AARHUS UNIVERSITY

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EXTENDED LACTATION STRATEGIES

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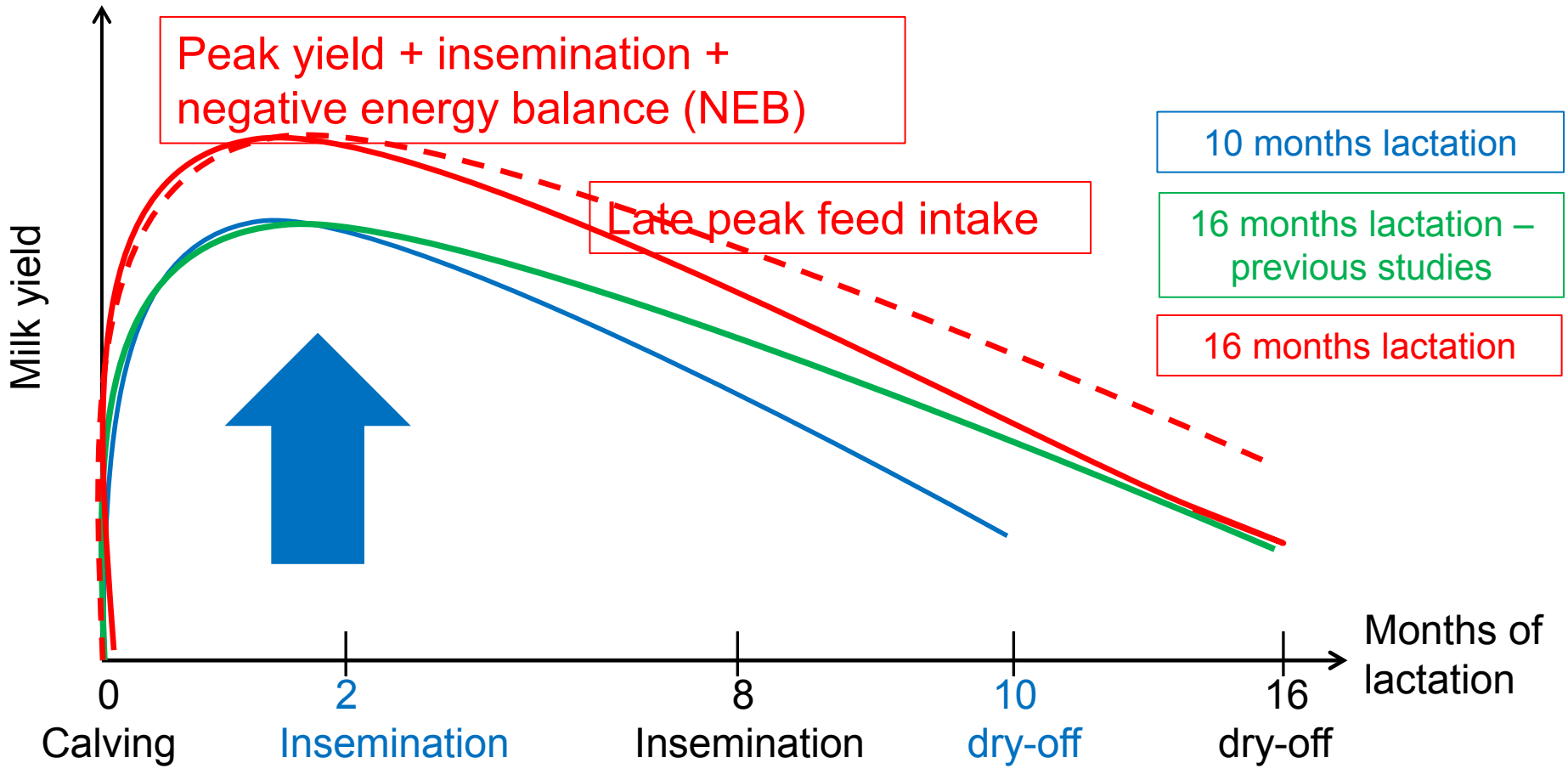
➢ *"The lactation curve is plastic"*

Persistency: slope of decline in milk yield after the peak (high persistency when the slope is small)
Relation: High peak – lower persistency = higher slope.



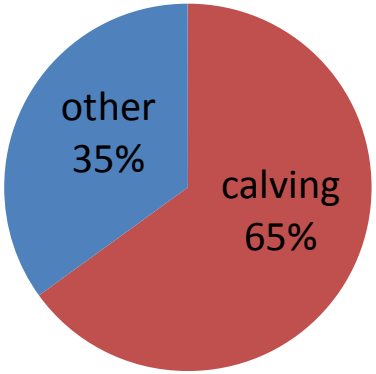
➢ *Health advantages of EL*

Traditional 10 months lactation

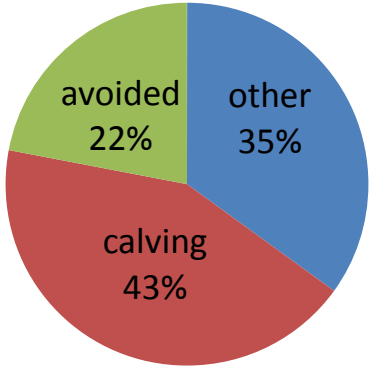
Extended 16 months lactation

Calving = 65% health incidents

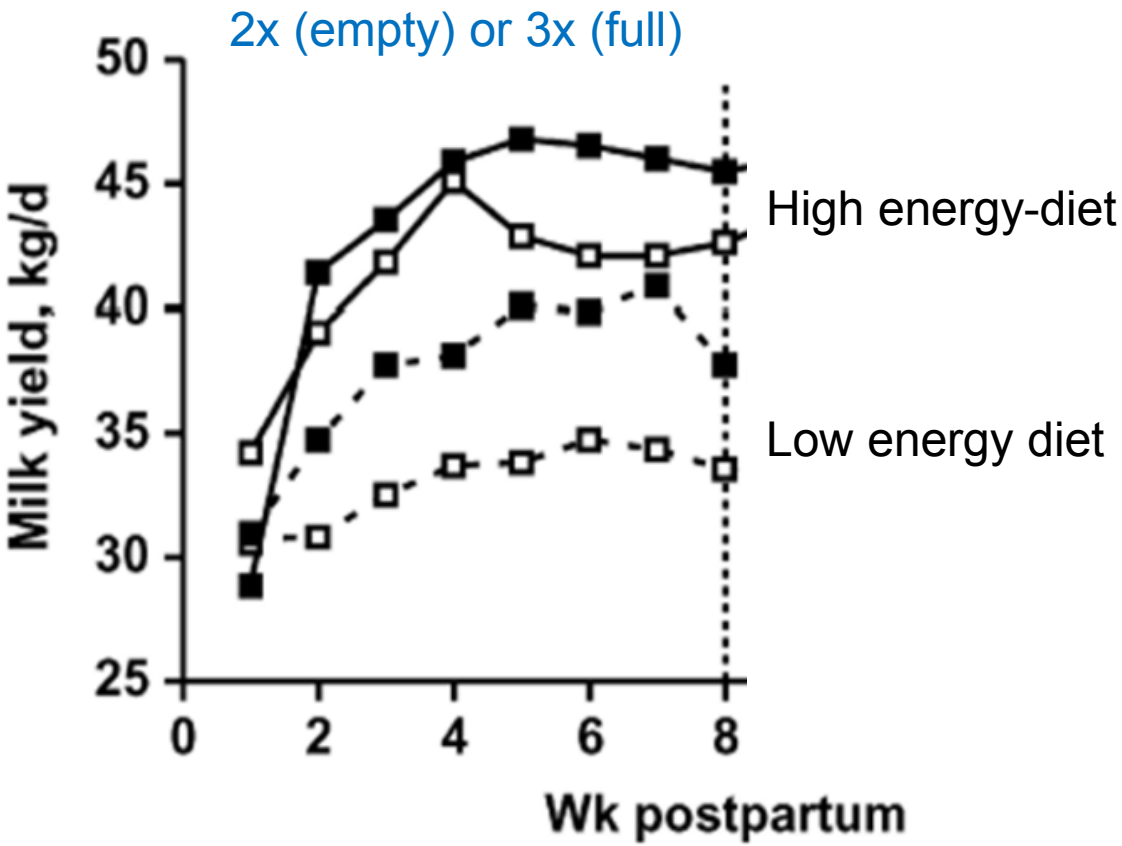
Health incidents over 3 years



Health incidents over 3 years



➢ *The strategies supporting lactation*



Factors:
- Milking frequency, Energy in the diet

Effects:
- Increase milk yield
- Increase persistency

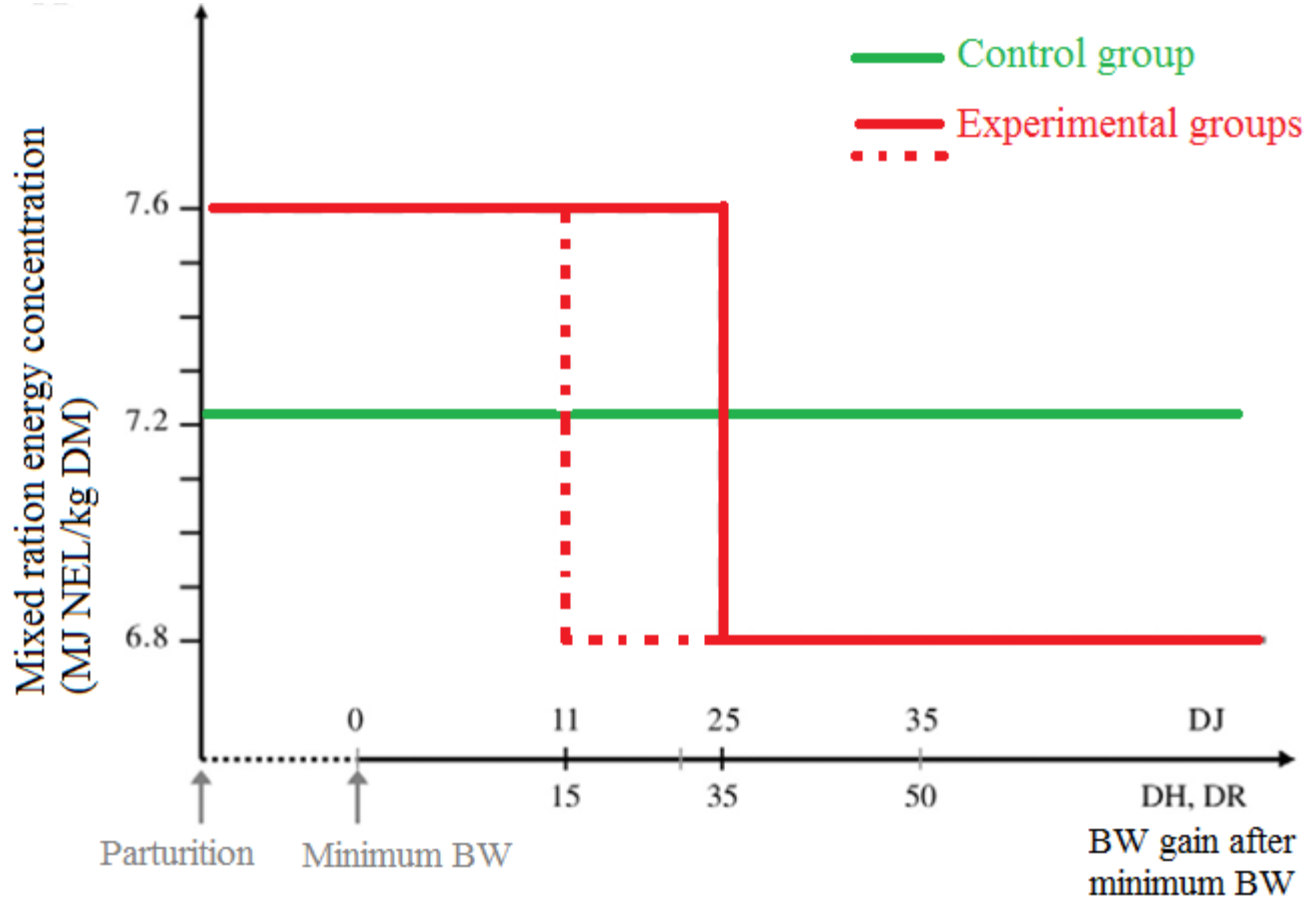
Nørgaard JV, Sørensen A, Sørensen MT, Andersen JB and Sejrsen K, 2005. Journal of Dairy Science, 88, 975-982.

=> milking frequency and energy diet effects are additive, this interaction can be used to maximize milk production

➢ *REPROLAC background - Individualized feeding*

- Bossen et al. (2009) - Automatically on-line real-time LW > to manipulate the extent and the duration of the mobilization phase

- 10 m
conc
  - high
  - redu
  - incr
  - mai



- ***REPROLAC project - Aim:*** to develop a new strategy for milk production that improves productivity, animal welfare as well as the economy of the farmer.

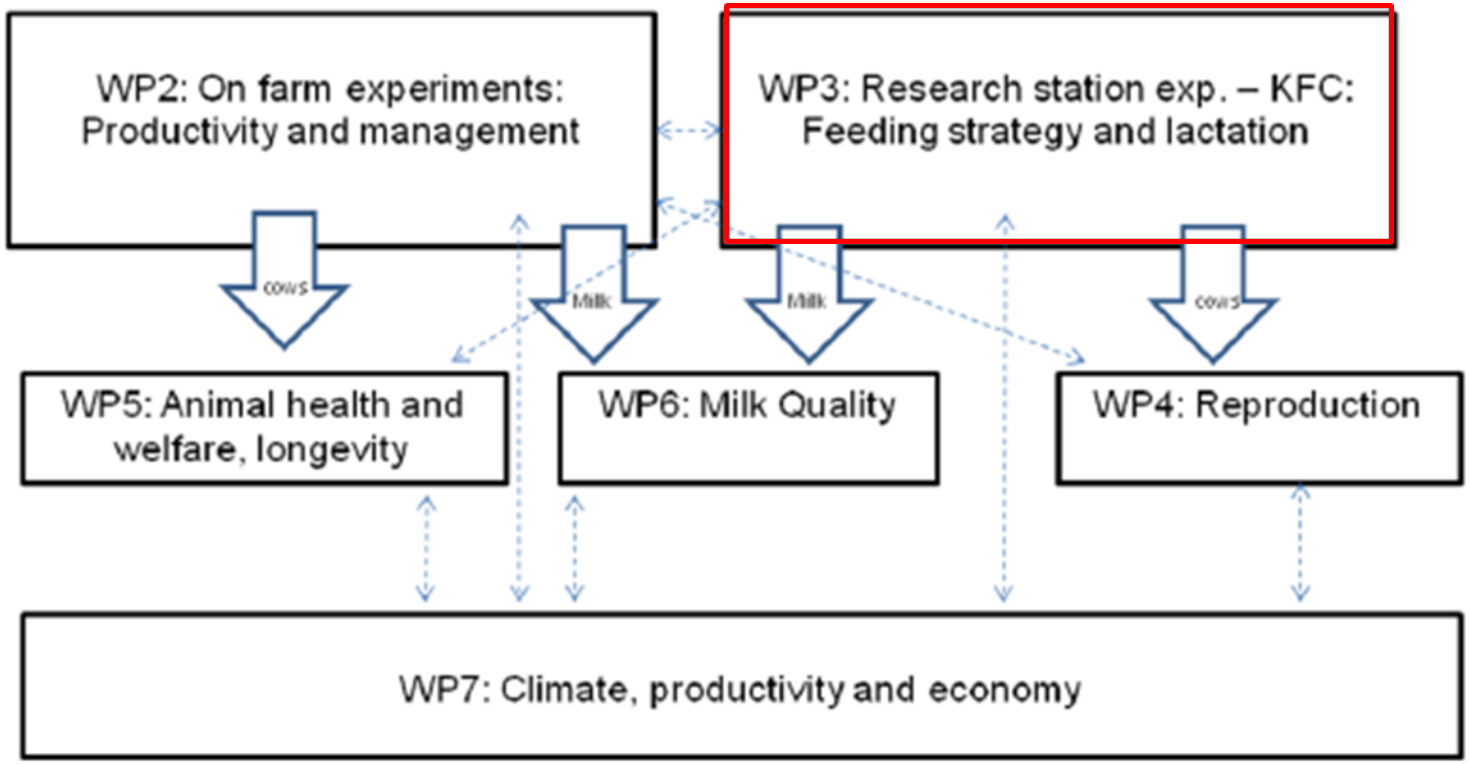


Figure 1: Scientific work package overview and interactions. Dotted lines: data flow, thick arrows: sample flow

➢ *WP3 / AU Foulum*

- ***Objective:*** to investigate the interaction between an individualized feeding strategy and an extended lactation in dairy cows with focus on metabolic adaptation and efficiency of production

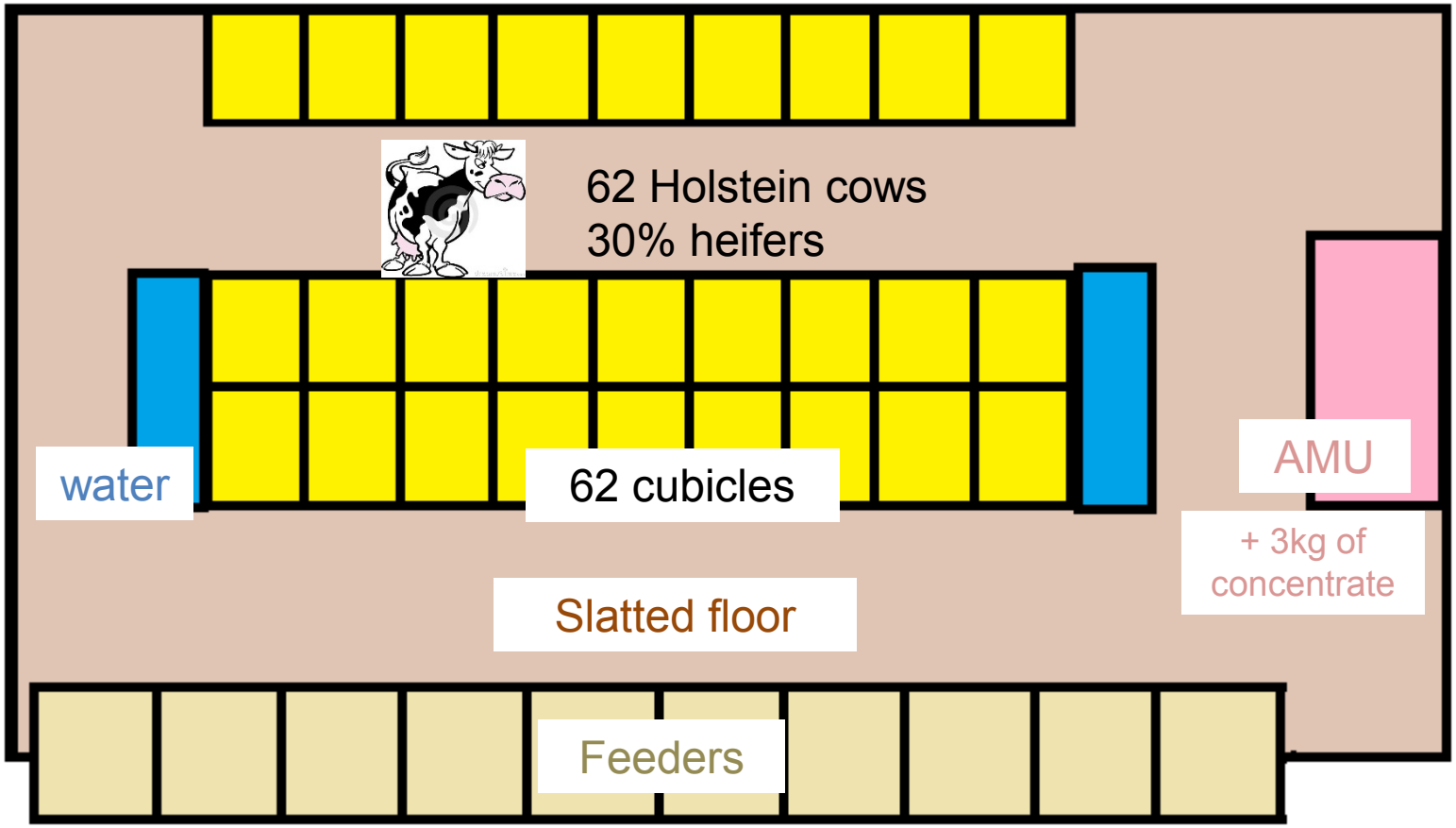
➢ *Hypothesis*

1) an energy-enriched diet until LW nadir will reduce the severity of the negative energy balance

2) the reduction in diet energy concentration from LW nadir will extend the negative energy balance period further

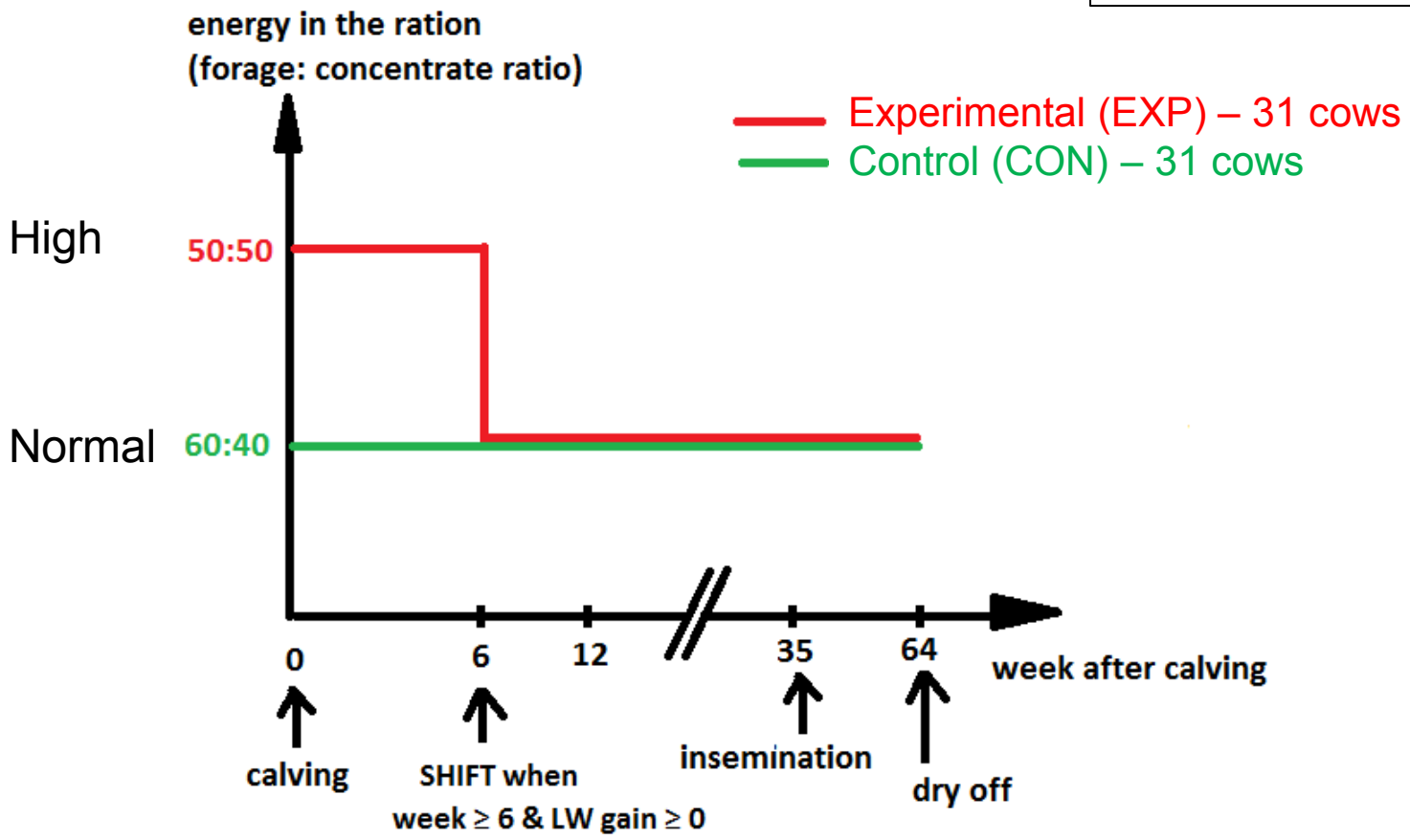
3) a supply of energy during the mobilization period will have a positive carry-over effect on milk production and persistency

➢ *REPROLAC - Facilities and animals*



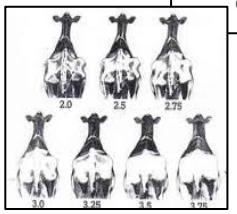
➢ *REPROLAC design and feeding*

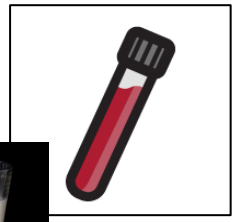
16 months lactation



Mixed Ration	Normal	High
PREDICTED RATIONS COMPOSITION (% OF DM)		
Barley	4.3	4.0
Wheat NaOH treated	-	**15.8**
Rapeseed meal, 10.5% fat	17.3	15.8
Beet pulp	8.6	7.9
Grass/Clover silage	30.2	23.7
Corn silage	28.1	22.2
Urea	0.01	<0.01
Concentrates in robot	10.8	9.8
Minerals	0.69	0.6
Forage:Concentrate	60:40	50:50
CHEMICAL COMPOSITION (G/KG DM)		
Ash	78.2	67.8
Crude protein	171.2	165.6
Crude fat	45.9	44.0
Sugar	47.7	45.9
Starch	144.9	228.5
NDF	337.6	305.2
Sodium	0.12	0.0

➢ *Measurements*

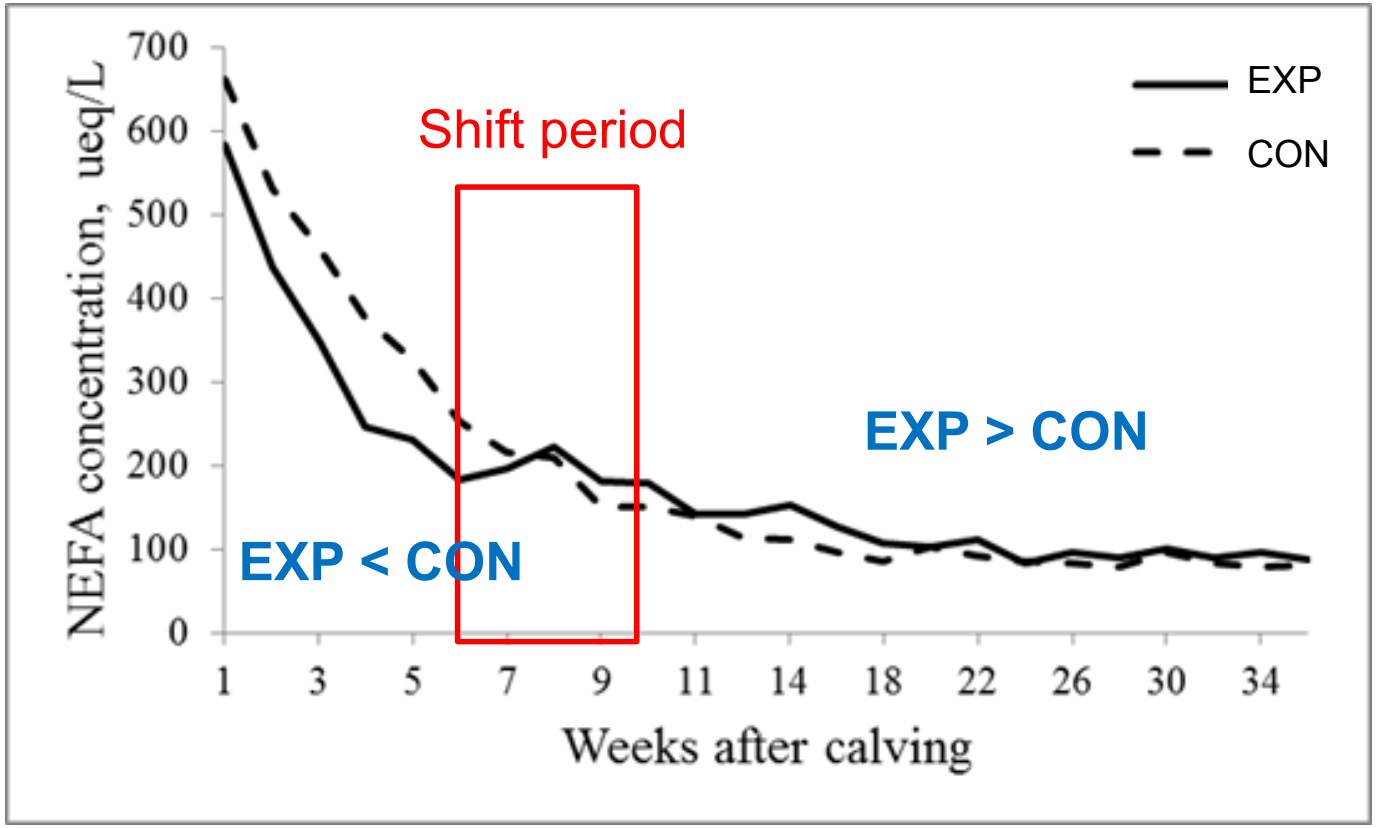




- Daily feed intake + concentrate intake
- Daily live-weight (LW)
- Daily milk yield
- Blood samples, from w. 1 to 36 + 60, 61
- Progesterone in milk (Herd Navigator)
- Body condition score (BSC)
- Mammary biopsies w. 3, 5 and 60

Preliminary data

➢ *Metabolic results*

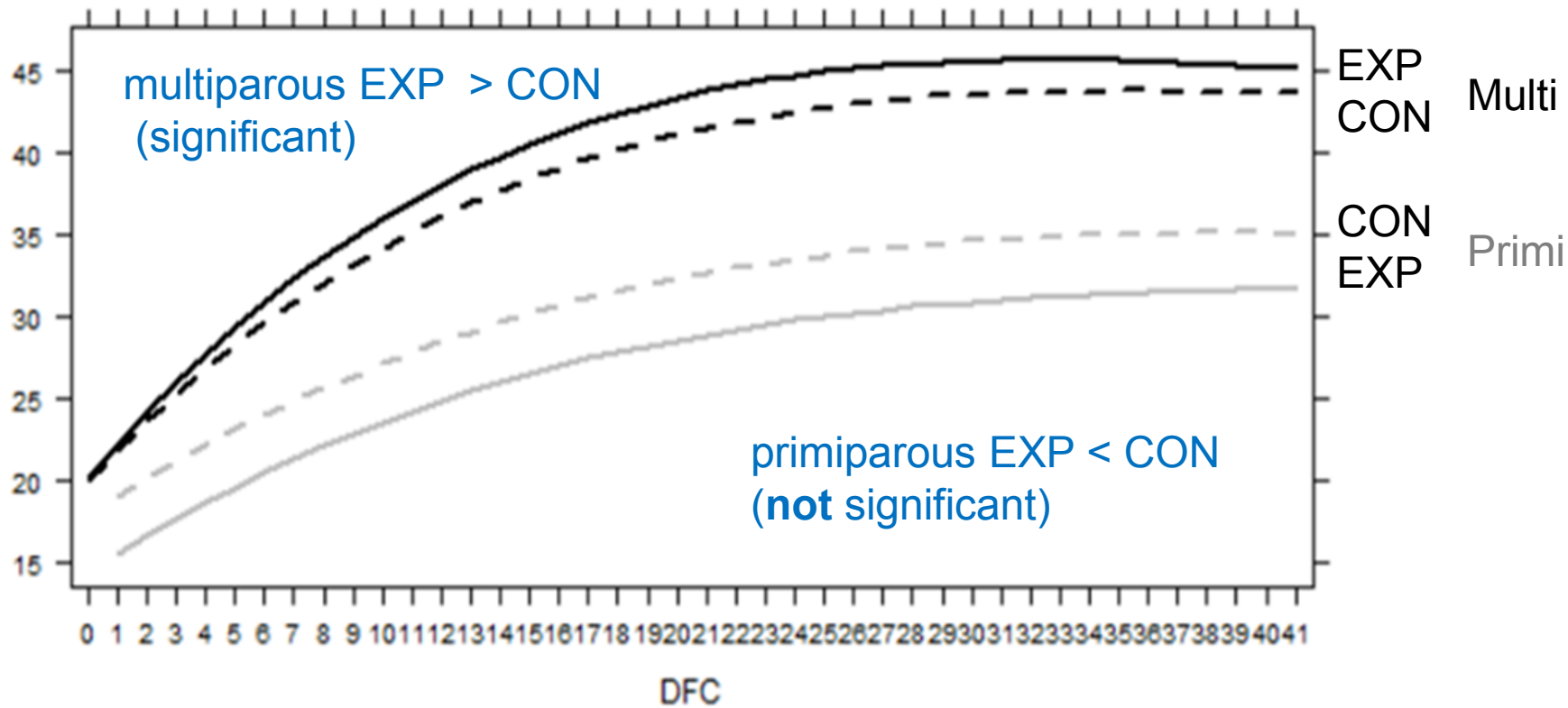


⇒ Early lactation: the enriched diet reduced NEB.

⇒ Carry-over effect of the enriched diet on late lactation metabolism.

➢ *Production results*

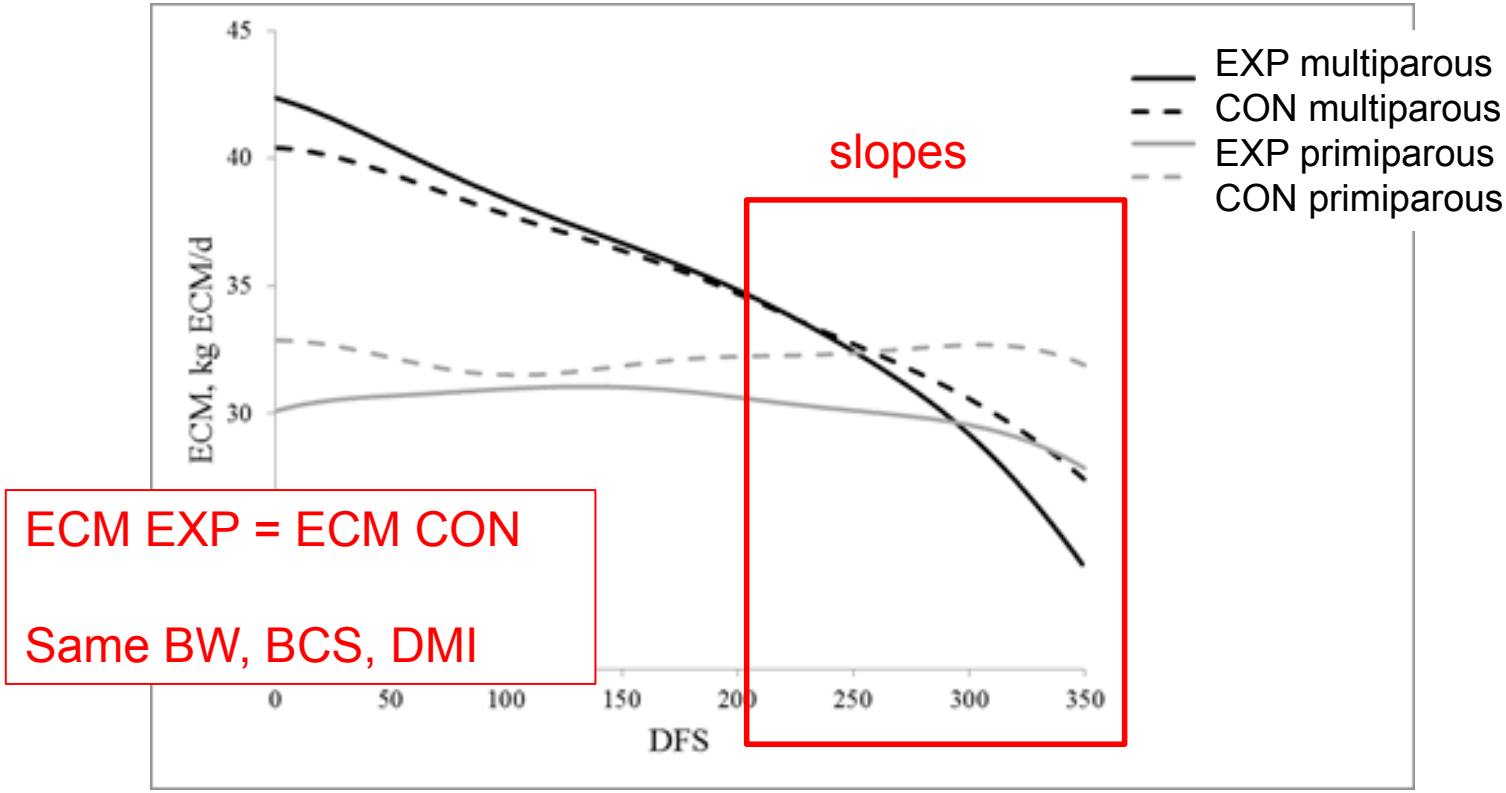
- 53 cows with EL average length of 461 ± 7 d.
- No effect of treatment or parity on lactation length.



⇒Treatment effect in early lactation: increase milk yield for multiparous and gain weight for primiparous

➢ *Production results – After the shift*

- New time scale from 0 Days From Shift to 300 DFS

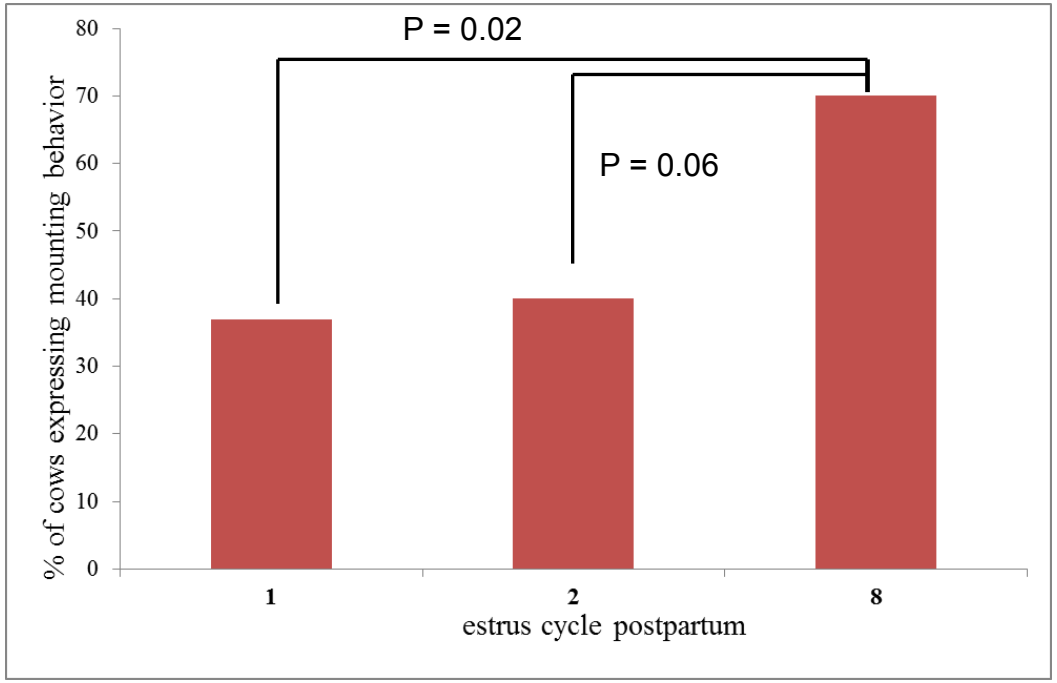


⇒ no carry-over effect of the enriched diet on EXP ECM

⇒ 300 d negative carry-over effect of the enriched diet on the persistency

Reproduction results

- 8 estruses, lost of 0.56 kg of milk per estrus day



- conception rates of 1st and 2nd insemination = those of the previous 10 months lactation (multiparous) => no negative effect of EL on insemination success

➢ *Conclusion*

53 cows over 62 succeeded in maintaining an extended lactation over 400 DIM.

1) NEB severity reduced NEFA EXP < CON

2) NEB period extended NEFA EXP > Con after the shift

3) No carry-over on the milk production, but

4) Negative carry-over on the persistency (late effect)

➢ *Perspectives*

How to support extended lactation in intensive dairy by feeding?

- criteria to take into account: average level of production, breed, age, feeding system, and milking frequency.

- maybe combine this feeding strategy with milking frequency.

- work on **virtual scenarios** to predict the effect of lactation duration, parity, feeding treatment on production variables during the cow's lifespam (GARUNS).

Thank you for your attention !