DFM supplementation during gestation on postpartum performance in dairy cows

Preliminary results

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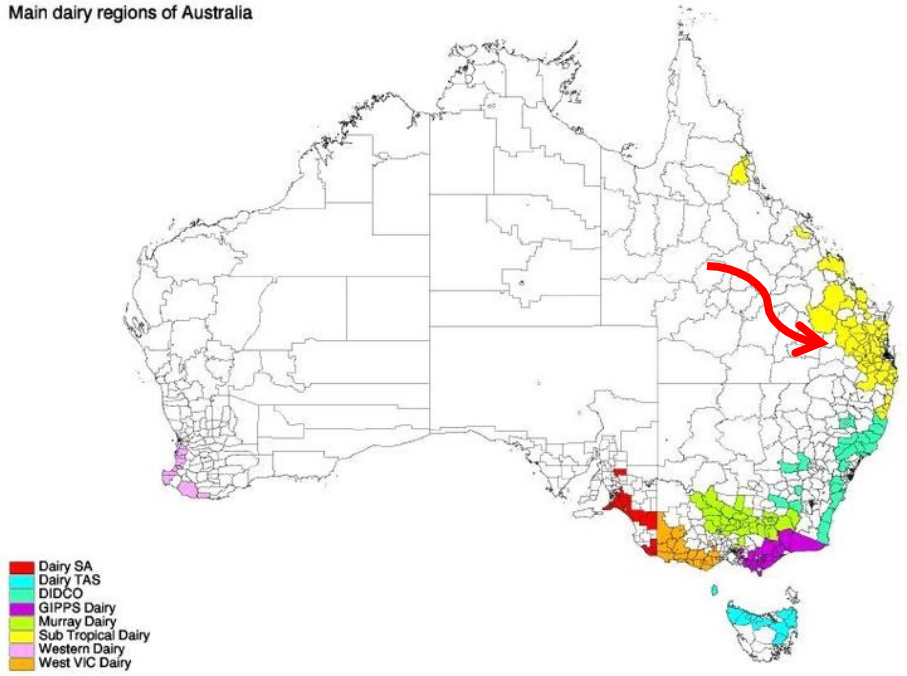
Terragen

Background

- Due to excessive livestock antibiotic use, safe alternatives are sought. DFMs containing live microorganisms show potential to enhance dairy cattle health and efficiency
- DFMs alter ruminal microbiome, fermentation, enhance digestibility, reduce methane
- Results with DFM supplementation's on milk production, milk components and reproduction efficiency are variable.
- We hypothesized that supplementing cows during gestation with a DFM enhances subsequent milk production and reproductive performance.

Trial set up

- Commercial dairy farm in tropical SW QLD, Australia (350 cows, 250 Has)
- Aim: Assess effect of DFM on methane emissions
  - Control (n=75)
  - DFM (n=75)
- HF or HF cross, 590 kg (± 67)
- 1st-3rd lactation (37% 1st, 26% 2nd, 36% 3rd)
- 127 (± 55.4) DIM
- 10 ml DFM/day/cow added in the TMR (top sprayed) (Mylo®, Terragen, Australia)
- DFM (3.5x 10^9 *CFU L.casei, L. paracasei*, and *L. buchneri)*
- ~16 months (Oct/21-Jan/23)

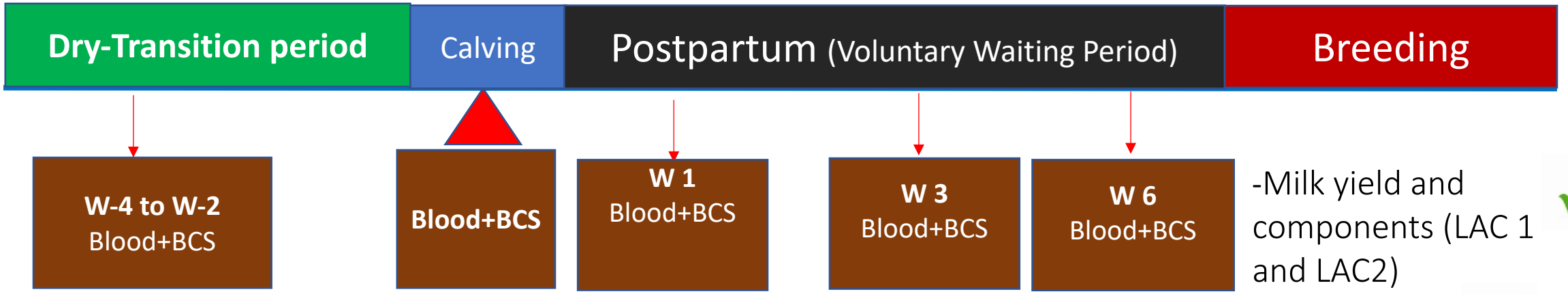


Diet

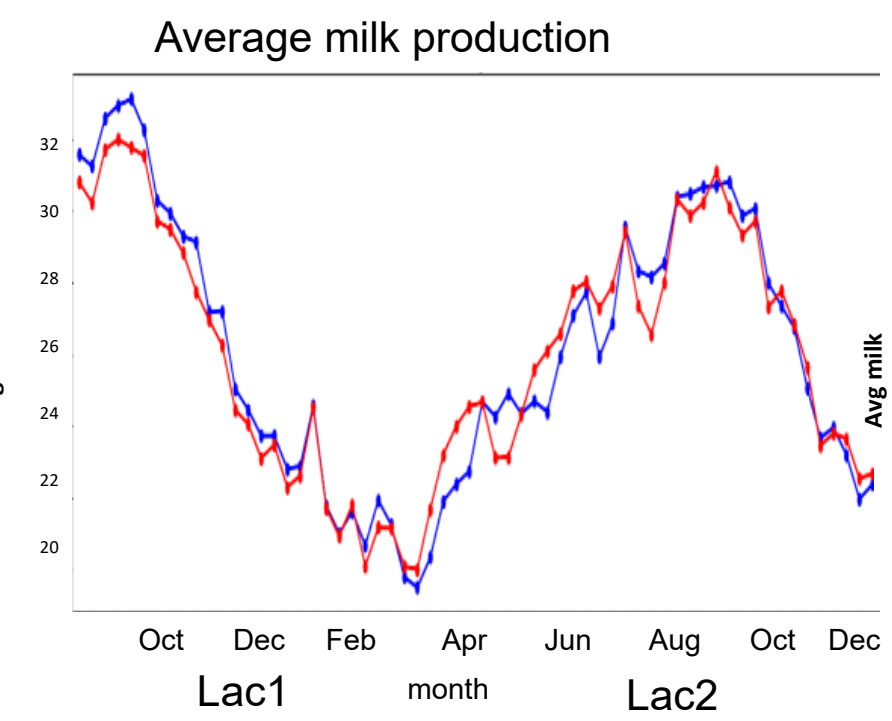
- TMR: Maize/barley silage, lucerne hay, soybean silage, canola meal, barley or wheat grain.
- Grain: 1.5 kg (Barley or wheat grain) x2 in the dairy
- Ryegrass or kikuyu pasture grazing to meet the milk production target based on the physiological stage.
- DMI targeted based on the physiological state

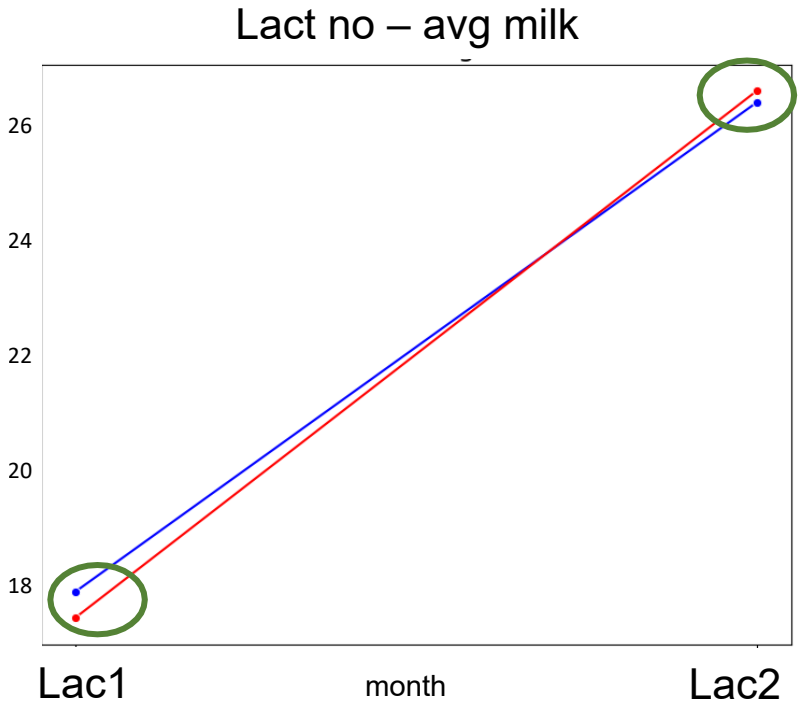
Productive and reproductive performance

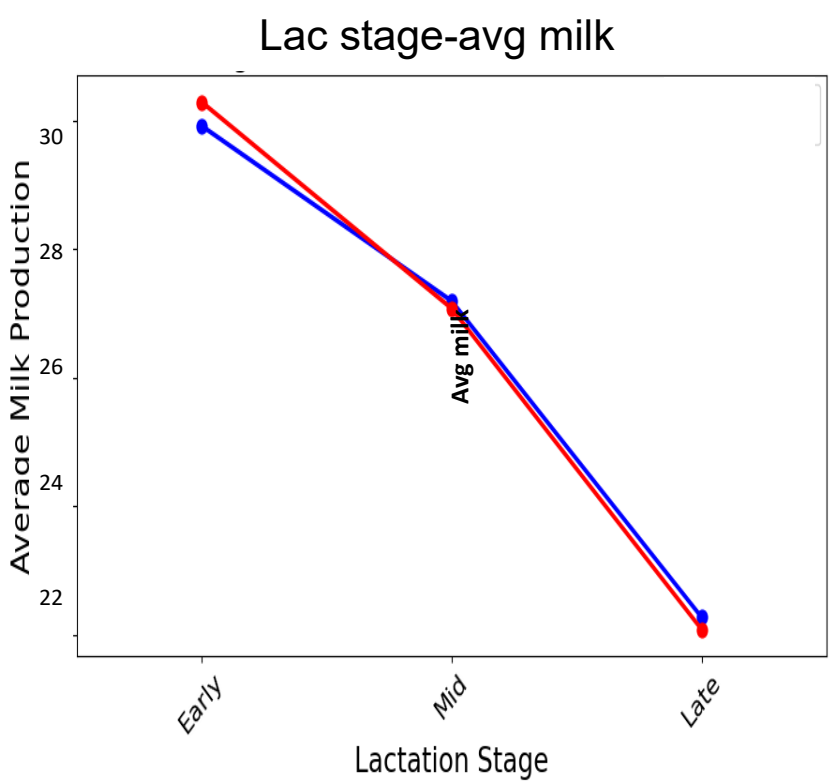
- Calving season (Mar-Jun/22) 90 cows (control n=43 & DFM=47)



Milk yield

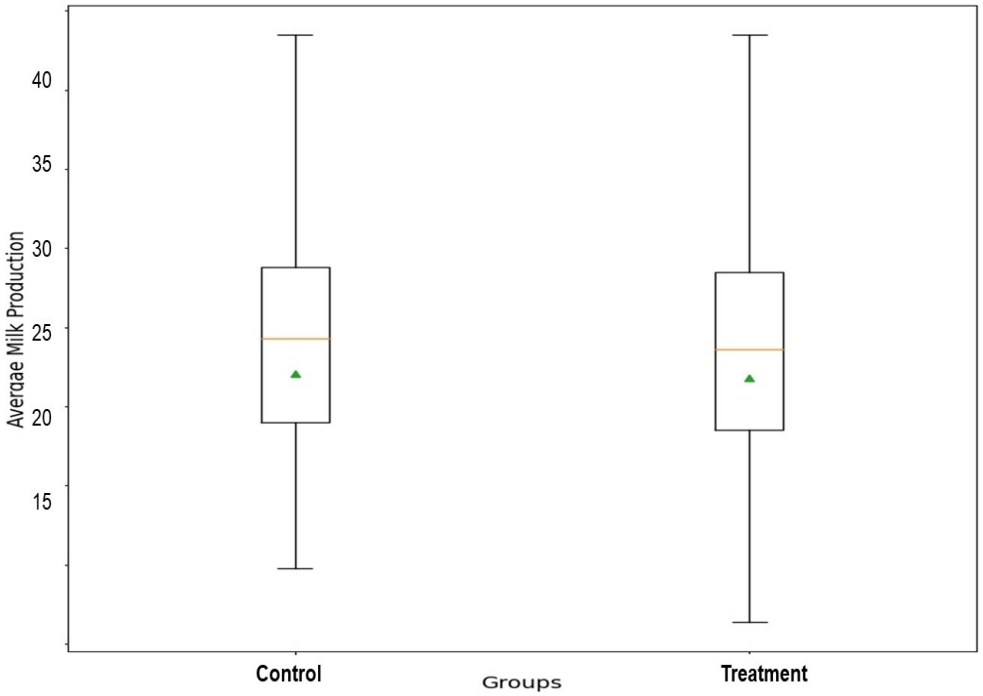






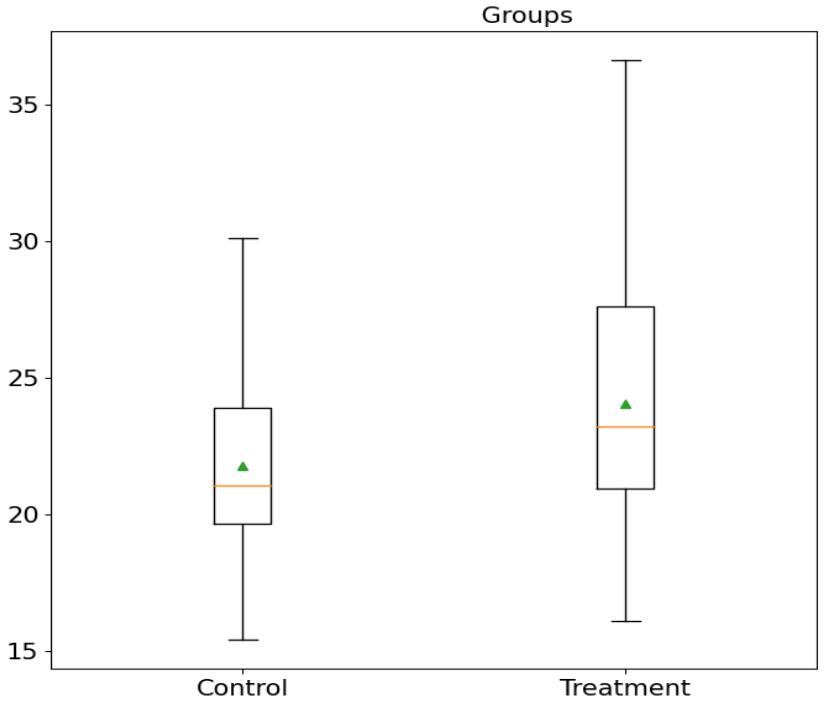
Control **DFM**

LAC 1
Average milk (lt/d)



	mean	std	25%	50%	75%
Control	22.1	10.7	19	24.3	28.8
Treatment	21.7	10.8	18.5	23.6	28.5

LAC 2
Average milk (lt/d)



	mean	std	25%	50%	75%
Control	21.7	3.79	19.6	21.0	23.9
Treatment	24.0**	4.4	20.9	20.9	27.6

**p <0.01

Productive performance (LAC2)

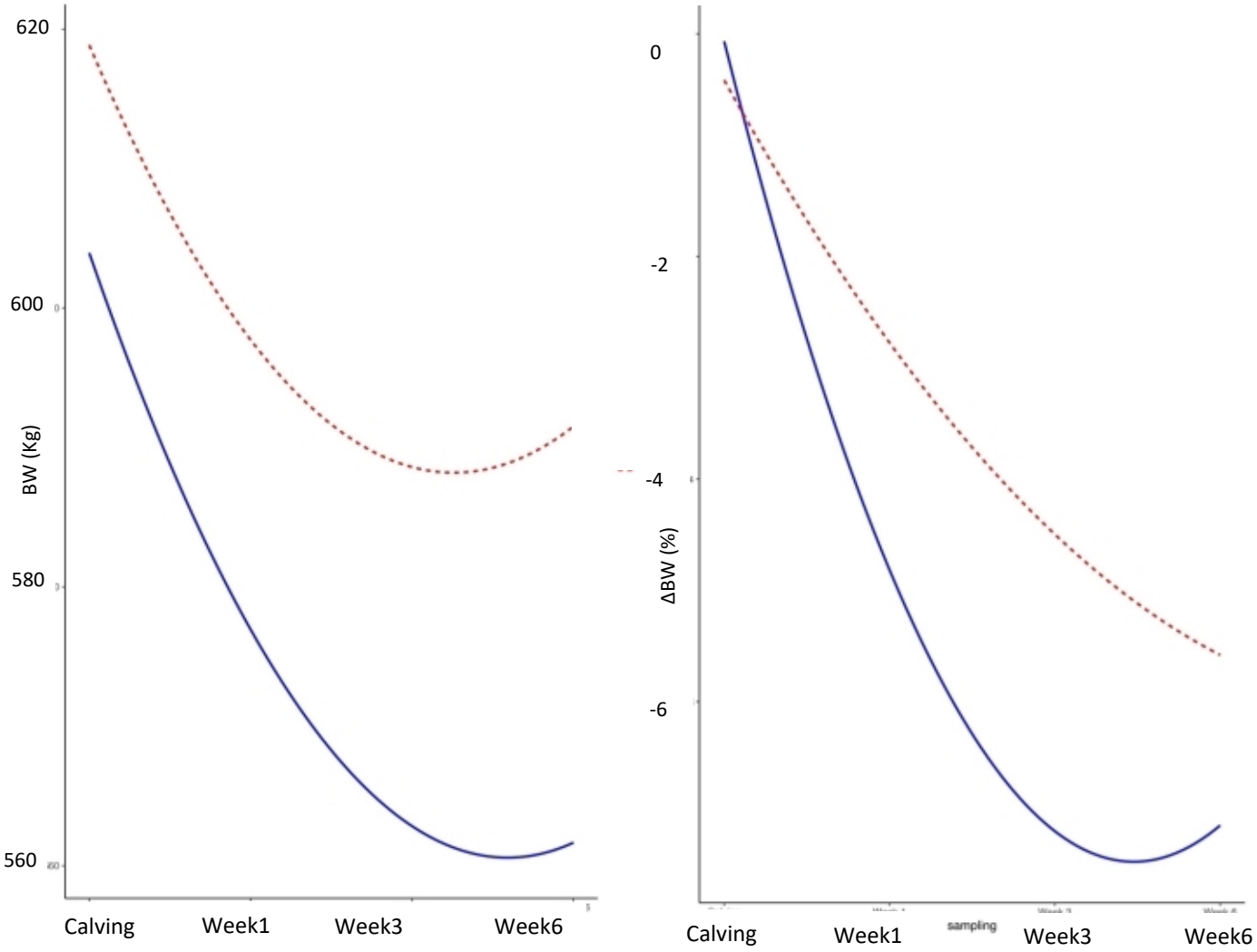
	Control	DFM	%
Lactation	2.6	2.9	
Avg Milk(30 DIM)	28.6	30.0	+4.8
Avg Milk(50 DIM)**	29.0	31.3	+7.9
Avg Milk(90 DIM)	28.7	29.5	+2.8
Total_100 d milk (L)	2743.6	2976.4	+8.4
Total_200d milk (L)	5240.6	5483.6	+4.6
Total DIM (d)	321.5	322.6	
Total milk Production (L)	7670.0	7994.4	+4.2
Average milk/day (L)	23.9	24.6	+2.9
Peak milk ** (L)	31.9	34.5	+8.3
Peak DIM (d)	71.7	73.0	
Fat (%)	3.7	3.7	
Prot (%)	3.5	3.4	
SCC (000/ml)± (SD)	180.5 (403)	211 (411)	

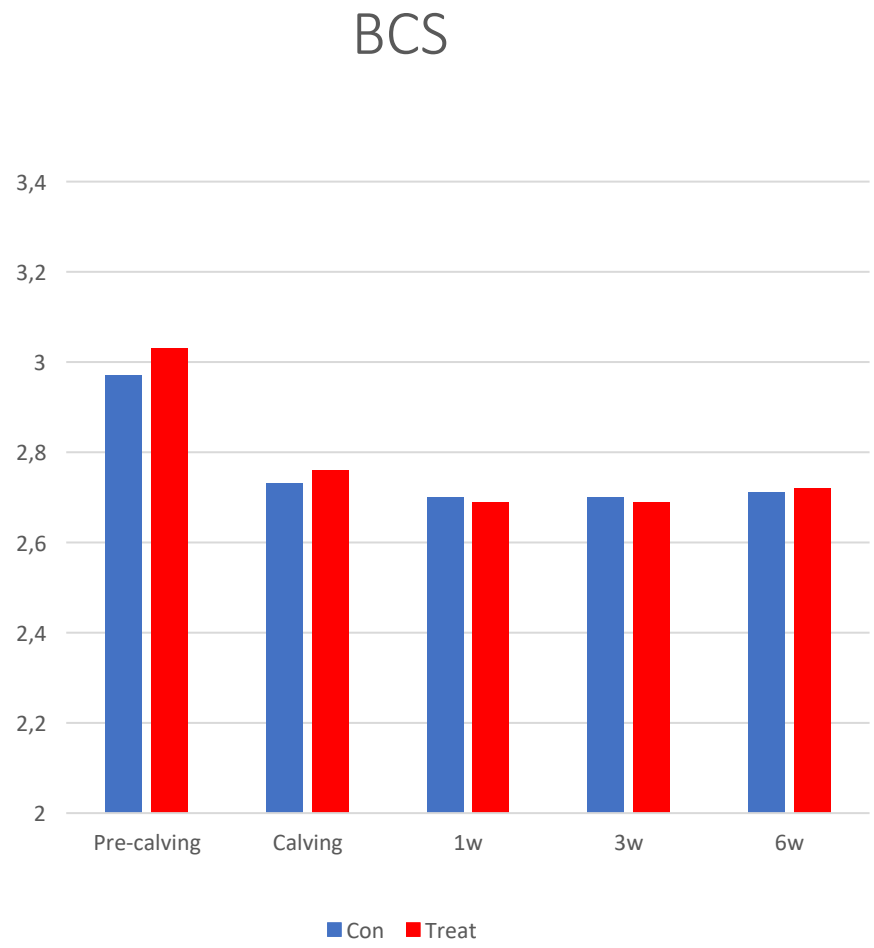
**P<0.05

Reproductive performance

	Control	DFM	P-value
DIM 1st Insem (d) *	74.3	64.7	0.03
Days Open (d)	95	93	0.45
Total Insemin	1.87	1.95	0.51
Calving Interval	376	340	0.42

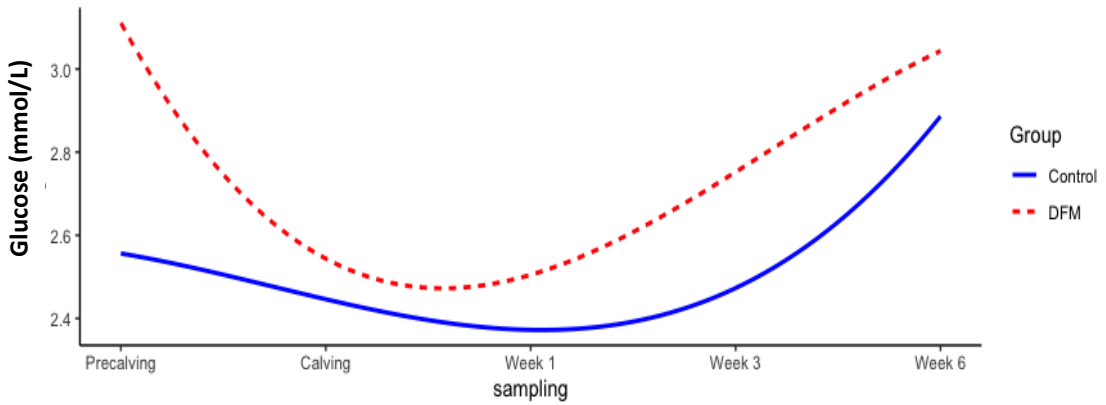
Bodyweight, BCS

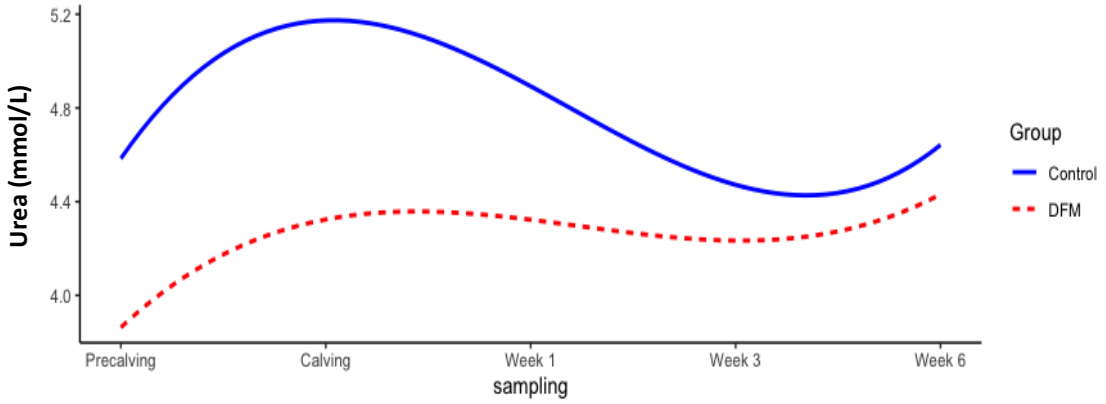


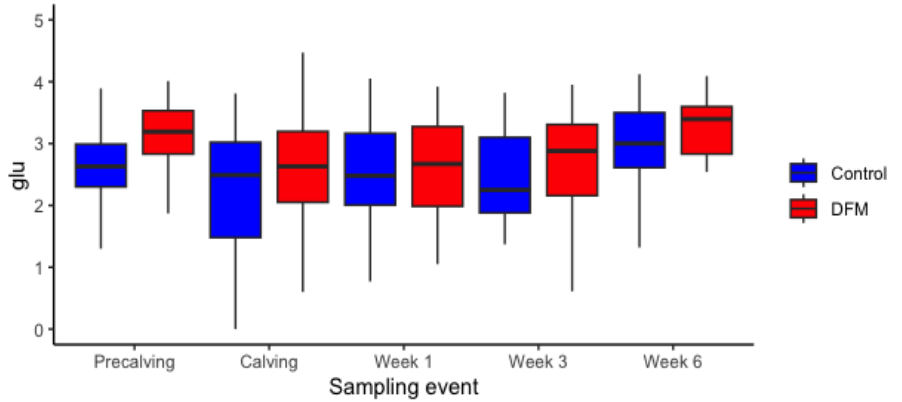


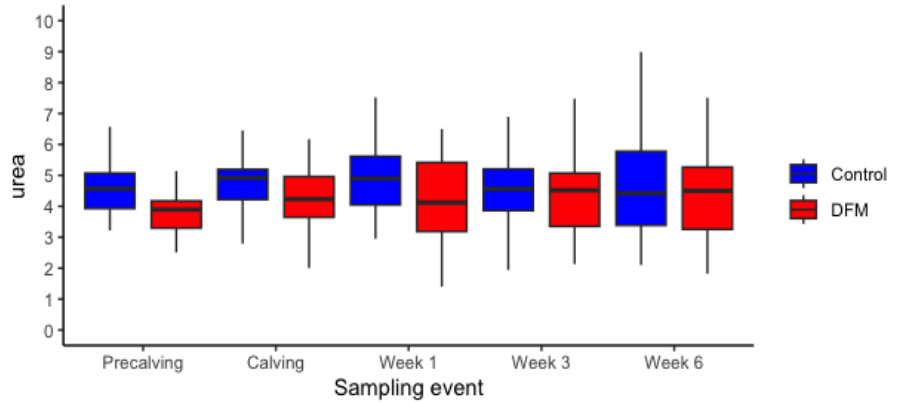
Metabolic profile

Higher glucose prepartum and after calving
Lower urea in the peripartum









Discussion

- Limitations of the study:

a) Uncertainty about the daily intake of DFM

- The most suitable considering length of the study and management practices in commercial dairy farm.

b) Individual grazing intake was uncertain

Driven by management decisions

c) Environmental conditions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual rainfall (mm)
2021	78.7	38.6	263.1	46.4	71.4	23.5	54.5	6.7	38.6	172.2	177.2	177.9	**1149**
2022	99.2	499	168	33.4	275.1	19.6	91.2	27.2	81.5	111	34	41	**1480**

Discussion

- No short-term effects in milk production and/or components during LAC1 which is similar to other studies
- In LAC2, DFM cows yielded more milk and peak higher than control cows
- Changes in the profile of metabolites (glucose and urea) during early lactation explain increase in productivity and reproductive performance.

Final remarks

- Several factors (dose, intake, strains, physiological stage etc) need to be considered before assessing the effect of DFMs on productivity.
- Continuing DFM supplementation during the dry period seems to be an important factor.
- DFMs help to overcome NEB improving productive and reproductive performance
- Assess ruminal microbiome and VFA's that might explain variation in metabolites
- DFM supplementation to gestating cows may be a strategy to enhance offspring performance and health but needs to be elucidated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