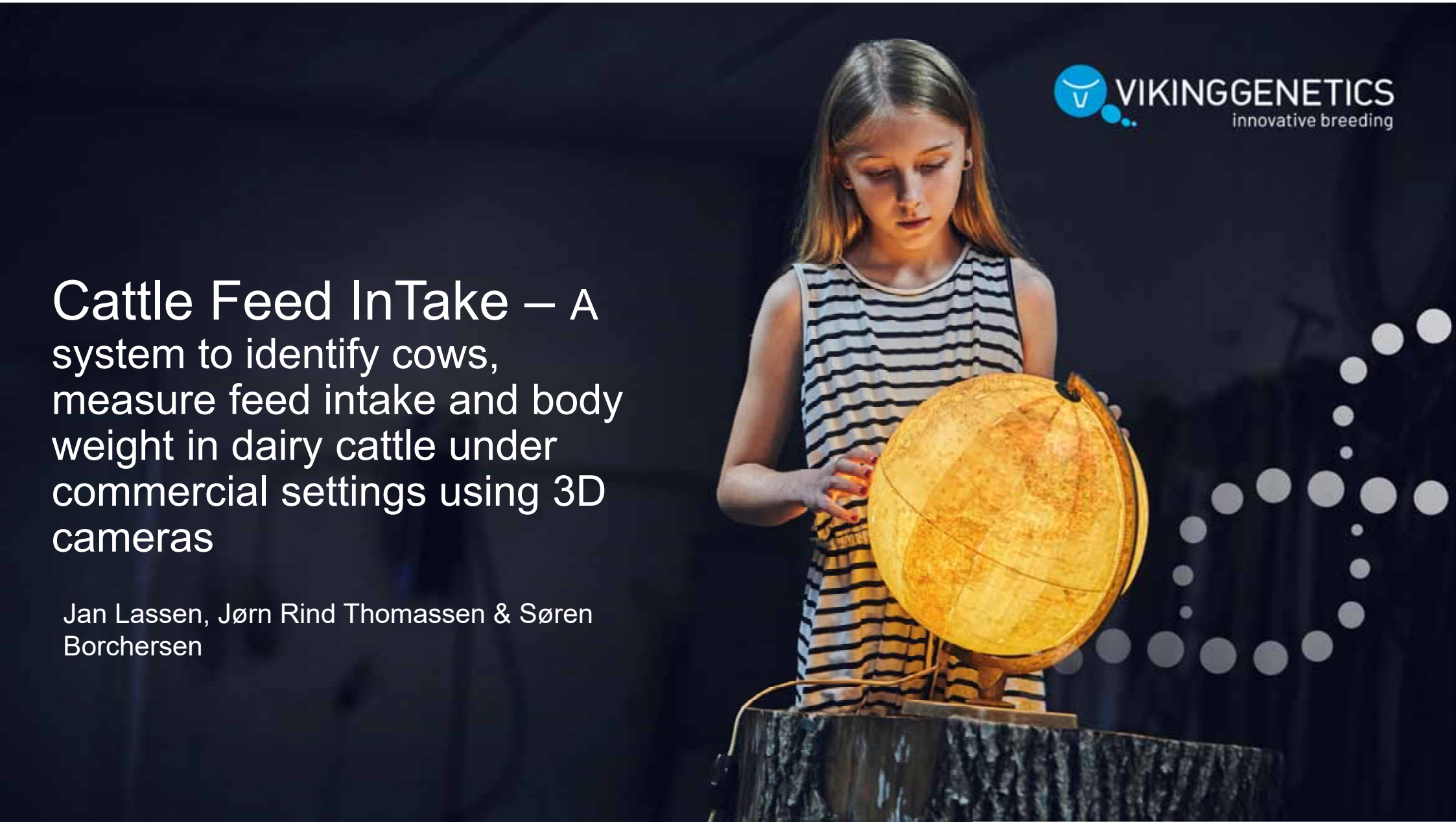
Cattle Feed InTake – A system to identify cows, measure feed intake and body weight in dairy cattle under commercial settings using 3D cameras

Jan Lassen, Jørn Rind Thomassen & Søren Borchersen



CFIT – Cattle Feed InTake

Vision with CFIT

- Identification of the individual cow
- Individual feed intake pr cow pr day
- Individual body weight pr cow pr day

- Used for breeding value estimation
- Used for management on farm

- Cow behaviour, health and reproduction
- Continued developement

Documentation

- 6 patentes
  - ID
  - Weight
  - Feed intake
  - Lameness/mobility


Animal 18 (2024) 101178

Contents lists available at ScienceDirect

Animal

The international journal of animal biosciences

Feed intake in housed dairy cows: validation of a three-dimensional camera–based feed intake measurement system

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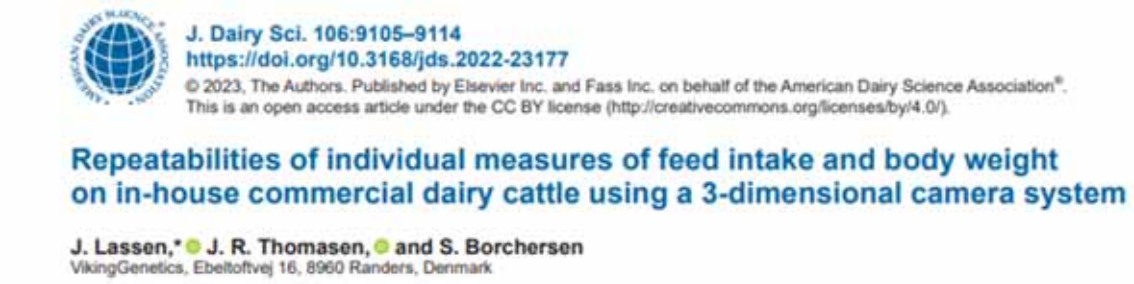
frontiers | Frontiers in Genetics

Original Research
05 January 2023

Supervised learning techniques for dairy cattle body weight prediction from 3D digital images

Grum Gebreyesus[1]*, Viktor Milkevych[1], Jan Lassen[1,2] and Goutam Sahana[1]


J. Dairy Sci. 106:9105–9114
https://doi.org/10.3168/jds.2022-23177

Repeatabilities of individual measures of feed intake and body weight on in-house commercial dairy cattle using a 3-dimensional camera system

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VG strategy is based on:

- Full lactations are necessary in all lactations
- Research farm data will not provide enough data
- The research farm approach is too expensive, time consuming and impractical in commercial farms
- Data from normal production herds are needed for documentation

Installations CFIT

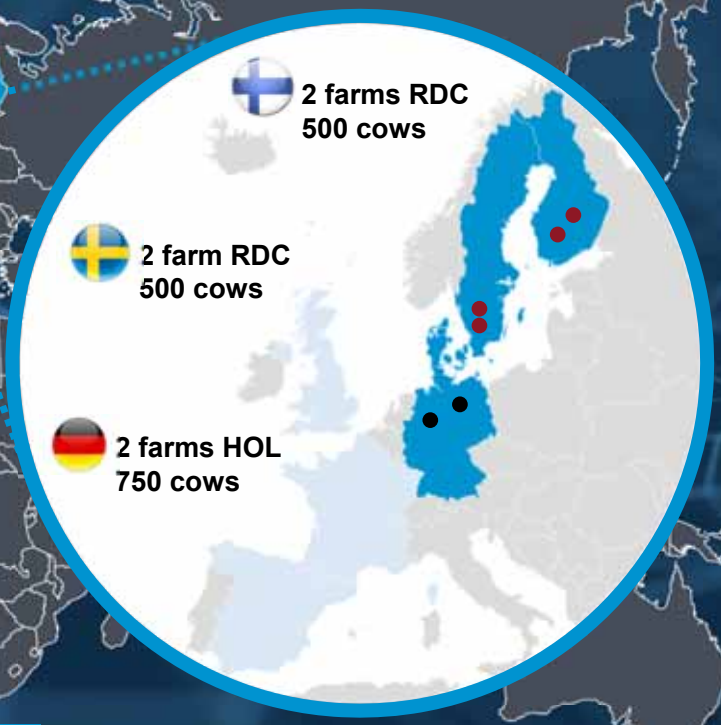
May 2026

VIKINGGENETICS
innovative breeding

42 herds in **4** countries

12 of these have methane sniffers

We measure on 10000 cows every day



	# cows	# farms
	7,600	12
	7,800	11
	11,500	16

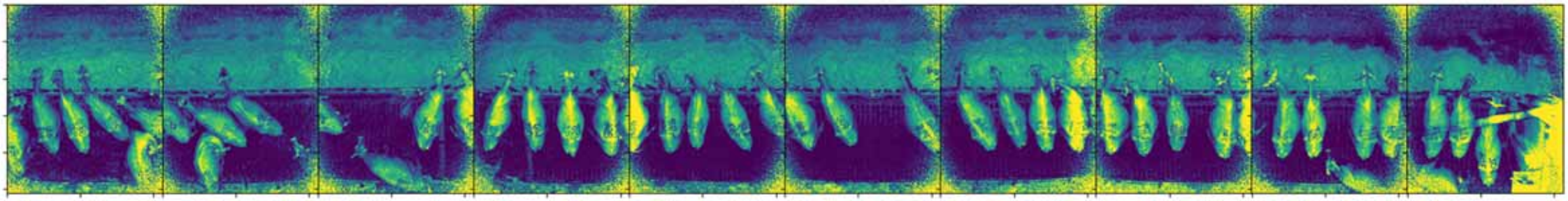
All measured since 2021

CFIT installed

Negotiating agreements

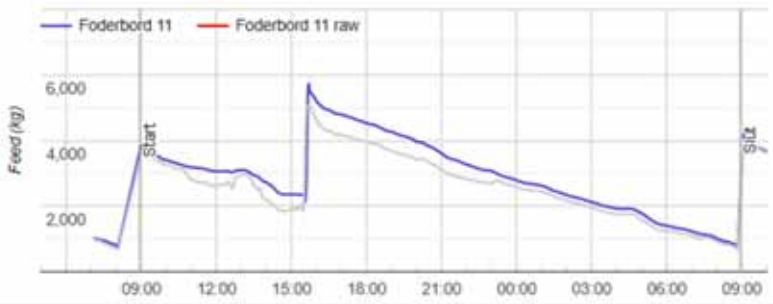
Genetic evaluation for efficiency

- CFIT feed intake and weight data used in genetic evalution in NAV countries (Denmark, Sweden and Finland)
- Single trait analysis for DMI, BW and ECM combined into an index called saved feed
- Selection for high yielding, efficient and smaller cows.

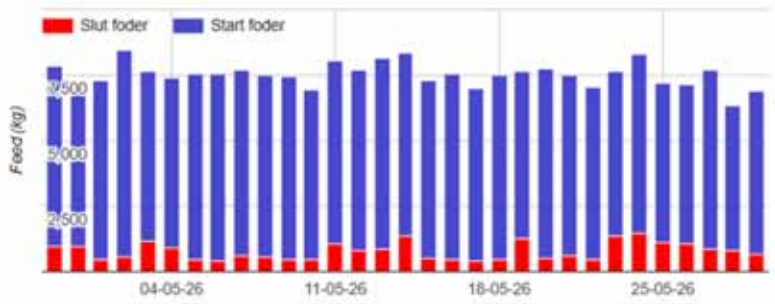


Data for farmer

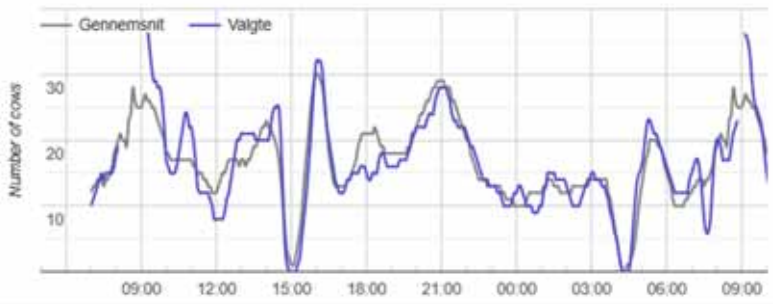
Total amount of feed



Amount of feed at start /end of day

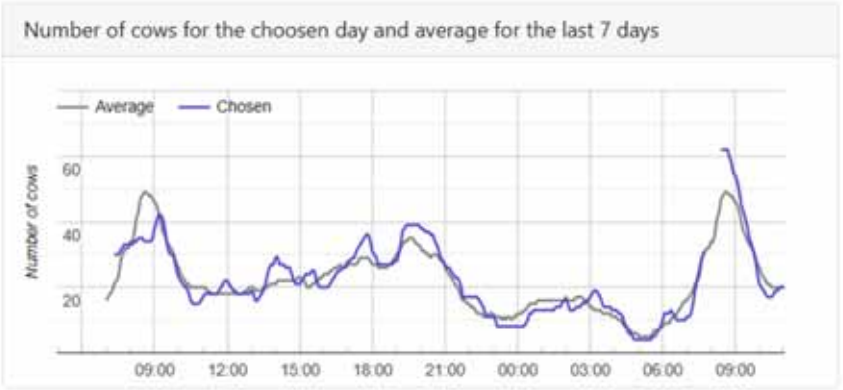


Number of cows for the choosen day and average for the last 7 days



Average feed intake pr cow

Cows at feeding table vs milking system

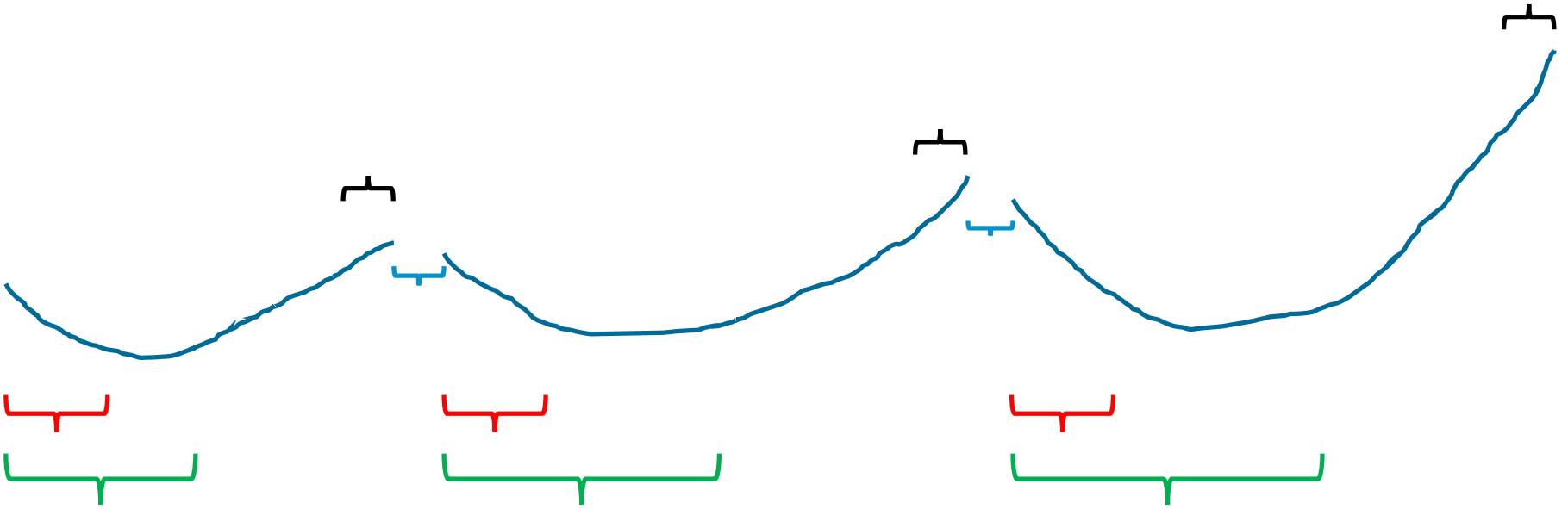


Weight developement early lact

Weight developement dry period

Days from calving at minimum weight

Weight change in late lactation

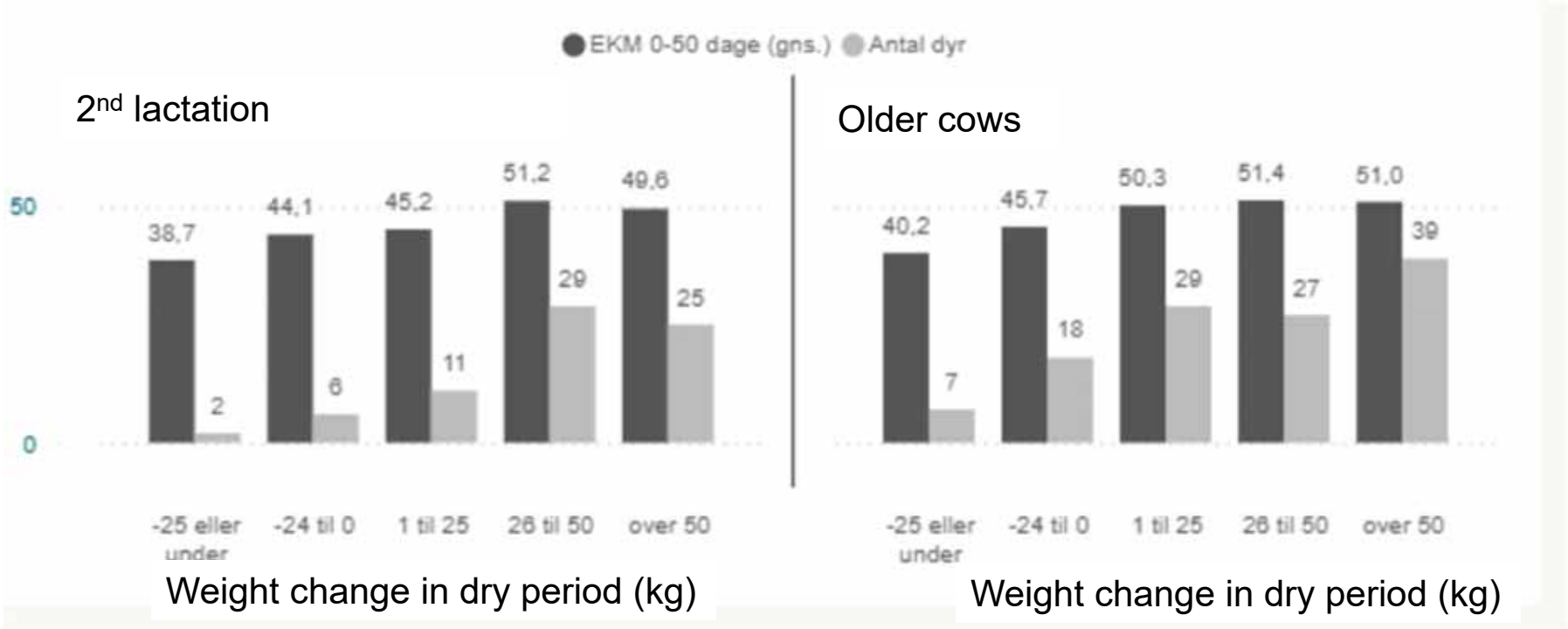


1. lact

2. lact

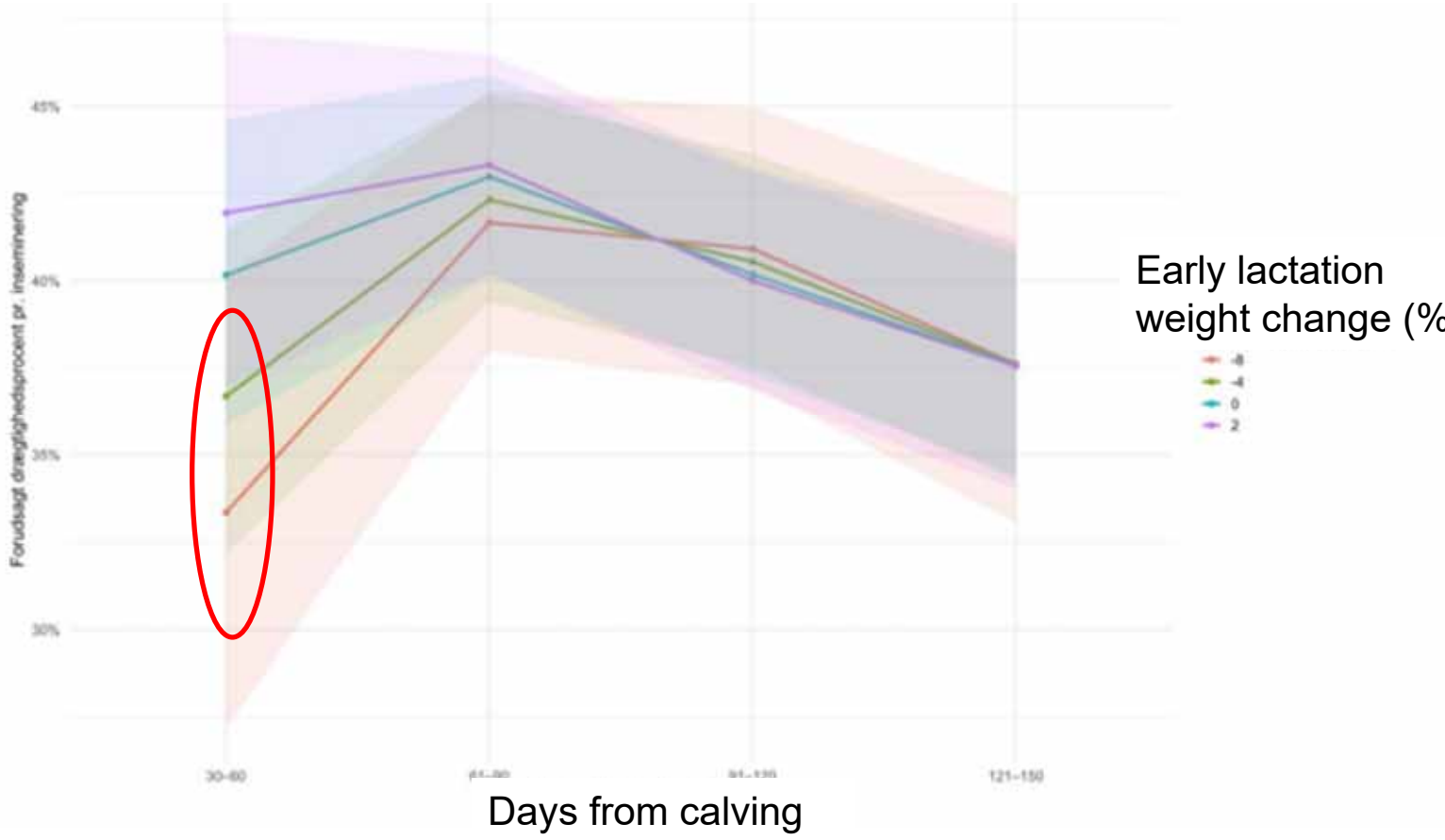
3. lact

Effect of weight change in dry period on yield in following lactation



Weight change in early lactation vs pregnancy rate

- Large weight loss in early lactation gives lower probability for early pregnancy



Weight change during lactation

0-80 Days in milk

	LAKT. NR.	DG. E. KÆLV.	VÆGT KG (CFIT)	VÆGTÆNDRING KG/D (CFIT)	KG. EKM	MÅL EKM	AFV. MÅL EKM	CELLETAL
Gennemsnit	2	42	700	-0,53	47,6	46,0	0,7	151
Summeret	141	2.628	39.874	-27,43	2.380,2	2.344,3	35,9	7.379
Antal dyr	62	62	57	52	50	51	51	49

60-150 Days in milk

	LAKT. NR.	VÆGT KG (CFIT)	VÆGTÆNDRING KG/D (CFIT)	DG. E. KÆLV.	KG. EKM	AFV. MÅL EKM	ANTAL INS.	DG. E. INS.
Gennemsnit	3	696	0,18	125	47,3	0,8	2	22
Summeret	246	59.149	15,53	10.975	4.166,2	73,7	73	936
Antal dyr	88	85	85	88	88	88	46	42

200-350 Days in milk

	LAKT. NR.	VÆGT KG (CFIT)	VÆGTÆNDRING KG/D (CFIT)	DG. E. KÆLV.	KG. EKM	MÅL EKM	AFV. MÅL EKM	CELLETAL
Gennemsnit	2	726	0,28	267	39,3	39,1	0,2	157
Summeret	230	60.958	23,68	25.095	3.416,5	3.401,6	14,9	13.639
Antal dyr	94	84	84	94	87	87	87	87

Weight and survival

- Average weight in all breeds is highest in third lactation

Lactation	RDC	HOL	JER
1	589	616	431
2	646	674	469
3	681	717	490
4	675	709	488
5	675	701	480
6	669	704	466

- In general the heavy cow does not get very old
- The hoves on a cow that weighs 600 kg is more or less the same size as on a cow that weighs 800 kg
- If you select for heavy cows you need a very good environment to compensate for the extra harm this selection provides.

Sum up

- 3D cameras can measure feed intake and body weight at an individual level
- These data can be used for improved management and genetic evaluation
- We have implemented a saved feed index
- We see very few arguments to select for heavier cows
- We strongly believe that direct selection for the trait you want to improve is the right way to do selection