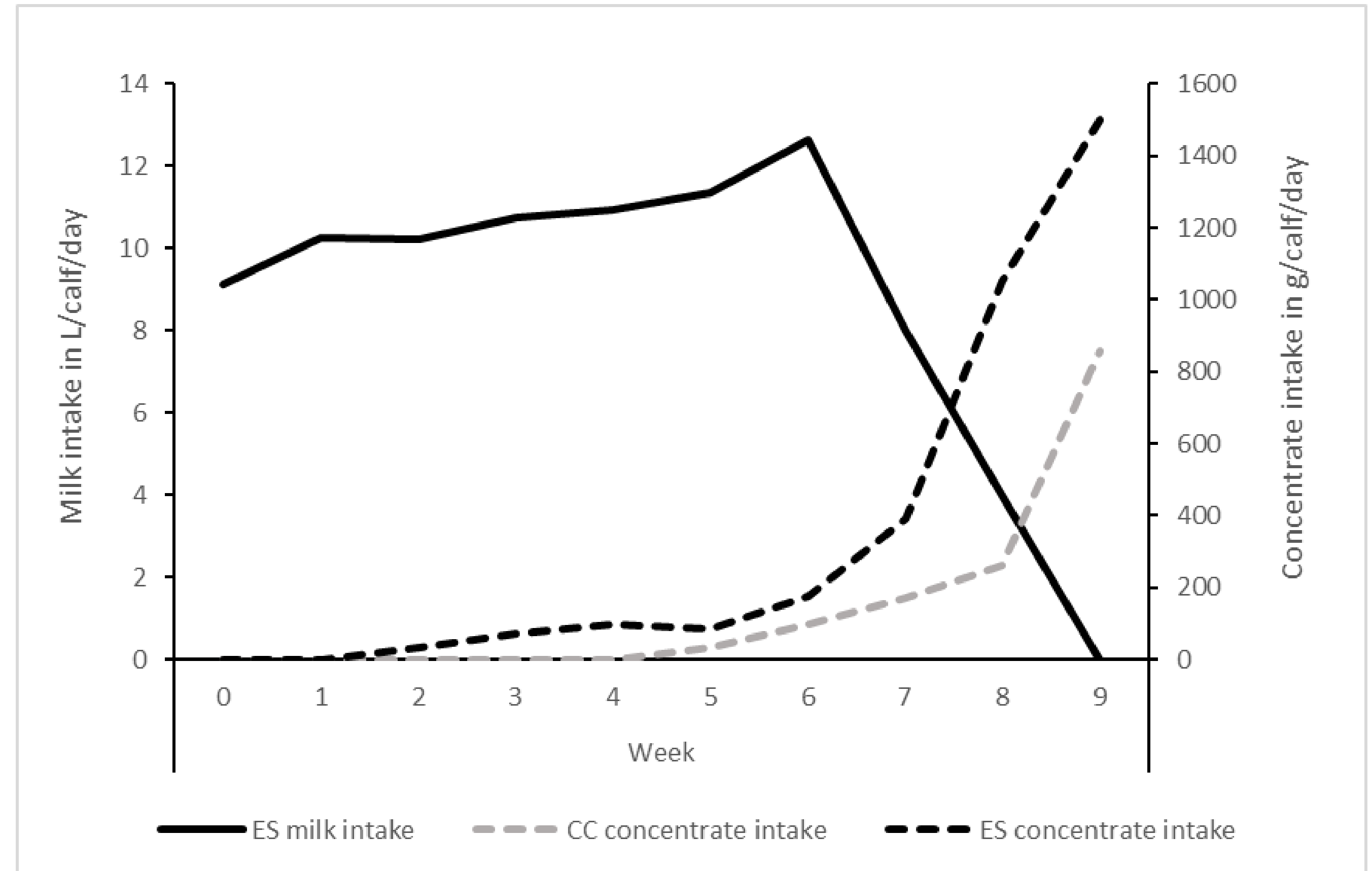
- CC: 1.15 vs ES: 1.11 kg/kalv/dag (uke 0 til 6-7 mnd)
- Ingen forskjeller innen hver av periodene
- Nedgang under avvenning



Calf BWG, Treatment*Period						Test statistics for treatment	
CC (n=10)			ES (n=10)			DF Num, DF Den, F-value	P-value
Birth-6 w	6-9 w	9 w-6-7 mo	Birth-6 w	6-9 w	9 w-6-7 mo		
1341 ± 49.7 ^A	1045 ± 49.7 ^{CD}	1058 ± 49.7 ^{BCD}	1254 ± 48.1 ^{AB}	920 ± 48.1 ^D	1164 ± 50.5 ^{ABC}	F _{2,00, 52.00} = 3.22	0.048

Kalv – Inntak melk og kraftfôr

- Vet ikke mengder CC-kalvene drakk..
- ES: Melkeinntak: 10.7 L/kalv/dag uke 0-6 (tilgang 12-14 L)
- ES: Spiste mer kraftfôr



Helse – Ku og kalv

- Noe diare hos CC og ES
- Noe hosting hos ES2
- Allmenntilstand ikke påvirket
- Generelt god helse hos alle

- Utfordring: Nedgiing av melk ved melking av CC kyr
- Spesielt tre førstegangskalvere
- Spesielt ved avvenning og separasjon
- Bekymringer om mastitt og forlenget lavere melkeytelse – Oxytocin-injeksjoner gitt
- Bare de to eldste CC kyrne ble ansett å ha normal nedgiing av melk

Health incident, cows	Item	CC1 (n=5)	CC2 (n=5)	ES1 (n=4)	ES2 (n=5)
Fecal consistency > 3	No. cows	0	1	4	2
Coughing score > 1	No. cows	0	0	0	0
Lameness	No. cows	0	0	0	0
Mastitis, clinical ¹	No. cows	1	2	1	1
Teat wounds/udder injuries	No. cows	1	2	0	2
Inhibited milk ejection	No. cows	3	5	0	0
Oxytocin in. week 0-6	No. of treatments	12	2	-	-
Oxytocin in. week 7-9	No. of treatments	26	26	-	-
Health incident, calves		CC1 (n=5)	CC2 (n=5)	ES1 (n=5)	ES2 (n=5)
Fecal consistency > 3	No. calves	1	3	5	5
Coughing (scores 1-2)	No. calves	0	0	0	4
Lameness	No. calves	0	0	0	0

Oppsummering forsøk

- Kalveatferd påvirket av CC (avhengig av alder)
- Lavere maskinmelket ytelse hos CC kyr, også etter separasjon
- Utfordring: Nedgiing av melk
- Lavere laktose i melk hos CC kyr ved diing
- Lik melkesammensetning etter forsøket
- Ikke forskjell kalvetilvekst og kalvehelse



Videre arbeid

- Review-artikkel med andre forskere om fremtidig forskning
- NORSØK-rapport fra spørreundersøkelse blant norske forbrukere 2024
- Metoder for separasjon og avvenning for å redusere stress?
- Metoder for å forbedre nedgiing av melk hos CCC-kyr på beite?
 - Undersøke bruk av mobil melkerobot på beite
- Venter på svar på en annen søknad...

NORSØK får 800.000 kr til mjølkerobot-prosjekt

Møre og Romsdal fylkeskommune løyver 800.000 kroner i stønad til NORSØK-prosjektet «Mobile mjølkerobotar for auka beitebruk».

Det har kompetanse- og næringsutvalet einstemmig vedtatt.

Med midlane på plass skal Norsk senter for økologisk landbruk (NORSØK) undersøke moglegheitene og interesse blant bønder i Møre og Romsdal for å ta i bruk mobil mjølkerobot for å auke beitebruk i mjølkeproduksjonen. Ein mobil mjølkerobot er ein mjølkerobot plassert i ein flyttbar konteiner, som kan flyttast dit dyra går på sommarbeite, så lenge det er tilgang på vatn og straum.

Gjere beiteareal meir tilgjengeleg

Prosjektet foreslår å utnytte mobile mjølkerobotar for å gjere beiteareal meir tilgjengeleg for mjølkeproduksjon. Og dei vil undersøke om det er praktisk, teknisk og økonomiske fordelar å velje mobil mjølkerobot ved ombygging til lausdrift viss det samtidig kan bidra til auka beitebruk, eller å oppretthalde dagens beitebruk gjennom fellesbeite eller seterdrift. Prosjektet skal også sjå på dyrevelferd med ku og kalv, samt sjå på løysningar som reduserer vassforbruket.

Takk for meg! 😊

