WHAT IS PHYTOREMEDIATION?

There are many ways to stop contaminated soils from leaching into your garden. One way is to use raised planting beds with clean soil. Another method is phytoremediation: using plants (“phyto-”) to lower the impact of harmful pollutants (“-remediation”).

Phytoremediation uses microorganisms (organisms that are invisible to the naked eye) that naturally reside on plant roots and the surrounding soil, to process the contaminants. These microbiota then break down the chemicals. Another form of phytoremediation is to use plants to directly absorb heavy metals through their roots. Both methods help lower the concentration of harmful contaminants in the soil and reduce the health risks associated with urban gardening.

RIPA's Park-as-Lab (PAL) is a research collaborative through which scientists, environmental advocates, and communities work together on scientific research. PAL works to encourage civic engagement, support STEM career paths, and increase our understanding of New York City's ecosystems. It is research for the people, by the people!

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Gardening in New York City is a lovely way to connect with the earth despite living in the Concrete Jungle. It is a chance for you to work with your hands, be outdoors, and even add to your diet, but it can also have risks: much of NYC's soil has elevated contaminants from past human activity. As an urban gardener, you may already be aware of the difficulties and risks of growing plants in the city.

Two major concerns are lead and polyacrylamide hydrocarbons (PAHs). Lead is a big problem in urban soils because of lead gasoline. PAHs result from incomplete burning of various chemicals used in industry. Both are found in NYC's soil, especially along roads in low-income neighborhoods. These chemicals do not break down over time and are toxic to humans, and can enter into the plants grown in contaminated soils, making them harmful when eaten.

**EXPERIMENTAL DESIGN**

The recently restored Living Shoreline (LS) meadow of Randall's Island was the site of 11 study plots. There were three experimental plots with high lead levels, three with low lead levels, two with high PAH levels, and a control plot for each conditions.

Two grass species shown to be useful in phytoremediation were planted in the eight experimental plots: red fescue (*Festuca rubra*) and switchgrass (*Panicum virgatum*).

Every week from May to September, the team recorded plant survivorship, environmental conditions, percent cover, and growth of the two study plants. Plant and soil samples were taken at the beginning of the study, midway through, and in September. These samples were sent off to our partnering labs!

**PRELIMINARY RESULTS**

The bacterial diversity of the control and experimental plots were not significantly different. This suggests the pollutants are not suppressing overall bacterial diversity, although they may be affecting the community composition.

We also did not find significant differences in the lead levels in our study plants, suggesting that the plants did not absorb lead. There was also no significant difference in plant height between those growing in a low lead plot and high lead plots. However, this was a short pilot study and a longer experimental phase may result in different results.

In the coming months, our analyses on the complete data set will add to these initial findings. Check bit.ly/RIPA-PAL for updates!