Impact of early life feeding management on fattening calves ruminal microbiota

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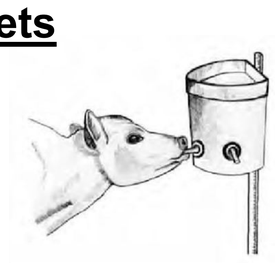
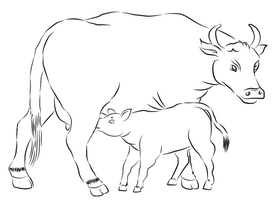
Introduction

- Feeding management during early life is different between dairy and beef cattle.
- We aimed at studying the impact of feeding management during early life on ruminal microbiota, in fattening calves fed high concentrate diets.

Materials and methods

Animals and diets





	REP	DAM
Animals	10 Holstein male calves	8 Parda de Montaña male calves
Rearing system	Separated from their dams at birth	Raised with their dams
Weaning	56 days of age	156 days of age
Diet before weaning	Milk REPLACER and free access to concentrate and straw	DAM's milk and free access to hay and straw
Diet after weaning	Corn-based concentrate and barley straw	

Ruminal microbiota data

Ruminal fluid was sampled via oesophagus tube twice: in growing (**GRO; 172 days of age, 241 kg body weight [BW]**) and finishing periods (**FIN; 295 days of age and 438 kg BW**).

Bacterial and archaeal community composition was analysed by taxonomic profiling of **16S ribosomal RNA V3-V4 variable regions**.

Results

- **Bacteroidetes**, **Firmicutes** and **Actinobacteria** were the main phyla.
- **Shannon index** values were higher in DAM animals in **GRO (2.45 in DAM vs. 1.03 in REP, P < 0.001)** but not in **FIN (2.32 in DAM vs. 1.86 in REP, P = 0.160).**

Results

They had a lot in common...

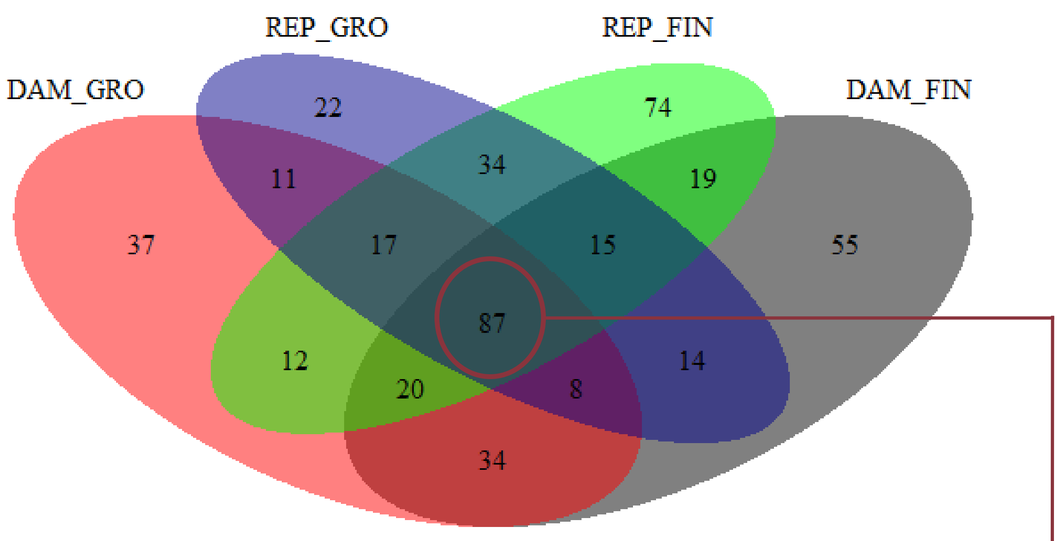


Fig. 1 *Venn diagram showing the number of OTUs shared or unshared by treatments and periods, depending on overlaps.*

Core microbial community gathered 92% of analysed sequences.

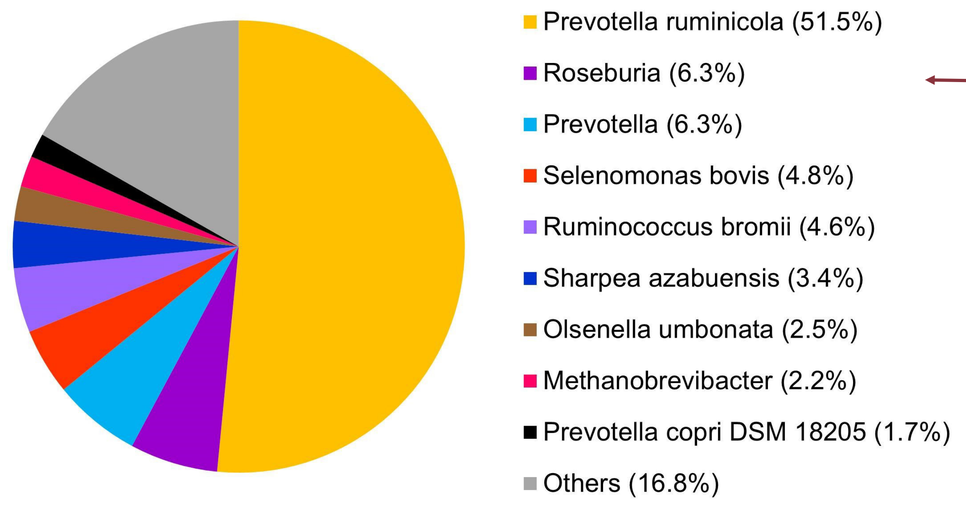


Fig. 2 *Pie chart showing core bacterial and archaeal composition within the four groups.*

… but they were still different!

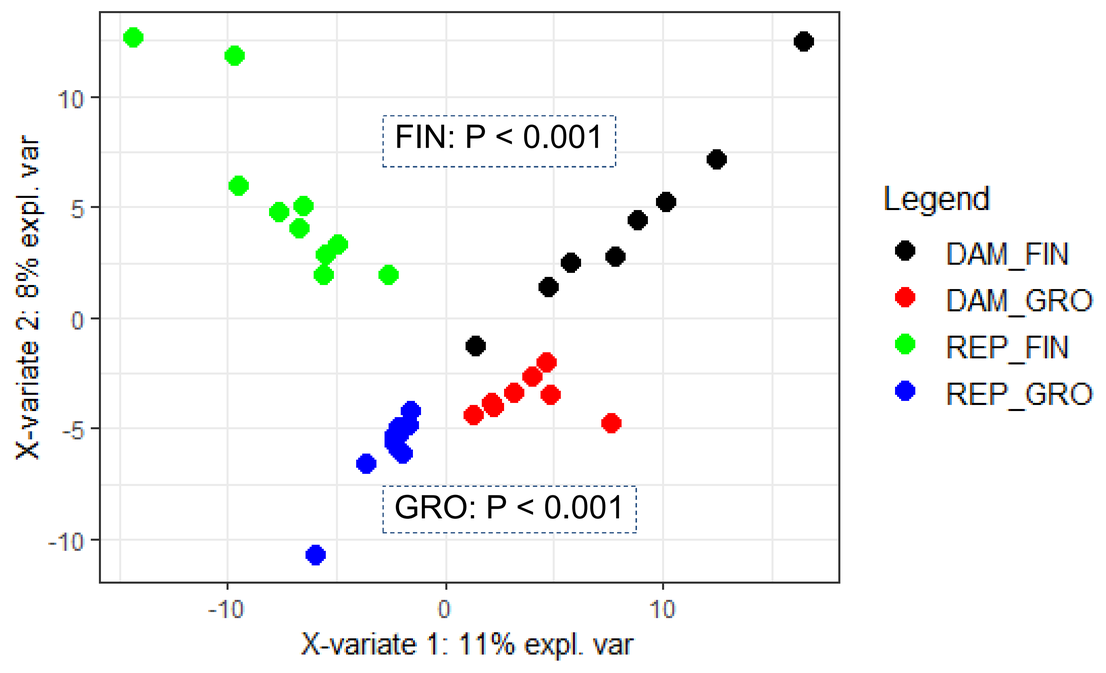


Fig. 3 *PLS-DA on ruminal fluid microbiota. P - values corresponding to Adonis test results are also included.*

Conclusions

Feeding management in early life clearly affected calves' ruminal microbiota and this effect lasted over all their fattening period.