



International Bull Evaluation Service

INTERBULL is a permanent sub-committee of ICAR (www.icar.org)

15:30-17:30 Session III-B: Crossbreed (Room **Gratte-Ciel 2&3**, parallel session)

Chairman: Gert PEDERSEN AAMAND

Schedule	Speaker	Topic
15:30-15:45	Judith Himmelbauer	Investigation on the metafounder concept in ssGBLUP based on a simulated cattle population
15:45-16:00	Matti Taskinen	Estimation of metafounder relationships for multibreed single-step genomic evaluation of Finnish beef breeds
16:00-16:15	Emre Karaman	Genomic evaluation of crossbred dairy cows considering breed origin of alleles
16:15-16:30	Timo Pitkänen	Multibreed single-step genomic evaluation model for Finnish beef cattle
16:30-16:45	Kevin Byskov	Beef on Dairy genomic evaluation for feed efficiency, methane emission and meat quality
16:45-17:00	Haifa Splittorff	Multi breed genetic evaluation of beef bulls used in dairy herds – emphasis on newest development
17:00-17:30		General discussion



Beef on Dairy genomic evaluation for feed efficiency, methane emission and meat quality

Kevin Byskov¹, Huiming Liu¹, Kresten Johansen² and Mahmoud Shirali¹

1: SEGES Innovation P/S, 2: Aarhus University

Interbull Open Session, Lyon 2023

STØTTE AF
Kvægaftifonden

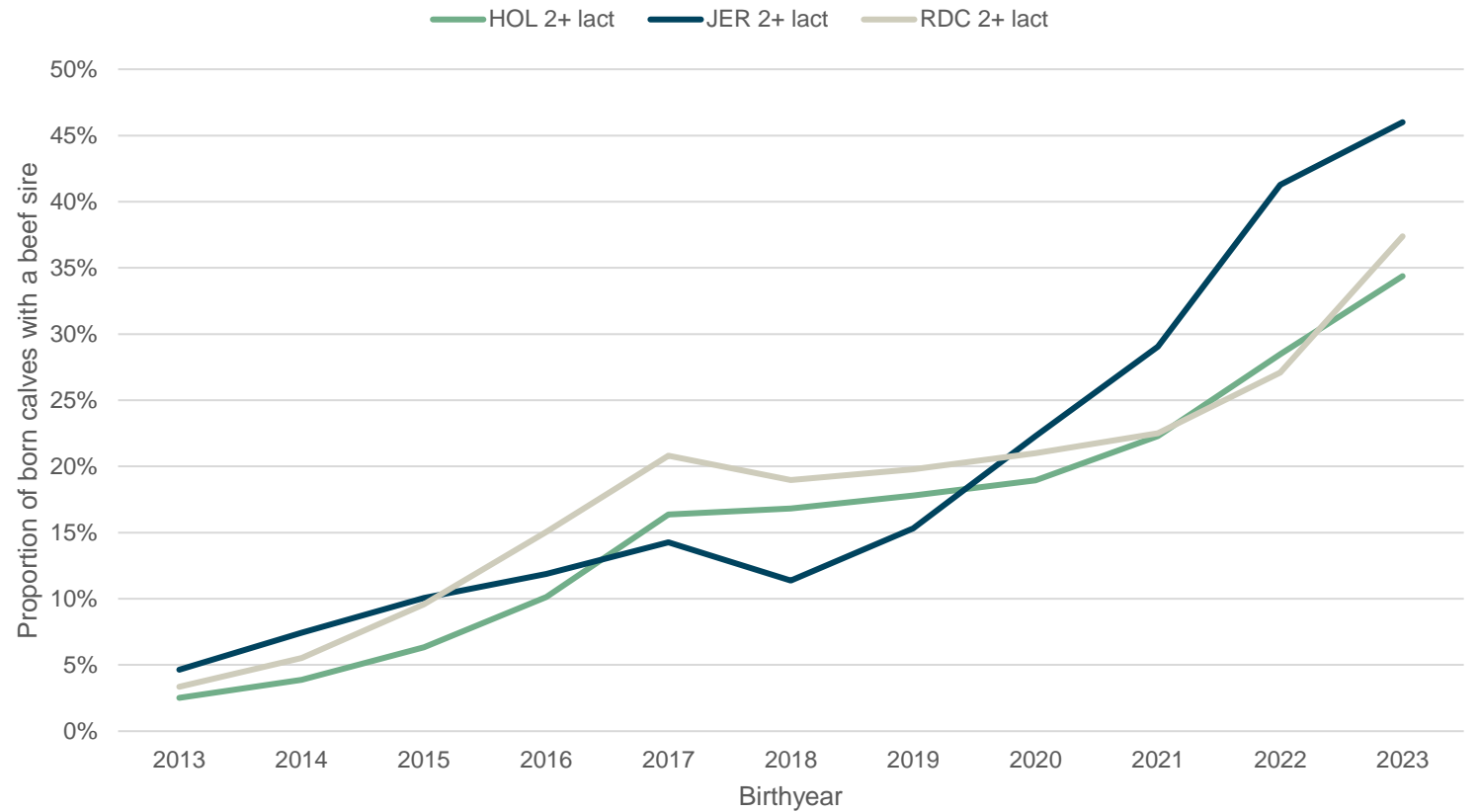


FRONTMATEC



SEGES
INNOVATION

Development in the Beef on Dairy segment



Aim of FutureBeefCross project



FutureBeefCross



To produce quality meat, improve production economy and lower climate impact by utilizing genetic potential for meat quality, feed efficiency and methane emission traits



Basis is development of new methods to phenotype 12,000 Danish Beef on Dairy crossbred calves

Experimental setup

Project started January 2019

5 commercial slaughter calf herds

- 4 feeding pellet diets and 1 feeding TMR
- Capacity to test feed intake on ~4500 calves/year
- Capacity to measure methane on ~3600 calves/year

Beef on Dairy crosses on Holstein dams

- Danish Blue
- Charolais
- Angus



Marbling score (MS) / Intramuscular fat (IMF)

- Hand-held camera solution at slaughterhouse.
 - Q FOM™ Beef (Frontmatec, Denmark).
- Picture taken off *Rib Eye* between 5th and 6th rib.
- Both MS and chemical IMF can be predicted.
- Ear cut of for genotyping



If you want to know more – Monday afternoon Session 18

16.30: *The precision and accuracy of the Q-FOM grading camera predicting rib eye traits in beef carcasses*

By S.M. Stewart, M. Christensen, H. Toft, T. Lauridsen and R. O'reilly

18.25 (poster session): *Beef on dairy – meat quality and prediction of intramuscular fat on the slaughter line*

By F.F. Drachmann and M. Therkildsen

Marbling score (MS) / Intramuscular fat (IMF)

- 1686 BBLxHOL calves with phenotype from 65 sires
 - 876 with both genotype and phenotype
- Heritability from phenotypic bivariate AM is 0.15 for both IMF and MS
 - Genetic correlation is estimated to 0.93 (0.09)
- Goal is a SS multibreed AM model including data from calves from HOL dams and CHA, AAN and BBL sires.

Methane and Feed data

- Age of calves in test (6-8 months).
- Length of test period ~3 weeks.
 - Body weight at start and end.
 - Feed intake pr visit (Allfeed, Allflex).
- 8 sniffers connected to 6 feed boxes each (Guardian® NG, Edingburg Instruments Ltd).



Feed efficiency – genetic RFI model

- 4266 BBLxHOL calves with phenotype from 74 sires
 - 2029 with both genotype and phenotype
- Model is a bivariate SS RR AM for daily dry matter intake (DDMI) and body weight (BW)
- Goal is a SS RR multibreed AM model including data from calves from HOL dams and CHA, AAN and BBL sires.

RFI Calculation

Genetic RFI was calculated following Esfandiari and Jensen (2021) and Shirali et al. (2018).

$$RFI = TDMI - b_{gain}GAIN - b_{mbw}MBW$$

Total dry matter intake (TDMI) was the sum of DDMI from 200 to 280 days of age.

$$a_{TDMI} = \sum_{t=200}^{280} l_{q1}(t)a_{DDMI}$$

GAIN was the total body weight gain during 200 to 280 days of age.

$$a_{GAIN} = (l_{q1}(t_{280}) - l_{q1}(t_{200}))'a_{BW}$$

Mean body weight (MBW) was the average body weight during 200 to 280 days of age.

$$a_{MBW} = \frac{1}{2} (l_{q1}(t_{280}) + l_{q1}(t_{200}))'a_{BW}$$

b_{gain} and b_{mbw} are the regression coefficients obtained from Genetic variance covariance matrix.

Feed efficiency complex – pedigree model results

The heritabilities (diagonal) and genetic correlations (off diagonal) are as follow:

	TDMI	RFI	GAIN	MBW
TDMI	0.24			
RFI	0.84	0.21		
GAIN	0.43	-0.12	0.21	
MBW	0.46	0.00	0.80	0.35

Methane emission

- Work has just started no results yet.
- Decided to use CH_4/CO_2 ratio as phenotype
 - Ongoing work on alternative phenotype (CH_4 production/day)
- Goal is SS multibreed AM model



Perspective



Foto: LandbrugsMedierne

- Include GEBVs for RFI, Methane emission and Marbling score in the combined index for Beef on dairy.
- Danish Beef on Dairy index already includes:
 - **Production** (e.g. net daily gain, carcass conf., slaughter %)
 - **Direct calving traits** (calving ease and survival)
 - **Young stock survival**
 - **Health traits** (pneumonia, diarrhea, Foot rot)
- A combined index, only relating to traits expressed after calves are sold from the dairy herd, is an integrated part of prize setting of Beef on Dairy calves.
- Using genetic superior beef bulls → higher sales price of crossbred calves.

Thanks to:

STØTTET AF

Kvægafgiftsfonden



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Animal Health



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DANISH CROWN

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VIKINGGENETICS

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