POSTER PRESENTATION

# EFFECTS OF ACID AND METALS ON BENTHIC ALGAE IN STREAMS OF DIFFERENT TROPHY USING CHEMICAL DIFFUSING SUBSTRATA

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Acid and dissolved metals associated with mine drainage can greatly decrease the abundance and diversity of benthic algal communities however, it is difficult to isolate effects *in situ*. We examined the efficacy of using chemical diffusing substrata (CDS) to determine how acid and metals interact to affect benthic algae in streams with different trophy. CDS containing Mn (24 mg/L), Fe (24 mg/L), Al (6.4 mg/L), acid (1.0N $H_2SO_4$), Mn+acid, Fe+acid, and Al+acid were deployed in a flow-through system to determine flux from the liquid media. Concentrations of metals and/or $H^+$ in CDS treatment solutions significantly decreased linearly over time. Flux values for metals ranged from 0.5 to 7.4 µg/cm$^2$/day, and $H^+$ flux for acid solutions was 212.6 µg/cm$^2$/day. Corresponding water column concentrations that would produce the same flux as CDS metal treatments were estimated to be near the lower end of the range where detrimental effects on algae occur. Acid treatments were estimated to be the equivalent of a stream pH of 2.5. Five replicates of each CDS treatment, and a water control, were placed into a eutrophic (ES) and an oligotrophic (OS) stream. In OS, periphyton on CDS treatments with acid solutions had significantly lower cell densities and significantly more acid-tolerant taxa. Acid treatments did not significantly affect cell densities, and were not related to species composition in ES, as higher alkalinity and nutrients likely increased neutralization processes within the biofilm. Lower chlorophyll and higher phaeophytin concentrations of communities on acid treatments in ES indicated sublethal effects. Metal treatments had little to no effect on abundance or species composition of algae in either stream. It is difficult to use CDS to examine impacts of relatively nontoxic metals because the media concentrations required to generate fluxes in the toxic range are near the limits of solubility.