HETEROGENEITY OF 3D CAMERAS FEED INTAKE HERITABILITIES IN FIRST PARITY HOLSTEIN, JERSEY AND NORDIC RED COWS

Session: New traits and proxies from sensor technologies for breeding purposes

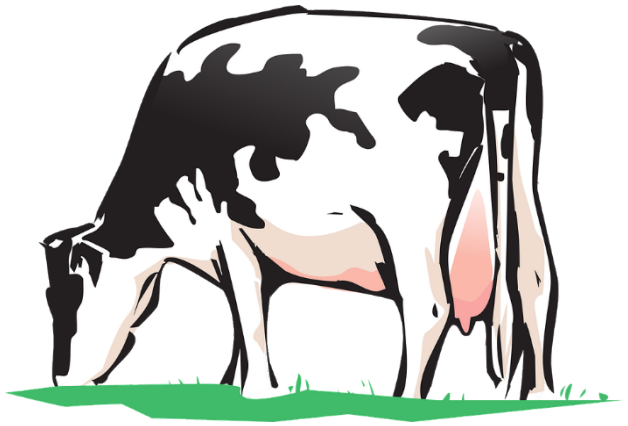
C.I.V. Manzanilla-Pech, R. B. Stephansen, J. Lassen.

AARHUS UNIVERSITY
TECHNICAL SCIENCES

RESIDUAL FEED INTAKE AS FEED EFFICIENCY

NAV introduces an index for Saved feed with maintenance efficiency as a first step

Rasmus S. Stephansen (NAV/SEGES), Anders Fogh (NAV/SEGES), Emma Carlen (NAV/Växa) and Terhi Vahlsten (NAV/Faba)



Large number of records for DMI and BW are needed to develop breeding values

3D CAMERA TECHNOLOGY

Individual measure of feed intake on in-house commercial dairy cattle using 3D camera technology

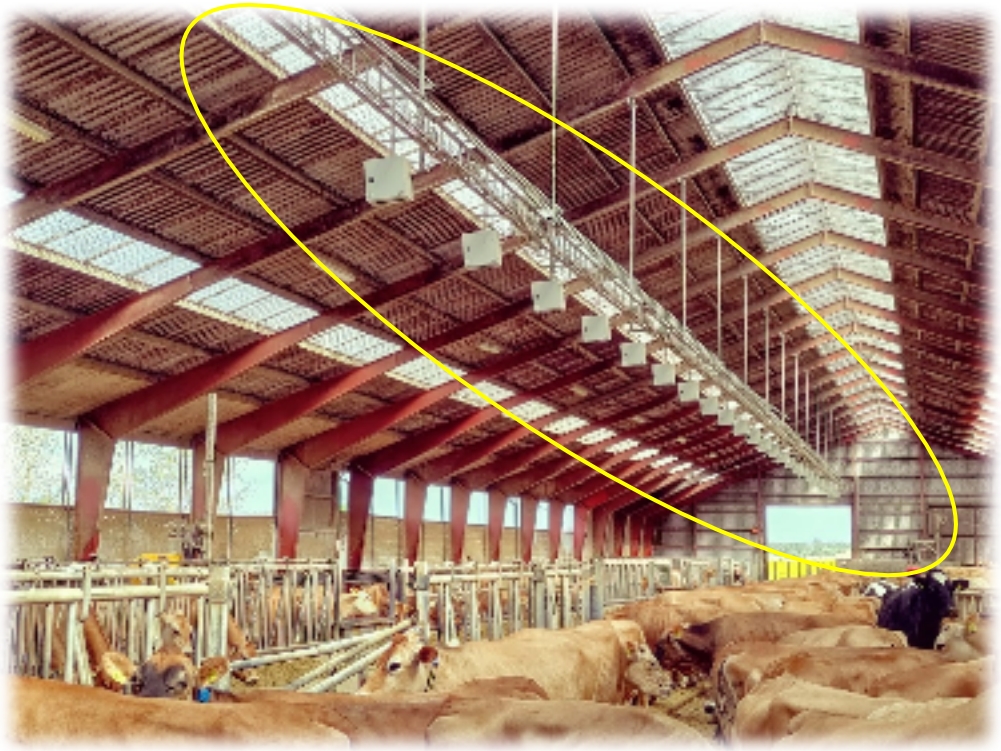
Abstract

Using 3D camera technology, feed intake was measured in a commercial farm. Results showed that measures were highly repeatable from day to day and from week to week in a period of 14 consecutive days. Also the feed intake measures were highly positively correlated to milk production, positively correlated to days in milk in the first 70 days in lactation and negatively correlated to days in milk from 70 days in milk and later. The method is cheap, noninvasive and does not affect the everyday routine for the farmer.

Jan Lassen, Jørn Rind Thomasen, Rikke Hjort Hansen, Glenn Gunnar Bri Nielsen, Eli Olsen, Peter Rene Bolvi Stentebjerg, Niels Worsøe Hansen, Søren Borchersen

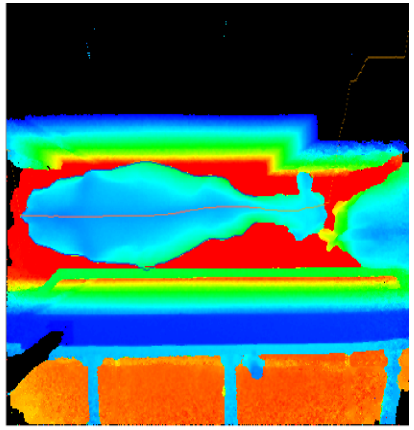
Repeatabilities of individual measure of feed intake and body weight on in-house commercial dairy cattle using a 3D camera system. *Accepted in JDS*

Lassen, et al. 2018, 2023

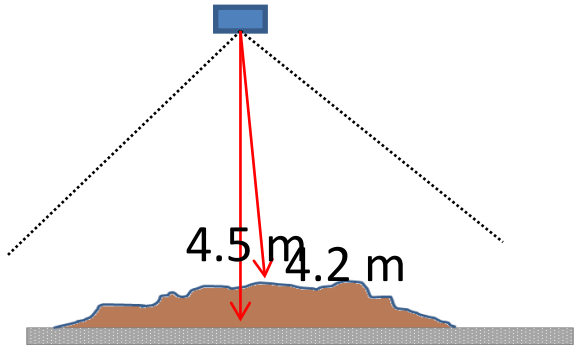


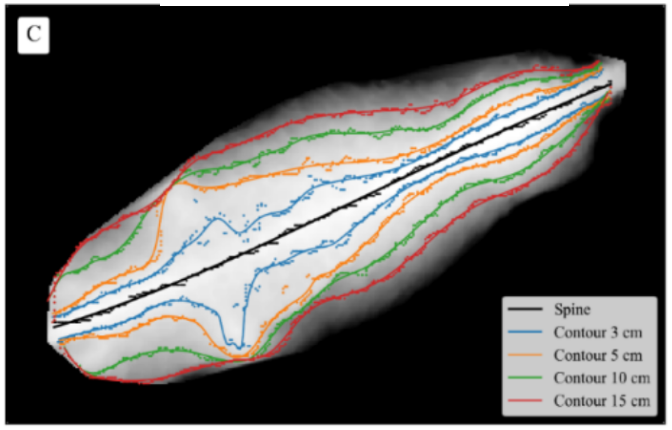
CFIT SYSTEM

- Identify the animal

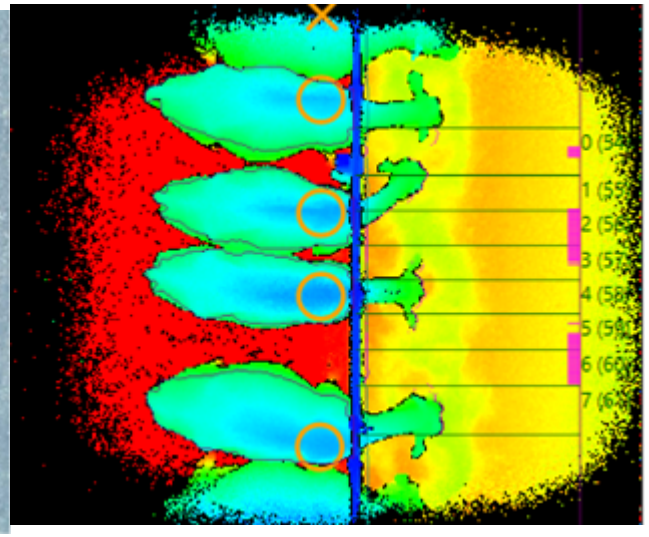


- Predicted body weight base on their back



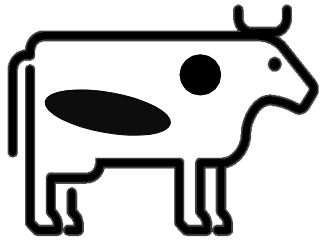


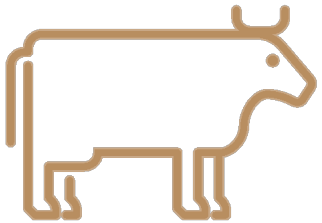
- Measure individual feed intake

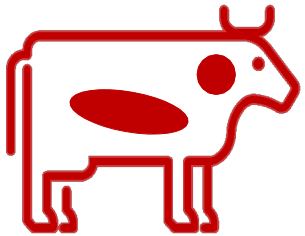


OBJECTIVES

Estimate heritabilities for **DMI and BW** measured by 3D cameras across lactation week in **first parity** Holstein (HOL), Jersey (JER), and Nordic Red (NR) cows

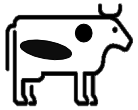






DATA DESCRIPTION

- 7 HOLSTEIN farms (since 2020)



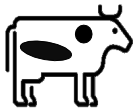
  - 41.8 weekly records on DMI and BW
  - 1.9K cows
- 5 JERSEY farms (since 2019)

  - 33.2K weekly records on DMI and BW
  - 1.4K cows
- 7 NORDIC RED farms (since 2020)

  - 33.8K weekly records on DMI and BW
  - 1.6K cows

DATA DESCRIPTION

- 7 HOLSTEIN farms (since 2020)



  - 41.8 weekly records on DMI and BW
  - 1.9K cows
- 5 JERSEY farms (since 2019)

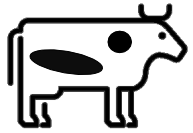
  - 33.2K weekly records on DMI and BW
  - 1.4K cows
- 7 NORDIC RED farms (since 2020)

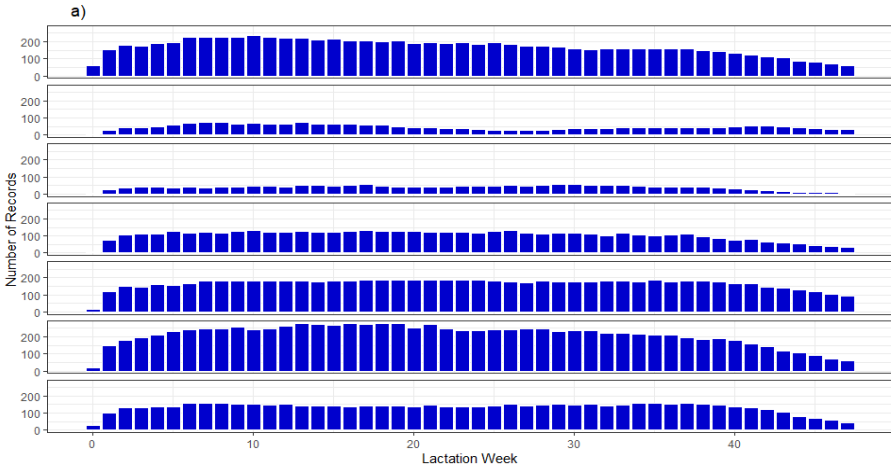
  - 33.8K weekly records on DMI and BW
  - 1.6K cows

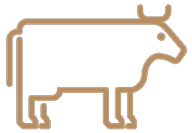
First parity cows

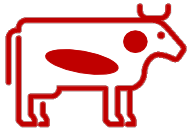
Latest update July 23

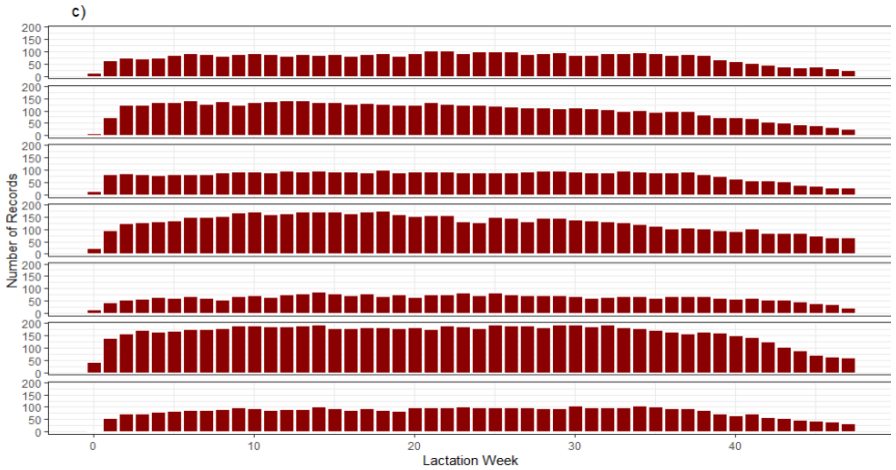
DATA DISTRIBUTION











RANDOM REGRESSION MODEL with LEGENDRE POLYNOMIALS (LG)

$$y = Xb + Z_1a + Z_2c + e$$

RANDOM REGRESSION MODEL with LEGENDRE POLYNOMIALS (LG)

animal = *2nd order LG*

$$y = Xb + Z_1a + Z_2c + e$$

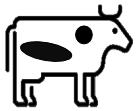
week = 44 *LG 3rd order*

environment = *2nd order LG*

age = 21-28 months

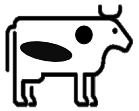
herd*year*season = 53-67

MEANS (SD)

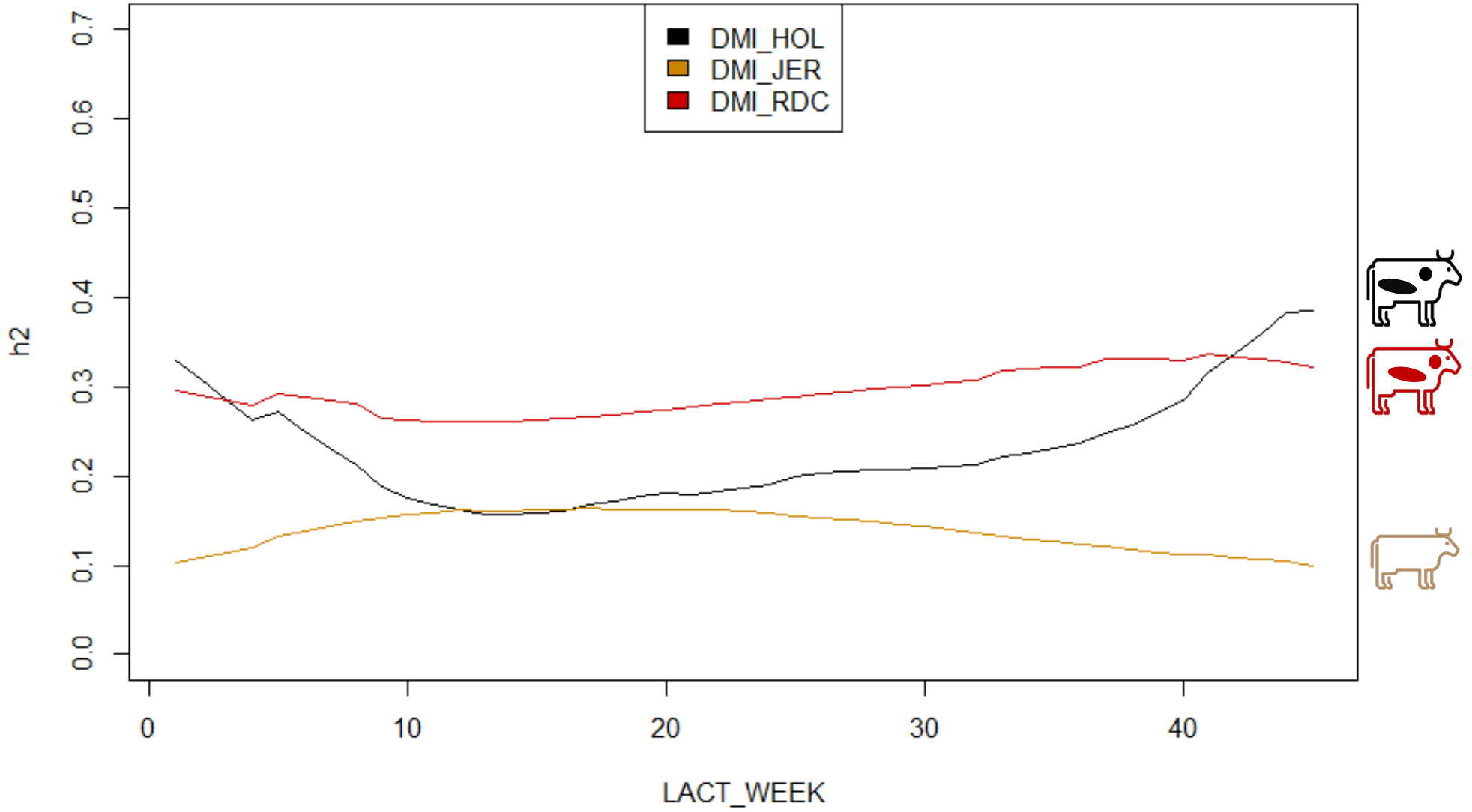


Trait	unit	HOLSTEIN	JERSEY	RDC
DMI	kg/d	23.8 (3.4)	19.9 (4.0)	23.5 (3.7)
BW	kg	621.4 (59.6)	431.5 (34.4)	603.9 (62.4)

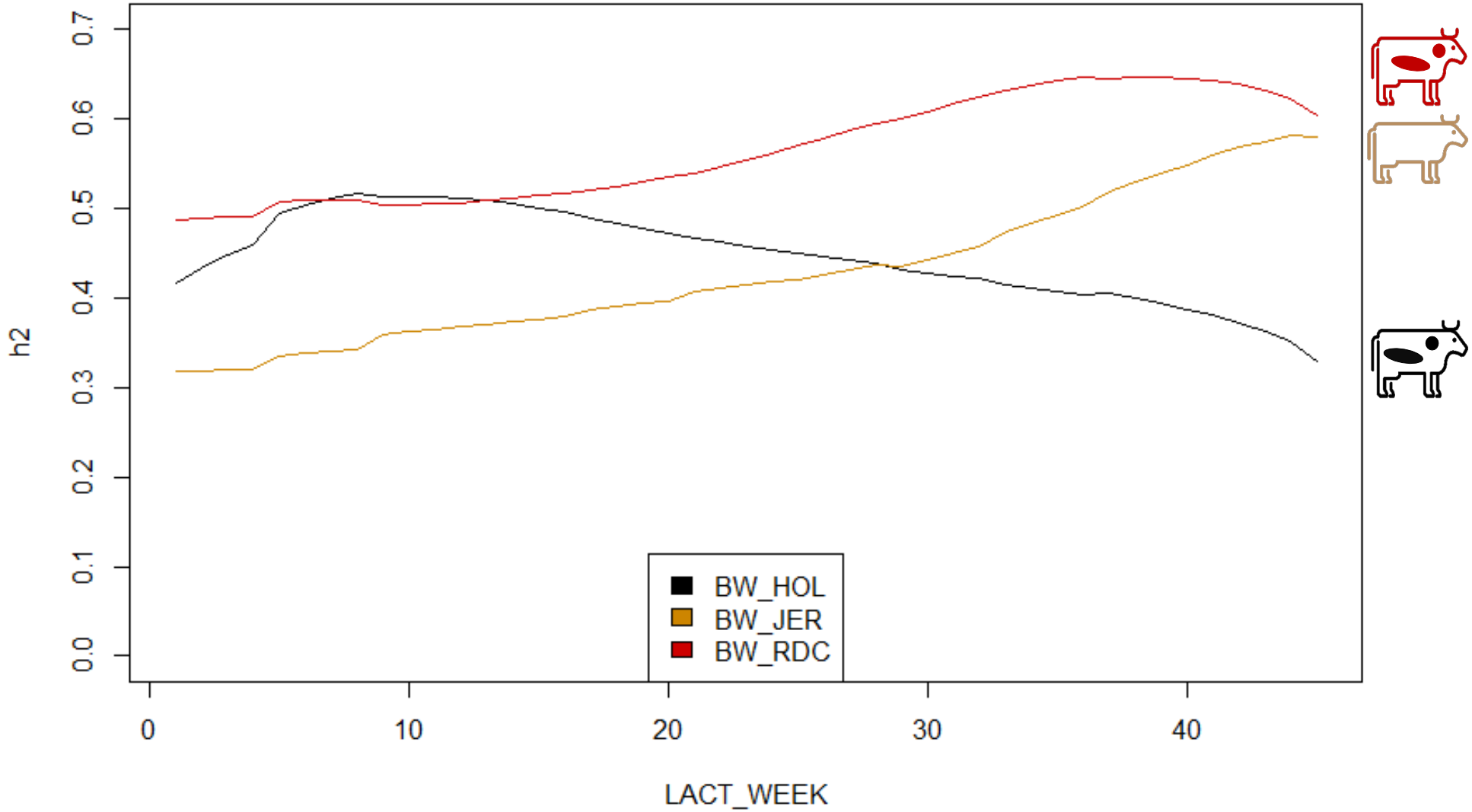
AVERAGE GENETIC VARIANCE

Trait	unit	 HOLSTEIN	 JERSEY	 RDC
DMI	kg^2/d	1.6	1.5	1.7
BW	kg^2	1151.0	383.2	1649.0

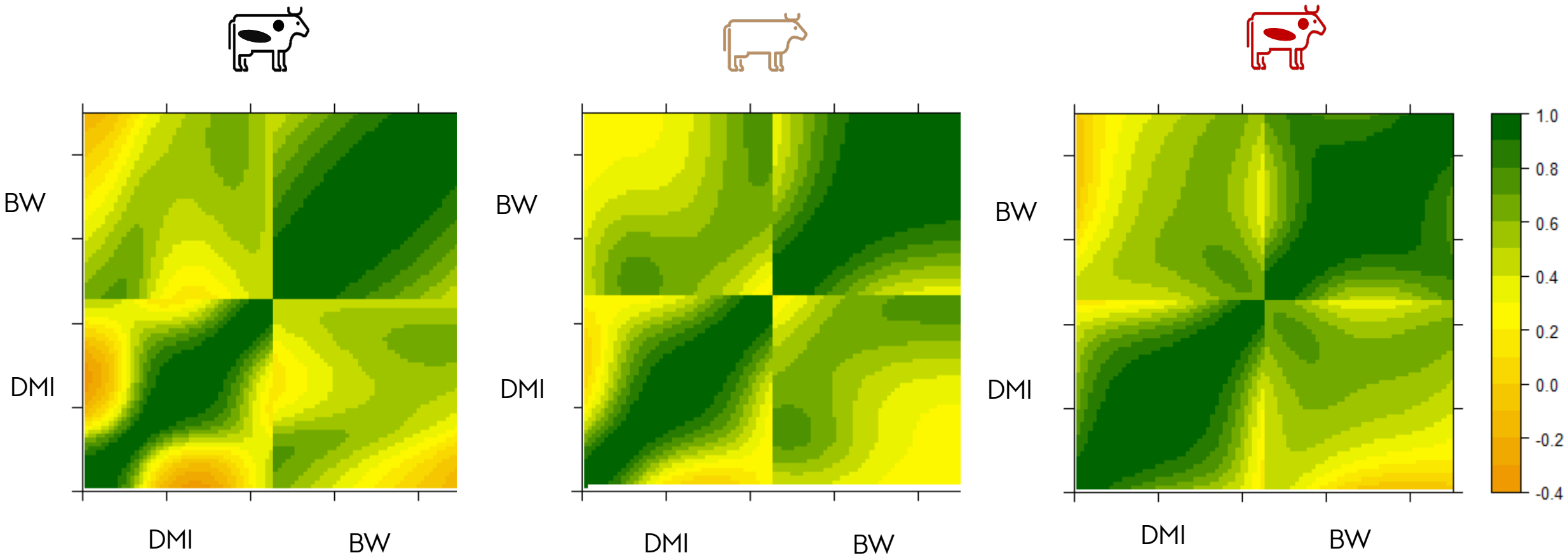
HERITABILITIES FOR DMI 3 BREEDS



HERITABILITIES FOR BW 3 BREEDS



CORRELATIONS DMI-BW 3 BREEDS



TAKE HOME MESSAGES

Heritabilities vary within lactation with differences per breed

Genetic correlations within and between traits are breed specific

3D camera technology allows for continuous data recording at large scale

AARHUS
UNIVERSITY