

Characterizing Sow Microbiome and Drinking Water Quality at Different Production Locations

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Introduction

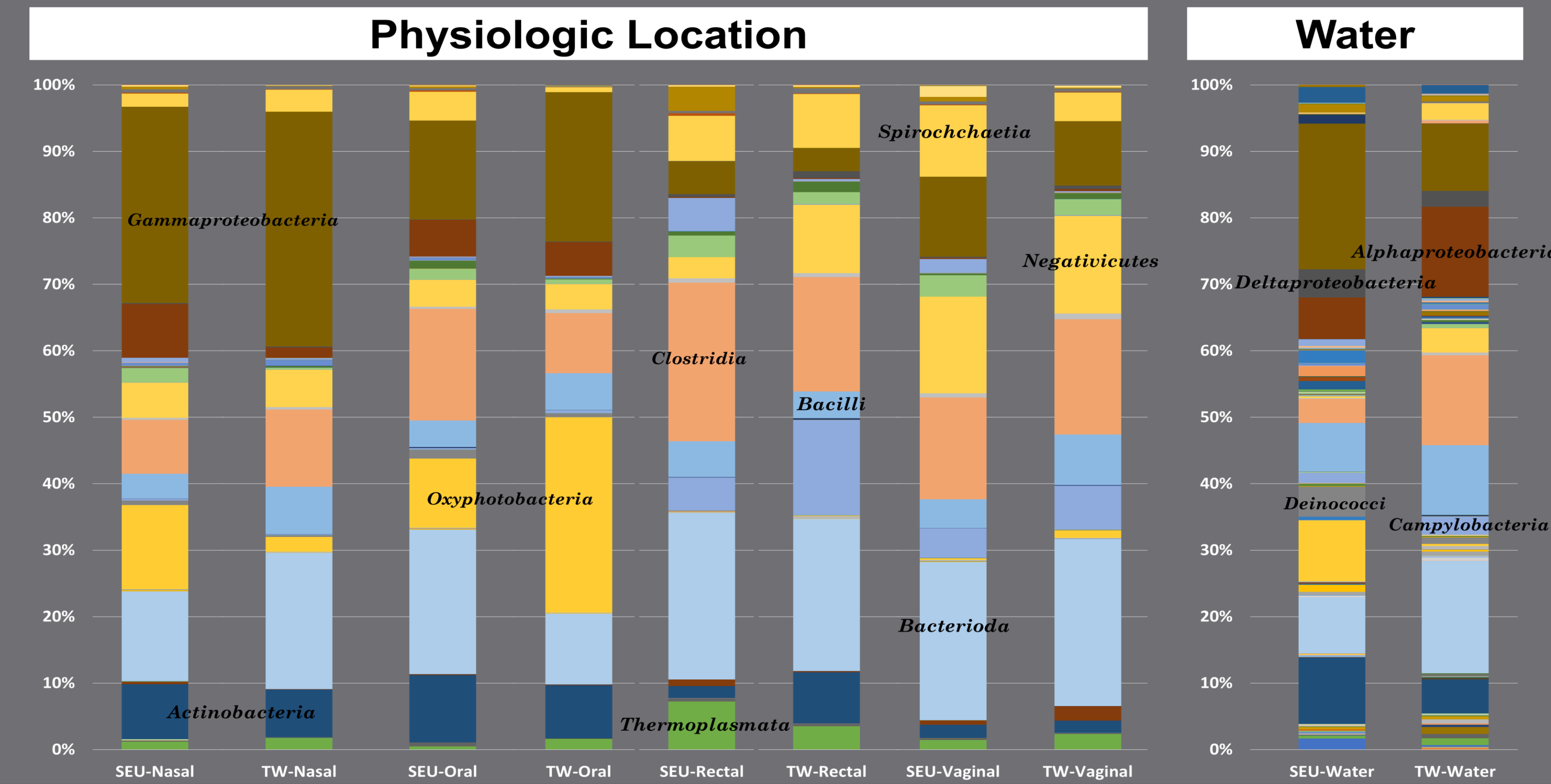
- A diverse community of microorganisms reside in the mammalian reproductive and gastrointestinal tracts that impact health and production.
- Across the United States, the standard of water quality differs from state to state.
- The purpose of this study was to identify connections between drinking water quality and the sow microbiome.

Methods

- Samples were taken at the farrowing and gestation stage (n=40, 20/location) of the North Carolina State Swine Education Unit (SEU) and Tidewater Research Facility (TW).
- Oral, nasal, rectal and vaginal swabs were taken from each sow.
- Water samples were taken from each production location.
- DNA was extracted via column chromatography and sent to University of Arkansas for 16s rRNA sequencing and QIIME2 2020.2 analysis.
- Data were considered significant at $P \leq 0.05$ for main effects and $Q \leq 0.05$ for pairwise differences.

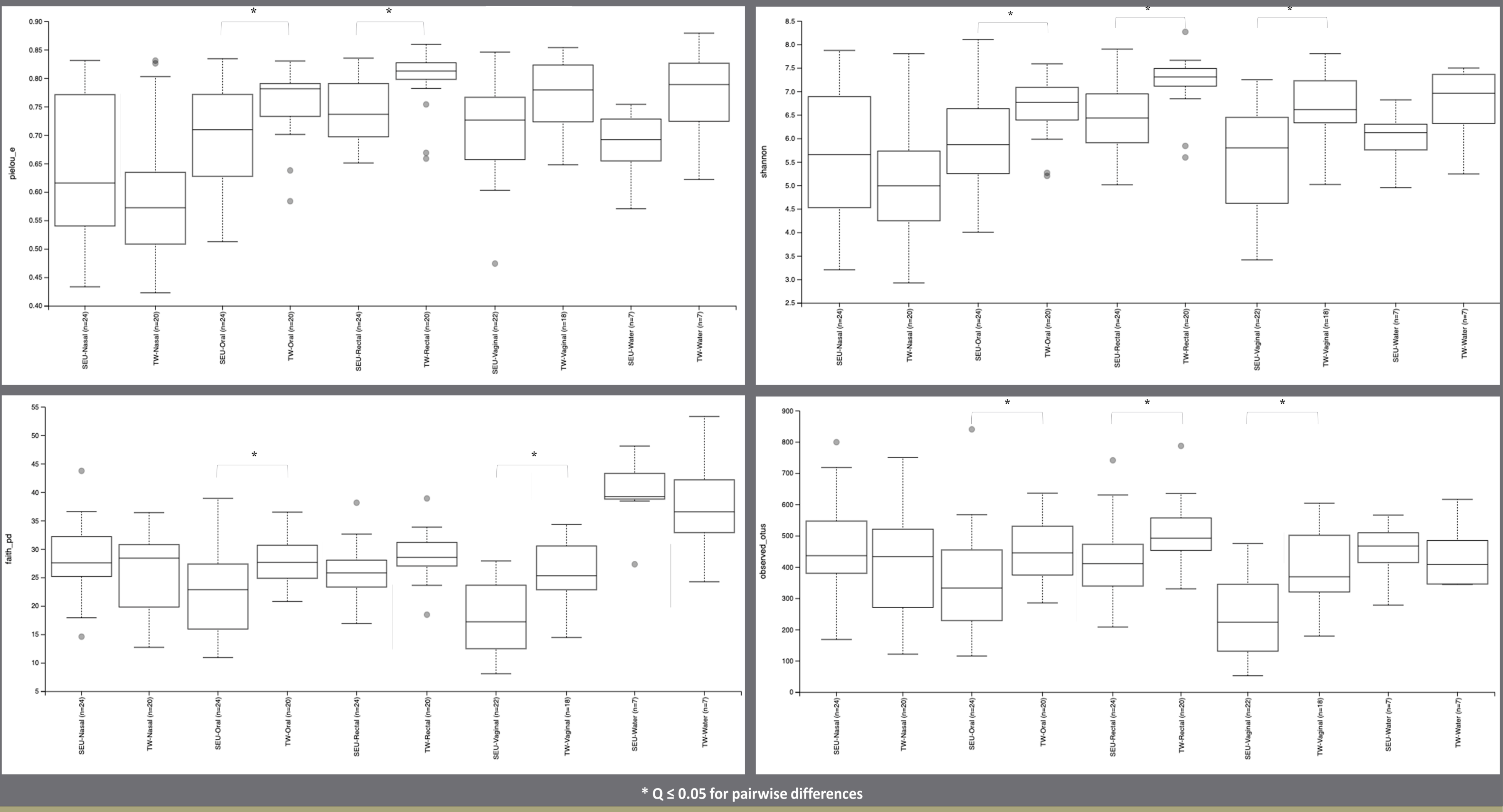
Results

Compositional Differences (ANCOM)

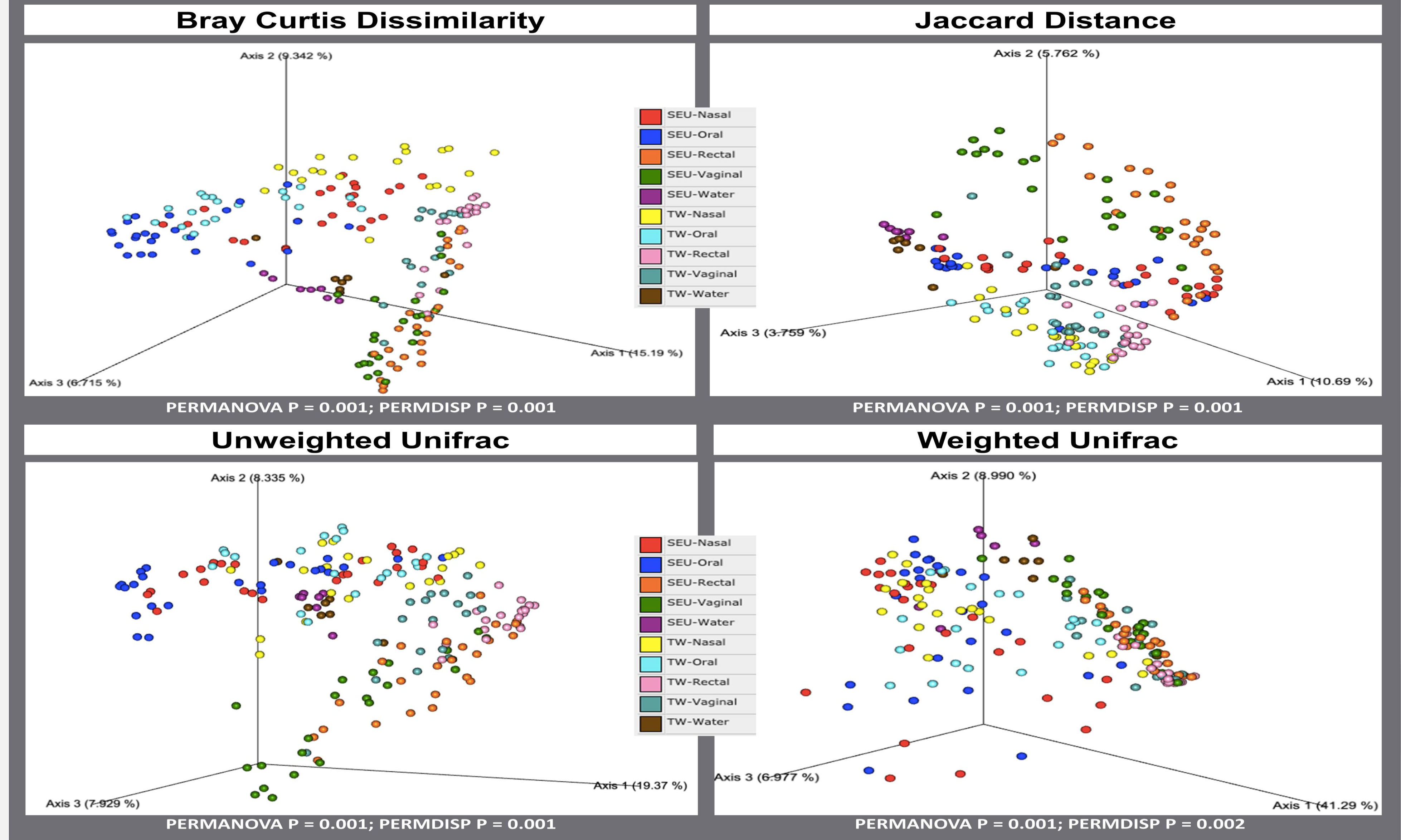


Results

Alpha Diversity



Beta Diversity



Water Quality Parameters Measured at Research Stations

	Swine Education Unit	Tidewater Research Facility	Acceptable Range
Na, ppm	7.00 ^a	133.90 ^b	NA
Cl, ppm	5.27 ^a	112.57 ^b	< 250
K, ppm	4.03 ^a	23.77 ^b	NA
Ca, ppm	13.87 ^a	31.74 ^b	1000
Fe, ppm	0.24 ^c	0.01 ^d	< 0.2
S, ppm	6.32 ^a	2.55 ^b	< 100
Ammonia N, ppm	0.64 ^a	1.97 ^b	< 1 to 2
pH	7.46 ^a	8.26 ^b	5 to 8
Hardness, ppm CaCO ₃	46.89 ^a	188.43 ^b	NA

^{a,b} means are different, $P < 0.001$, ^{c,d} means are different, $P < 0.05$

Summary

- Some Alpha diversity metrics for TW were greater than SEU for oral, vaginal, and rectal samples.
- There were significant differences between locations for all beta diversity metrics possibly due to dispersion within treatments.
- Campylobacteria* was more abundant in SEU water than in TW water
- Clostridia* was more abundant in SEU oral and rectal samples, but less abundant in water samples when compared to TW.
- While some water quality parameters were different, all were within acceptable ranges.

Conclusion

Drinking water quality and environment may influence the sow microbiome.

Acknowledgements

Thank you to the Office of Undergraduate Research at North Carolina State University for providing partial funding for this project.