Undergraduate Research Symposium May 18, 2018 Mary Gates Hall

Online Proceedings

POSTER SESSION 3

Commons East, Easel 69

2:30 PM to 4:00 PM

Mycoremediation of Coliform Bacteria in University of Washington Bothell Wetlands

Ryan Michael Mayer, Senior, Global Studies (Bothell)
Kellen Michael Maloney, Recent Graduate,
Keenan Viggo Cain, Senior, Environmental Science - Bothell Campus
Mentor: Rob Turner, Interdisciplinary Arts and Sciences

Mycoremediation is a water cleanup method that relies on the ability of mushroom mycelium to extract or eliminate contaminants in the water. Following a series of controlled laboratory tests that demonstrated how woodchips inoculated with King Stropharia (*Stropharia rugusoannulata*) mushroom mycelium could significantly reduce *E. Coli* counts in pathogen-contaminated water, we designed a larger scale experiment to treat contaminated runoff in the UW Bothell/Cascadia College Campus wetland. We created a system that could allow campus runoff to flow into, and then out of, a 55 gallon barrel half full of woodchips previously inoculated with mycelium over the course of 4 to 5 months. We conducted a series of three trials with this system to test its effectiveness at filtering fecal coliform bacteria (FCB). Using a valve to control flow, we sampled input and output concentrations of FCB at times +5min, +30min, +1hr, +2hr, +3hr, +5 hr, +10hr, and +24hr. Our first experiment (Trial One) showed an average of approximately thirty percent decrease in output coliform counts after 1 hour. Trial Two was conducted 9 weeks after Trial One. In that interim, the woodchips sat undisturbed in the barrel in a saturated state. Trial Two sampling and analysis showed no significant change in coliform concentration. Trial Three was conducted 2 weeks after Trial Two. Immediately prior to Trial Three, 10 to 15 gallons of fresh mycelium-inoculated woodchips were added to the barrel. Trial Three showed an increase in output coliform concentrations. Though the first trial indicates that mycoremediation can remove pathogenic bacteria, conditions need to be optimized for the mycelium. The effectiveness of S. rugusoannulata was hampered by long-term inundation. Future implementations of mycoremediation should focus on the sustainable ecology of the fungi and identify environments where it can be integrated to perform wetland services.

POSTER SESSION 4

Commons West, Easel 11

4:00 PM to 6:00 PM

Association between King County Population's Cardiovascular Disease Rate and Accessibility to Environmental Amenities Using GIS

Mingyou Yang, Senior, Environmental Science - Bothell Campus
Mentor: Santiago Lopez, Interdisciplinary Arts and Sciences Program

Social-economic disparity has been shown to be one of the most significant risk factors influencing population health. Some factors that project this disparity include accessibility to fresh food options, green spaces, and healthcare; these amenities are unevenly distributed geographically similar to disease occurrence patterns. In this study, we use a geographic information system (GIS) framework to depict the relationship between cardiovascular disease induced mortality rate and accessibility to services such as farmer's markets, food facilities, parks, and health insurance in King County at the census tract level (N=397). We also used the target population's demographic information such as age distribution, sex ratio, ethnicity, and population density in each census tract as our control variables. We used spatial regression to test the relationships between independent and dependent variables. Our results indicate that the number of people with insurance, Asian and White ethnicity appear to be statistically correlated at a 0.05 significance level. The results of this study show the possibility of predicting risk factors of population's cardiovascular health through the integration of public health and spatial analysis.