What's in your water?
Microbes of three freshwater wetlands in Southeast, Georgia USA

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INTRODUCTION

- This research is a continuation from last summer and fall when the physicochemical properties of the three freshwater wetlands were gathered and compared between the Oglethorpe Point Elementary School on Saint Simon's Island location, James Boykin Lake in Bill Morris Park in Jesup, Ga, and Laura S. Walker State Park in Waycross, Ga.
- It was focused on seeing what microbes were present in comparison to the physicochemical properties.
- Several tests were conducted to narrow down the species present in each site.

Figure 1: Oglethorpe Point Elementary School, Saint Simon's Island, Georgia
Figure 2: James Boykin Lake, Bill Morris Park, Jesup, Georgia
Figure 3: Laura S. Walker State Park, Waycross, Georgia

OBJECTIVES

The objectives of this study are to:

1. See what microbes reside in each freshwater wetland site.
2. See how these microbes could impact each freshwater wetland site.

METHODS

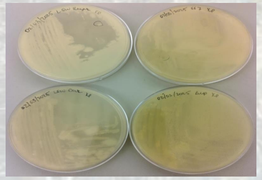
Data Collection

A fresh sample of water was collected from each site at the beginning of the semester. Regular nutrient agar was used to grow colonies to pull samples from for testing.

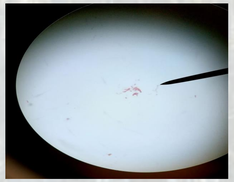
Data Analysis

Testing started with running EMB and MSA plates and gram staining the colonies from each nutrient agar plate to see if the colonies were gram positive or gram negative. Next, a series of tests (Glucose tubes, Sucrose tubes, Lactose tubes, Gelatinase tubes, Lipase plates, and Starch plates) were conducted to narrow down what species of microbe was residing in each site. Hydrogen peroxide slide tests were conducted after the results of the abovementioned tests were concluded. Afterwards, SIM tube tests, MRVP tube tests, a Urea Tube test, and Simmon's Citrate tube tests were also conducted. The results were finalized for the SSI and LSW Kayak sites. Lastly, an antibiotic test was conducted on the BMP and LSW Dam sites to finalize those results. A dichotomous key, *Bacillus* key, and an Antibiotics key was used to interpret the results. See journal for details of study.

RESULTS

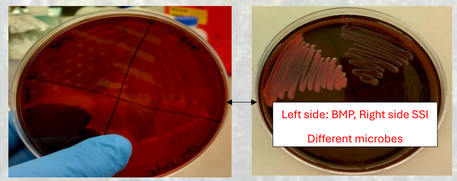


Nutrient agar plates for samples

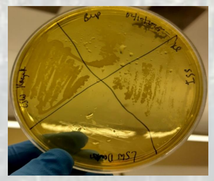


Laura S. Walker Site first gram-staining, gram-negative

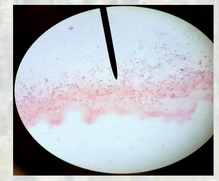
Bill Morris Park first gram-staining, gram-negative



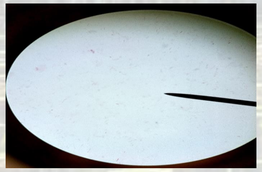
EMB plate positive for BMP (purple) & SSI (pinkish) sites



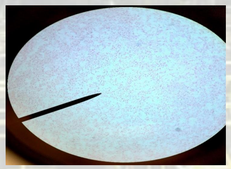
MSA plate positive for BMP, SSI, & LSW Kayak sites



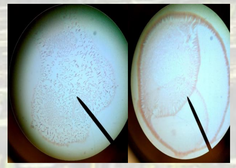
Gram-stain from SSI MSA plate, mixture of gram-positive & gram-negative bacteria



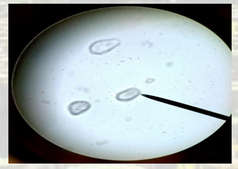
Gram-stain from LSW Kayak MSA plate of gram-negative bacteria



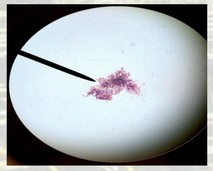
Gram-stain from EMB BMP plates, mostly gram-negative



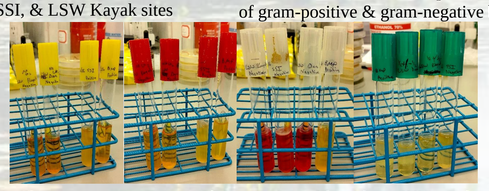
Gram-stain from MSA BMP plate, looks gram-negative with another organism



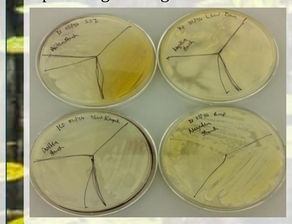
Gram-stain from MSA LSW Kayak plate, looks gram-negative with another organism

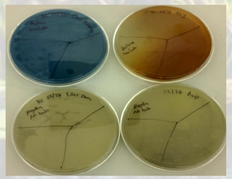


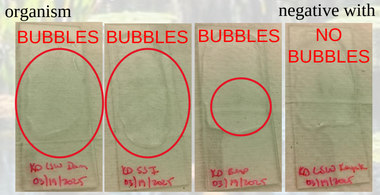
Gram-stain from EMB SSI plate, looks like clump of gram-positive & gram-negative bacteria



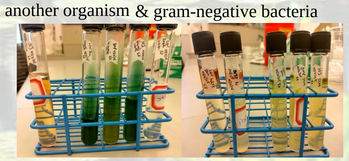
Glucose, sucrose, Lactose fermentation with/without CO2 production; Gelatinase reaction; Lipase & Starch plate with/without halo



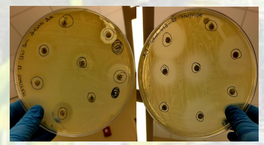




Hydrogen peroxide test for bubble production



SIM Tube for indol, sulfide, & motility test; Simmon's Citrate Tube for citrate as carbon source test; MR-VP Tube test; Urea Tube for urease test; Gelatinase Tube test;



Name of Antibiotic	LSW Dam Site	BMP Site
Penicillin	Resistant	Resistant
Chloramphenicol	Susceptible	Susceptible
Tetracycline	Intermediate	Susceptible
Streptomycin	Susceptible	Susceptible
Erythromycin	Susceptible	Susceptible
Vancomycin	Susceptible	Susceptible
Gentamicin	Susceptible	Susceptible
Ampicillin	Resistant	Resistant

CONCLUSIONS

Given our results, we conclude that:

1. The dominate microbe at Bill Morris Park, James Boykin Lake is *Enterobacter aerogenes.* This is a gram-negative, rod-shaped bacteria that exists as a commensal microflora in aquatic environments. It is common in aquatic environments and considered an opportunistic pathogen in humans.
2. The dominant microbe at Oglethorpe Point Elementary School, Saint Simon's Island is a *Proteus* species. These species are usually, an indication of fecal pollution in the environment.
3. The dominant microbe at Laura S. Walker State Park Dam site Waycross, Ga is *Corynebacterium xerosis.* It is a gram-positive, slightly curved and rod-shaped. It is normally not infectious. The dominant species at the Laura S. Walker State Park Kayak site, Waycross, Ga is *Bacillus cereus.* It can be used as a modulator for water quality if the physicochemical properties are optimal for its growth.

ACKNOWLEDGEMENTS

I want to thank Dr. Hatchel for helping me conduct this study and Dr. Deemy for showing me how cool wetlands are. I also want to thank the Georgia Department of Natural Resources at Laura S. Walker State Park for allowing me to conduct the study and checking on me.

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