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Carbon Sinks to Carbon Sources: A Soil Analysis of the Colorado Mountain Pine Beetle Infestation

As the Mountain Pine Beetle (Dendroctonus Ponderosae) infestation progresses eastward across the continental divide, it threatens Ponderosa Pine trees on the eastern side of the divide. My study for this year's ISEF aims to understand the effect this impending infestation could have in the future. I analyzed this effect from a soil perspective, taking soils from Lodgepole Pine Trees in Grand County, CO and comparing their composition, relative abundances of organic compounds, and CO2 respiration rates to Ponderosa Pines in Boulder County, CO. In doing so, I first used remote sending to find the sites at which I collected the soils. After careful preparation of the soils, I packed some samples for GCMS spectrometry and some for Carbon and Nitrogen analysis, while leaving other samples in air-tight jars for a 41 day incubation. The most significant data I found showed an average 2.73 times higher rate of respiration among Boulder County soils. I have a planned duff layer analysis. This suggests that on the eastern divide, decomposing trees (and their needles first) will create an influx of Carbon in the microbial soil systems, causing a higher rate of respiration and more CO2 released into the atmosphere. The far-reaching applications of this study suggest that in addition to the loss of pine tree forests in Colorado, the Mountain Pine Beetle poses the threat of more greenhouse gas emissions by causing an increased rate of CO2 respiration in soils where pine trees have decomposed on the eastern side of the continental divide.