Alleopathic effects of garlic mustard (*Alliaria petiolata*) on soil bacteria

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Introduction

- Garlic mustard (*Alliaria petiolata)* is an invasive biennial plant in the United States.
- Invasive species affect soil communities in ways that promote their own growth while inhibiting growth of other native species (Lankau 2011).
- *A. petiolata* produces allelochemicals which inhibit mycorrhizal fungi in soil responsible for plant growth (Lankau 2011).
- If *A. petiolata* affects nitrogen-fixing bacteria such as rhizobia, it could alter the nitrogen cycle in the ecosystem.

Hypothesis

- *Do to A. petiolata*'s allelochemicals we expect differences between soil communities between plots with and without *A. petiolata.*

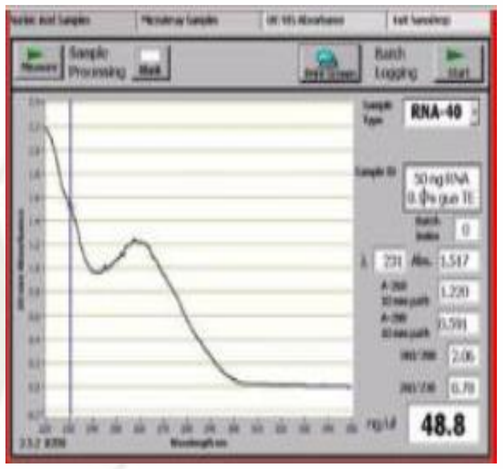
Figure 1 Photo of sample site with *A. petiolata* taken July 12, 2011

Methods

- We studied soil communities under three conditions: 1) with *A. petiolata*, 2) without *A. petiolata*, and 3) with *A. petiolata* removed .
- Study sites were divided into 18 1x1m plots with 6 replicates of each treatment (Fig. 1).
- Plant species in each plot were surveyed to describe plant communities.
- *A. petiolata* in random plots were removed and all soil samples were collected a week following, allowing for the drainage of possible allelochemicals from the soil.
- DNA samples from each soil were and extracted using MO BIO UltraClean Soil DNA Isolation Kit and gel eletrophoresis was perform to confirm extraction (Fig. 2).

Trouble Shooting

- PCR reactions using extracted DNA were not successful. So, we began trouble-shooting measures.
- To demonstrate that the primers were not bad, we tested them on a successful DNA extraction and got positive results in our electrophoresis gel.
- Humic acid was another possible contaminate that would inhibit PCR. It has a high level of absorbance at 230 nm, and this was characteristic in a majority of our nanodrop graphs.
- Ethanol was another possible PCR inhibitor. We used it in the extraction phase, so we evaporated and re-suspended our samples, but this did not help.
- None of these steps worked so we tried re-extracting our DNA with the MO BIO UltraClean Soil Isolation Kit with no positive results.
- We are ordering a new extraction kit, so hopefully the kit was the problem and there is not an issue with the soil itself.



Poor Nanodrop Results

Future work

Once successful PCR has been achieved, we plan to

- Digest PCR product in order to investigate RFLPs (restriction fragment length polymorphisms.
- Identify OTUs (operational taxonomic units) in order to determine whether there are different communities composed of these OTUs.

References

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