

Microbiota-mediated detrimental effect of dietary fiber deprivation in pigs

Zhenyu Wang, de Vries Sonja, Walter JJ Gerrits, Junjun Wang



Background

Emerging evidences gradually revealed dietary fiber intake sufficiency is associated with various diseases. And our previous work has shown that dietary fiber deprivation induced the extinction of probiotics such as *Lactobacillus*, *Bifidobacterium* but promoted the proliferation of potential pathogens. However, regarding the specific relationship between dietary fiber deprivation and pathogen colonization, limited information is available.

Objectives

The objective of present study is to investigate the specific relationship between dietary fiber deprivation and pathogen colonization resistance.

Methods

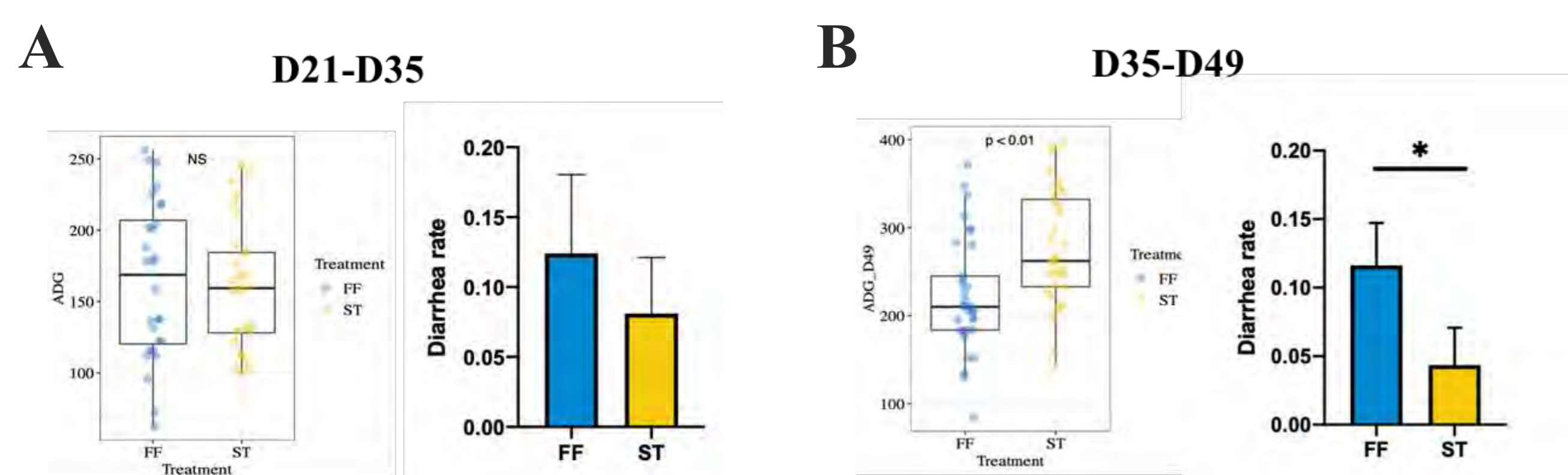
Sample collection

- At day 21, all piglets were weaned, and body weight were determined. Two weaned piglets with similar body weight were selected from each litter and randomly assigned to standard diet (SD) and dietary fiber deprivation diet (DFD).

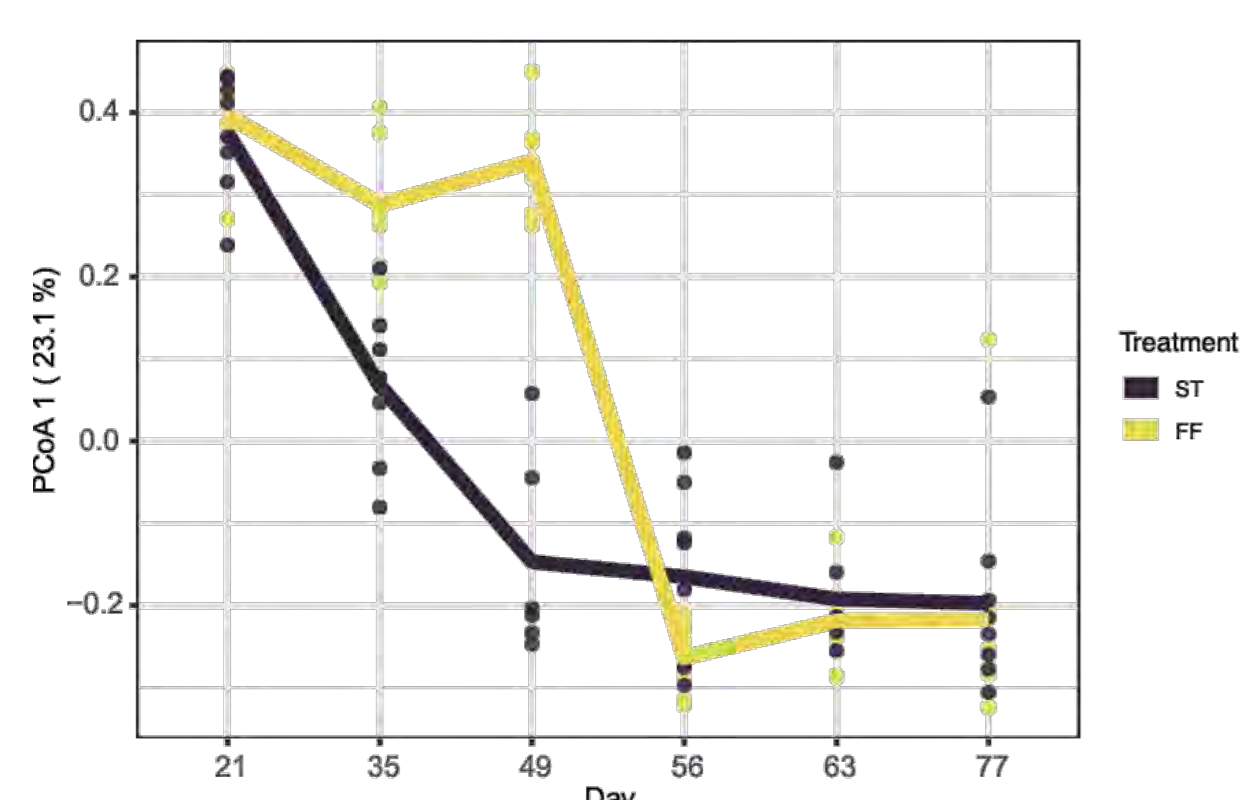
Metagenomics sequencing

- Raw data was first filtered to remove adapter and low-quality read using fastp. Then host contamination was determined and removed by mapping reads to pig genome using kneaddata. After quality control, the resulting high-quality reads were taxonomy classified using metaphlan3.

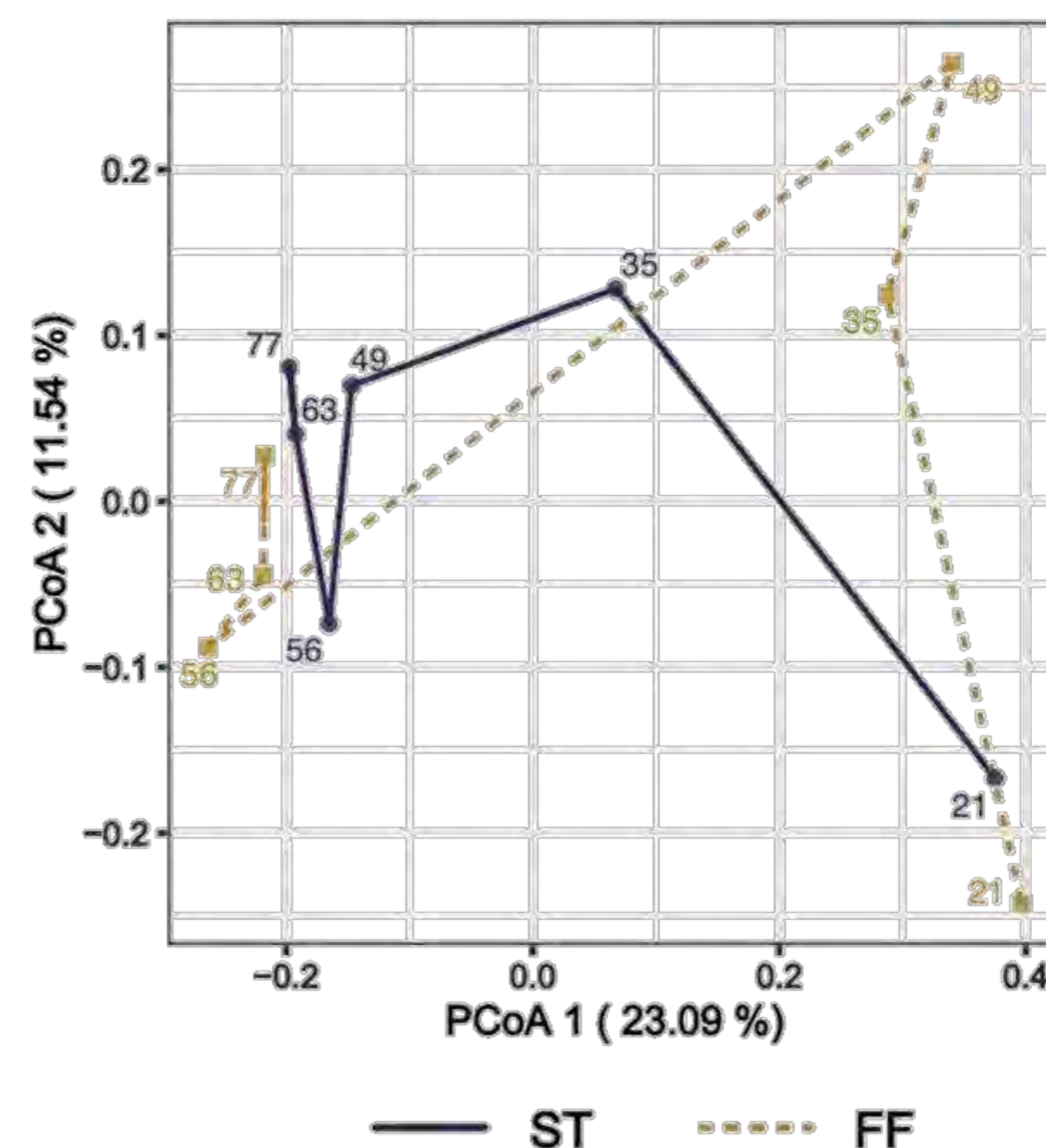
Results



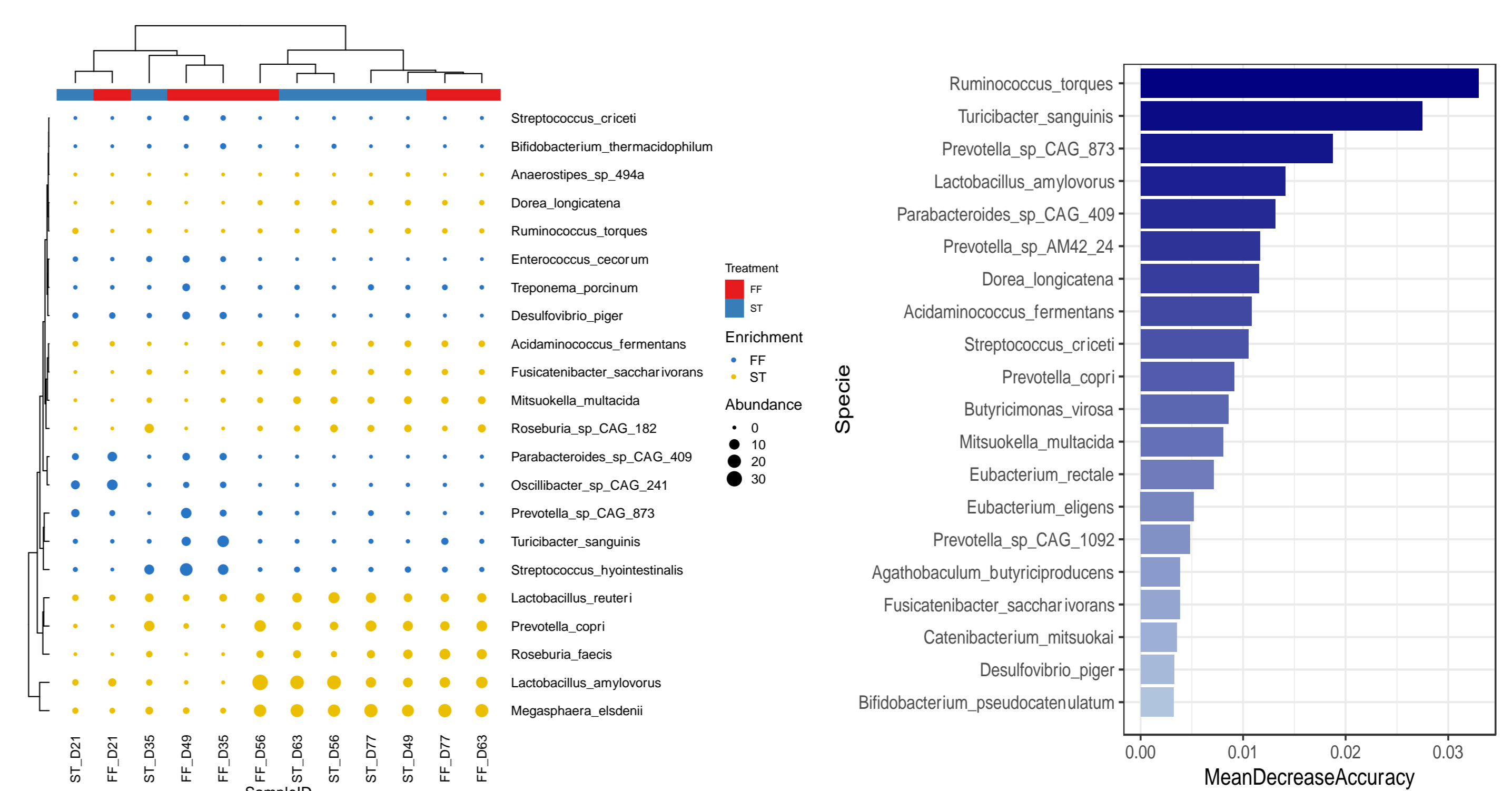
- Dietary fiber deprivation leads to compromised growth performance and increases diarrhea rate



- Dietary fiber deprivation results in the delay of gut bacteria community assembly



- Comparing to standard diet, dietary fiber deprivation reshapes the gut bacteria community structure, But this shift quickly recovered after switching back to standard diet



- By using LEfSe and random forest classification model, we identified *Lactobacillus amylovorus* as important biomarker discriminating dietary fiber deprivation and standard diet.

Conclusions

In conclusion, we verified the detrimental effect of dietary fiber deprivation on gut microbiome and further found out its negative effect on growth performance. Moreover, we also identified a new biomarker of which the abundance dramatically decreased in dietary fiber deprivation. The strain could be potential probiotics to restore the negative effect induced by dietary fiber deprivation.

Acknowledgements

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