Testing the Effectiveness of Mycorrhizae in the Phytoremediation of Heavy Metals from Stormwater

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Heavy metals found in stormwater runoff are a pervasive environmental issue. Heavy metal contamination in places like Flint Michigan have brought a new awareness to the problem. These pollutants pose a threat to not only the aquatic life who inhabit the water bodies, but to humans as well. Phytoremediation, the use of plants to remove non-volatile and immiscible soil contaminants, has gained popularity in recent years as a possible method to remove these pollutants due to its cost efficiency and aesthetics. Although phytoremediation techniques have been researched thoroughly over the past three decades, the incorporation of arbuscular mycorrhizal fungi, those that form symbiotic associations with the roots of host plants, to these techniques, have been minimally explored in stormwater research. This study investigates the effectiveness of mycorrhizae in the remediation of copper (Cu) from stormwater. An experiment was set up where filters, which consisted of the host plant (sorghum sudangrass), growth soil media (a sterilized mixture of perlite, vermiculite, and sand), and mycorrhizal inoculum (species Rhizophagus intraradices) were compared to control filters that contained only sterilized soil media and sudangrass. After six weeks of growth, a heavy storm event was simulated for a week by treating respective plant groups with 50mL of 0 ppb, 500 ppb, and 1000 ppb of Cu(NO)3 solutions. Spectrophotometry was done on the filtrate of the plant groups (mycorrhizal and non-mycorrhizal) to see which group removed the greatest concentration of metals. Although a treatment effect was evident, a t-test value of 0.2142 showed that there was no statistically significantly difference in filtrate concentrations of plants infected with mycorrhizae and those that were not.

Awards Won:

Intel ISEF Best of Category Award of $5,000

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