



Microbial Bacteria in Prince Edward County



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Background

- Microbiomes can express an abundant amount of diversity
- Prince Edward County's microbiome has yet to be studied or tested
- Specific factors such as pH and salinity can effect microbial diversity

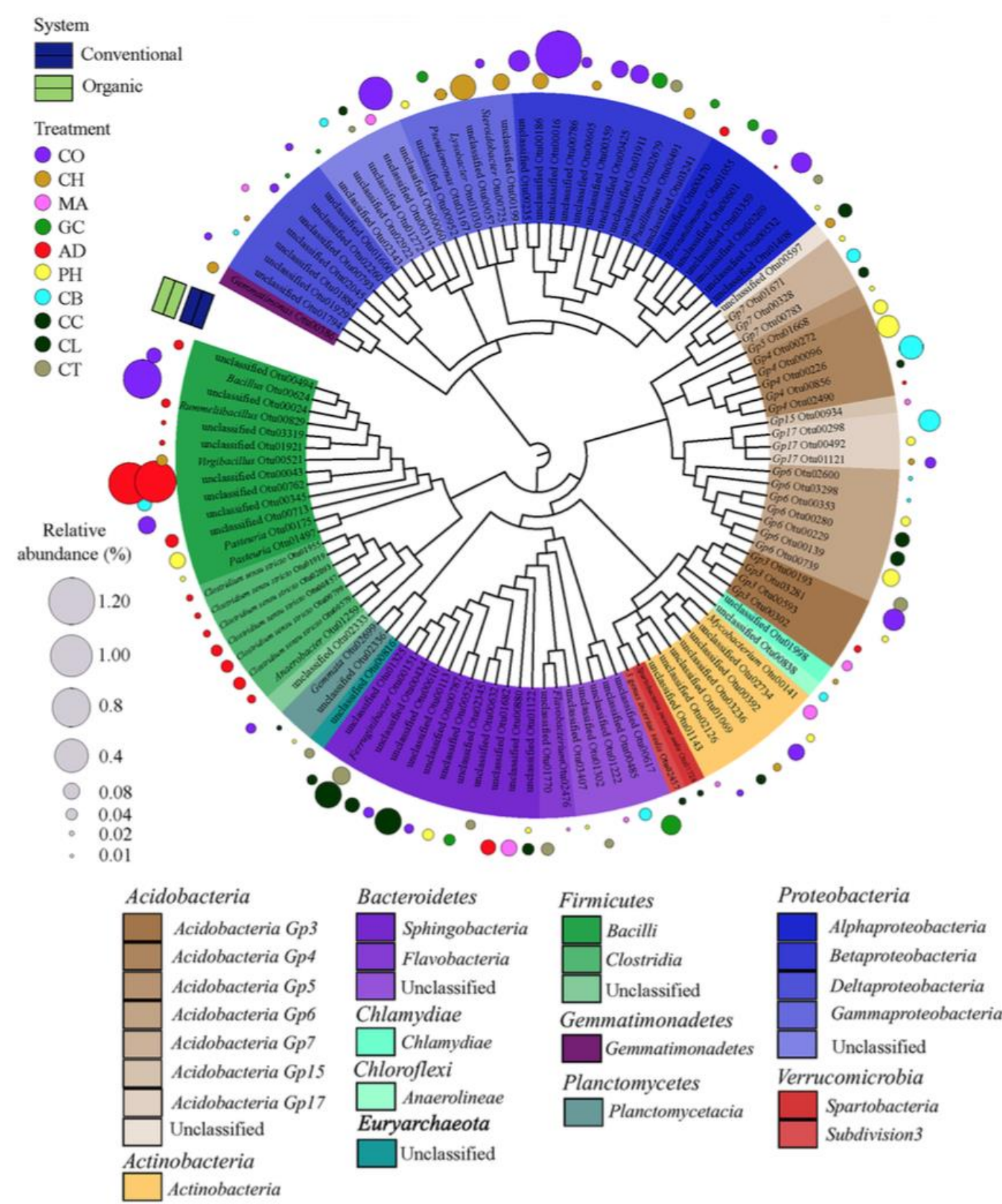
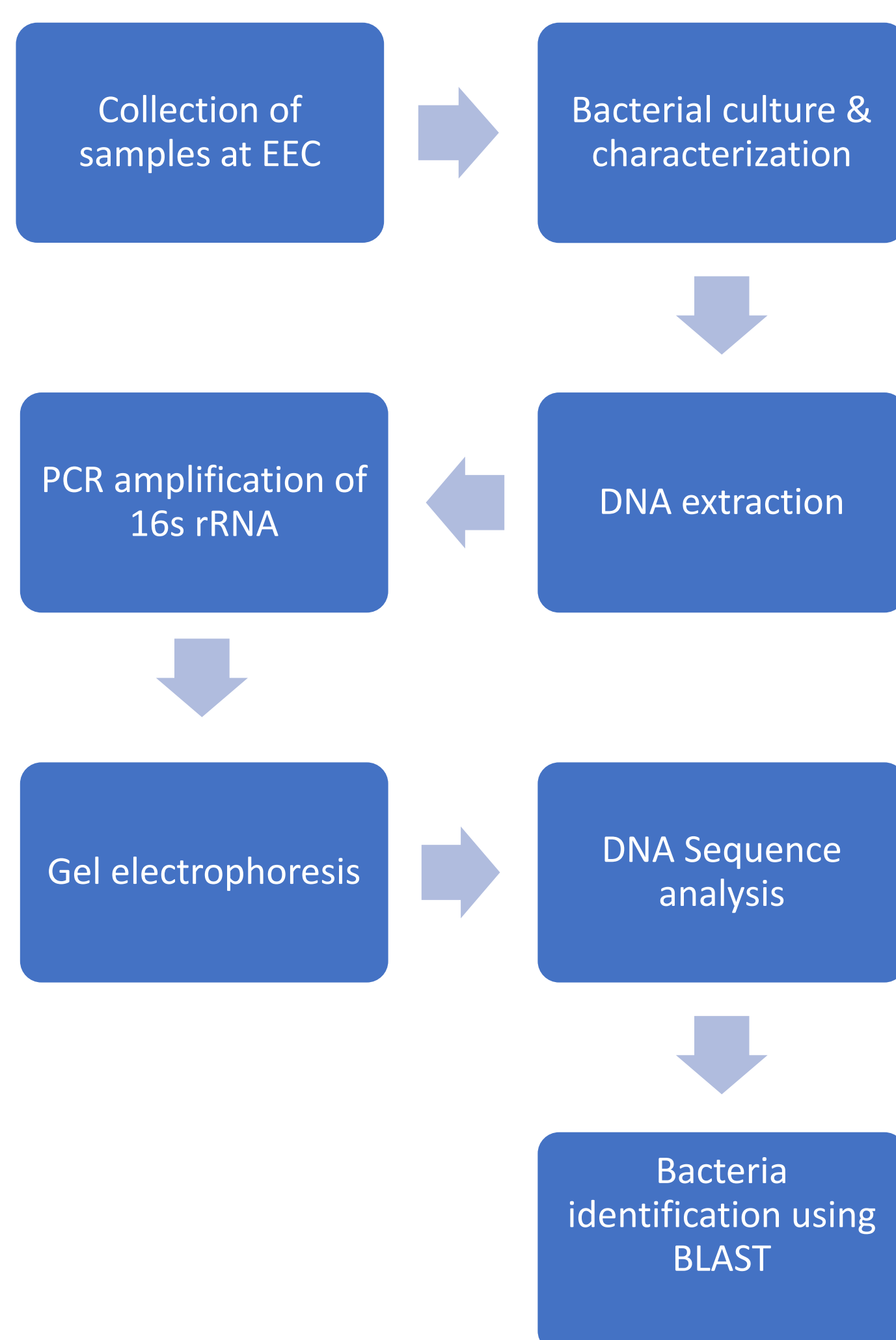


Figure 1. Dendrogram showing the taxonomy and the habitat associated with soil health treatments¹

Specific aim

- The purpose of this study was to understand the microbial diversity in Prince Edward county.
- Our hypothesis was that there would be an abundance of nutrients and pollution at the first site in the soil near the run off because it is close to a farm, whereas at Appomattox river soil, the furthest site, there will be less nutrients and bacteria.

Methods



Site	Characteristic of Bacteria Chosen
Buffalo Creek Soil	Glossy, white
Buffalo Creek H2O	Spotted, grey dot in the center, glossy
Farm H2O	Spotted, glossy, raised, yellow
Farm Soil	Glossy, black/purple
Appomattox River Soil	White, purple dot in center, glossy
Appomattox River H2O	Glossy, orange, raised

Table 1. Site locations of bacteria we isolated and specific characteristics pertaining to each colony.

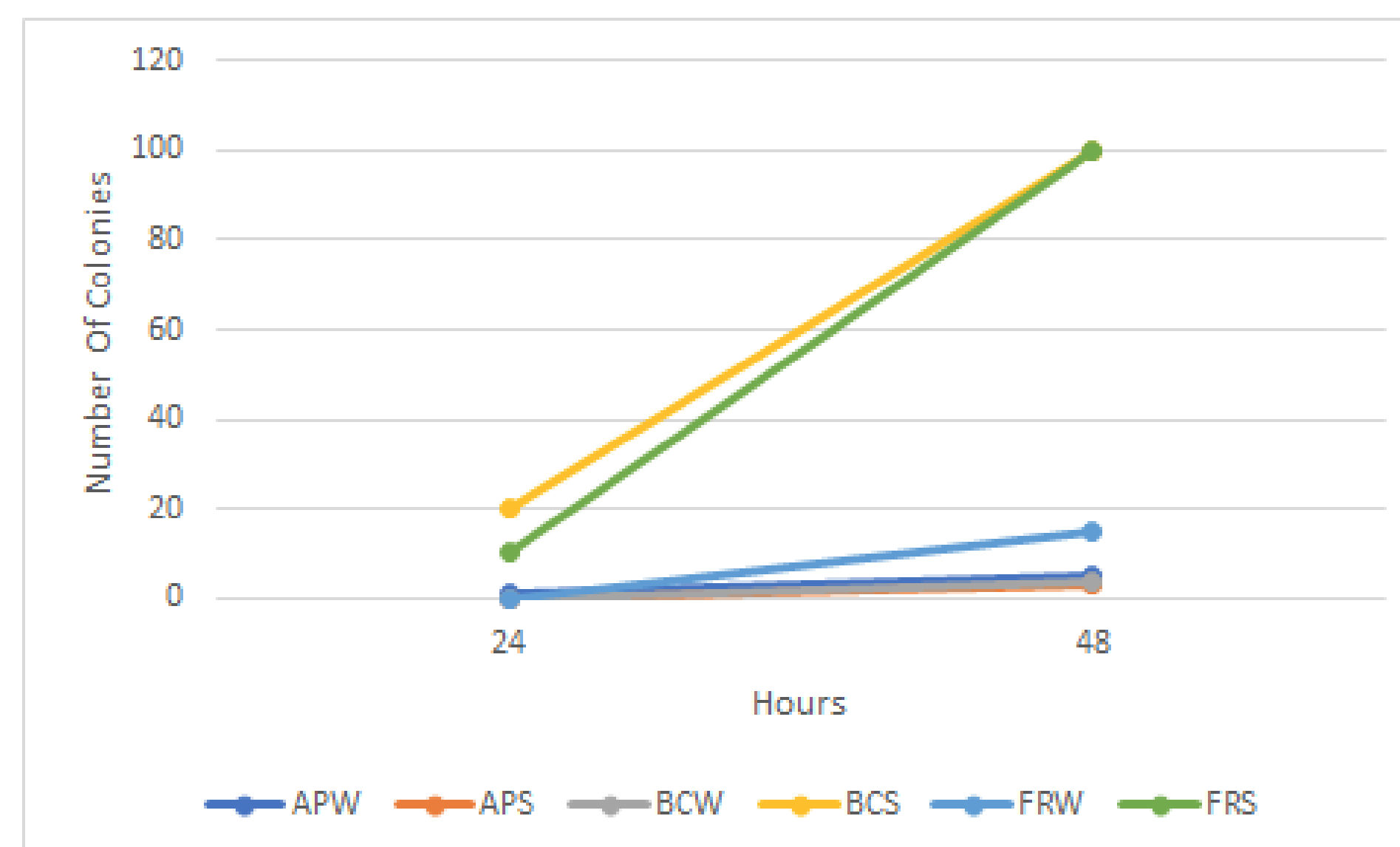


Figure 2. Growth of colonies from both soil and water samples at the Farm location, Buffalo Creek and Appomattox river on the agar over 48hrs .



Data

- Gel electrophoresis was largely unsuccessful
- 3 different strands of bacterial DNA were isolated:
 - *Janthinobacterium Lividium*
 - *Pseudomonas Fredrickbergensis*
 - *Pseudomonas Frederikus*

Location	BLAST match	% Identity	# of Gaps
Buffalo Creek Soil	<i>P. fredrickbergen sis</i>	99%	13
Appomattox River Soil	<i>P. frederikus</i>	99%	6
Farm Soil	<i>J. lividium</i>	99%	9

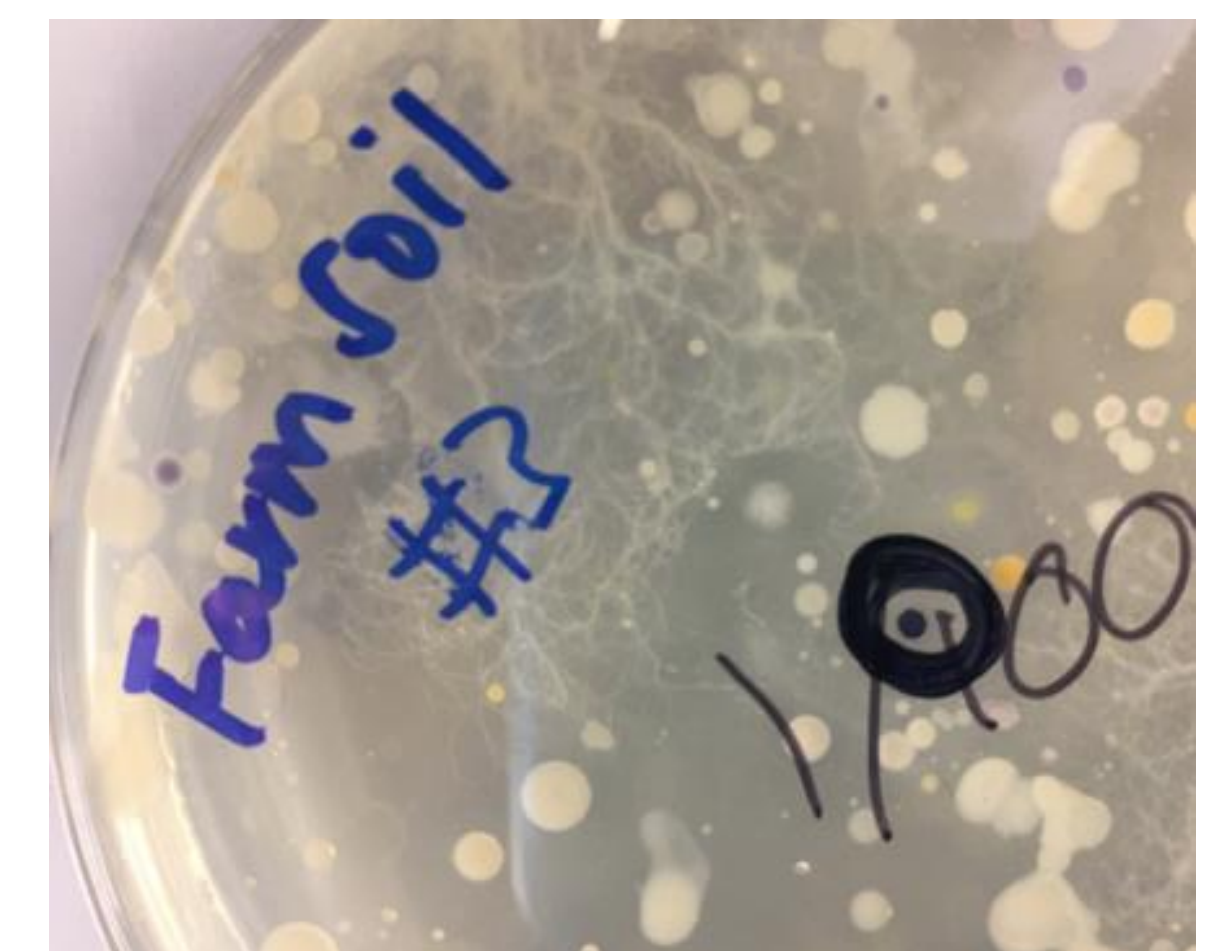
Table 2. BLAST analysis of the three sequenced bacterial samples.

Conclusion

- The three isolated DNA sequences possess qualities such as fungi and tumor-fighting and aerobic degradation properties.
- This experiment opens the window for future projects involving DNA isolation and experimentation in Prince George County.

Future Directions

- We plan to continue this research by studying our bacteria more in depth.
- Specifically *Janthinobacterium lividium* because of it's anti tumor properties in frogs.
- We hope to explore the specific properties that cause this bacteria to fight off cancer.



Citations

Hartmann M, Frey B, Mayer J, Mader P, Widmer F, et al. (2015) "Distinct soil microbial diversity under long-term organic and conventional farming".¹
 Zeng, Q. et al. (2016) "Effects of Soluble Phosphate on Phosphate-Solubilizing Characteristics and Expression of *gcd* Gene in *Pseudomonas frederiksbergensis* JW-SD2."
 Ruiz, Oscar et al. (2015) "Draft Genome Sequence of *Pseudomonas frederiksbergensis* S18, a Psychrotrophic Aromatic-Degrading Bacterium."
 Rebillier, Eria et al. (2016) "Direct and Indirect Horizontal Transmission of the Antifungal Probiotic Bacterium *Janthinobacterium livid* on Green Frog (*Lithobates clamitans*) Tadpoles."
 Valdes, Natalia et al. (2015) "Draft genome sequence of *Janthinobacterium livid* strain MTR reveals its mechanism of capnophilic behavior."