Session 28, vivim.thorup@agrsci.dk

Real-time individual dairy cow energy balance estimated from body reserve changes

Vivi M. Thorup[1*], Søren Højsgaard[2], Martin R. Weisbjerg[1], and Nicolas C. Friggens[3]

1. Aarhus University, Dept. of Animal Science, Blichers Allé 20, Foulum, 8830 Tjele, Denmark
2. Aalborg University, Dept. of Mathematical Sciences, Fredrik Bajersvej 7G, 9220 Aalborg Ø, Denmark
3. INRA and AgroParisTech, UMR Systemic Modelling of Ruminant Nutrition, 16 rue Claude Bernard, Paris, France

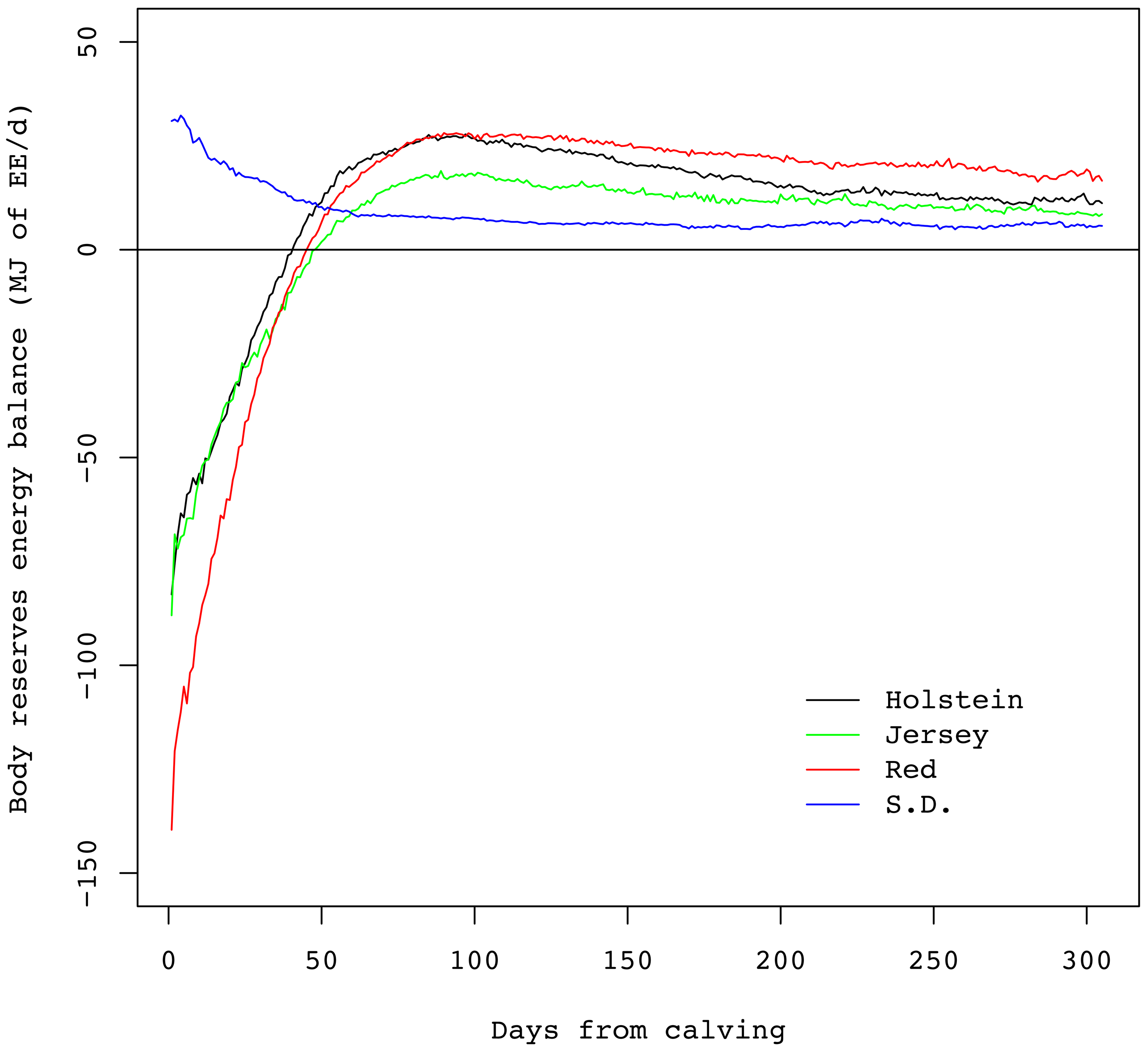

Fig. 1: Mean and S.D. EB_{body} (MJ EE/d) relative to days from calving grouped by breed (31 Holstein, 17 Jersey, and 29 Red cows).

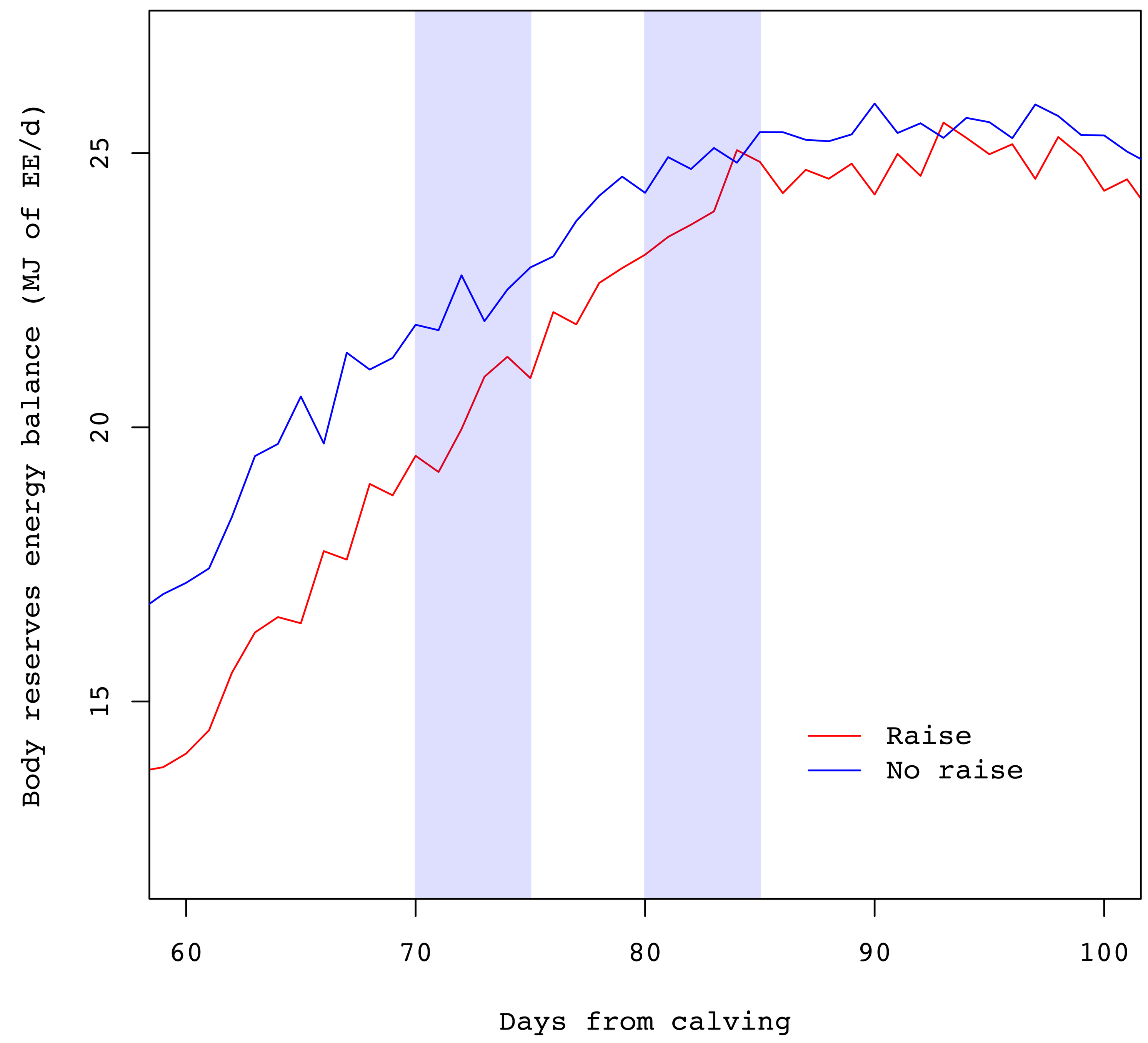

Fig. 2: Mean EB_{body} (MJ EE/d) relative to days from calving grouped by concentrate raise (n=37) or no raise (n=40). Blue regions mark the compared levels.

1. INTRODUCTION

In dairy cows extended periods of negative energy balance have been linked with reduced reproduction, digestive, locomotive, and metabolic diseases. Real-time energy balance estimates for individual cows on-farm would be a profitable management tool enabling early intervention. Traditional ways to estimate energy balance require measurements of milk yield and feed intake, and the latter is hard to measure in practice. Our method estimates real-time energy balance (EB_{body}) from body weight (BW) measures combined with body condition score (BCS). Also the consequence of omitting BCS data when estimating EB_{body} is evaluated.

2. METHODS

- Data from 77 primi- and multiparous cows were used
- Half the cows were offered an increased concentrate amount during mílking for a period starting on day 75 from calving
- BW was measured automatically at each milking in a voluntary milking system
- BW during milking was smoothed to correct for the weight of milk in the udder, growing foetus and gutfill
- EB_{body} was calculated from BW changes combined with BCS changes (Fig. 1) and from BW changes only
- EB_{body} differences between levels the week before and the 2nd week after concentrate raise were calculated (Fig. 2) and analysed (ANOVA)

3. RESULTS

EB_{body} can be estimated without BCS data by assuming profiles of standard body protein change. The variability in individual profiles was sufficiently small to justify this assumption.

Real-time functionality allowed EB_{body} changes caused by a concentrate raise to be detected the 2nd week after the raise, as cows offered a raise tended to show a larger EB_{body} increase than cows not offered a raise ($P<0.1$).

4. CONCLUSIONS

This simple EB_{body} method can become an on-farm tool to manage excessive negative energy balance with the advantage of needing only frequent BW measures.

AARHUS UNIVERSITY
DEPARTMENT OF ANIMAL SCIENCE

*corresponding & presenting author: ViviM.Thorup@AgrSci.dk