

University of Louisville

ThinkIR: The University of Louisville's Institutional Repository

Undergraduate Arts and Research Showcase

Undergraduate Research

2021

Soils Associated with the Invasive Grass: *Microstegium vimineum* Increases Growth of Native Trees

Bethany Lee

bethany.lee@louisville.edu

Kimberly Koenig

kimberly.koenig@louisville.edu

Sarah Emery PhD

sarah.emery@louisville.edu

Follow this and additional works at: <https://ir.library.louisville.edu/uars>



Part of the [Natural Resources and Conservation Commons](#)

Recommended Citation

Lee, Bethany; Koenig, Kimberly; and Emery, Sarah PhD, "Soils Associated with the Invasive Grass: *Microstegium vimineum* Increases Growth of Native Trees" (2021). *Undergraduate Arts and Research Showcase*. 51.

<https://ir.library.louisville.edu/uars/51>

This Book is brought to you for free and open access by the Undergraduate Research at ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in Undergraduate Arts and Research Showcase by an authorized administrator of ThinkIR: The University of Louisville's Institutional Repository. For more information, please contact thinkir@louisville.edu.

Soils associated with the Invasive Grass: *Microstegium vimineum* Increases Growth of Native Trees

Bethany Lee, Kimberly Koenig and Dr. Sarah Emery

Department of Biology, Louisville, KY

Introduction

Microstegium Vimineum is a well-established, and fast spreading invasive grass that can influence soil biota and cause chemical or physical changes to surrounding species.

We hypothesize that native tree species in invaded soils would exhibit less growth than native tree species in native soils.

Methods

- Five native trees: *Fraxinus pennsylvanica*, *Carya ovata*, *Acer saccharum*, *Quercus rubra* and *Cercis canadensis*.
- 6 soils to be tested - from three field sites that held both a native and invaded soil - along with a control soil, resulting in 7 total trial conditions. Each trial condition was replicated 10 times.

Results

- *Cercis canadensis* exhibited too low germination.
- *Acer saccharum* saw no preference between invaded/native soils.
- *Carya ovata* saw more biomass in invaded soils, though it was not statistically significance.

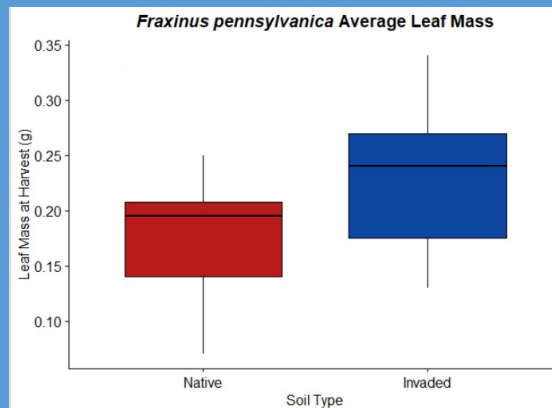


Fig 1 White ash shows significant differences between invaded vs native soils when analyzed through a paired t-test. $t = -2.4496$, $df = 27$, $p\text{-value} = 0.02107$

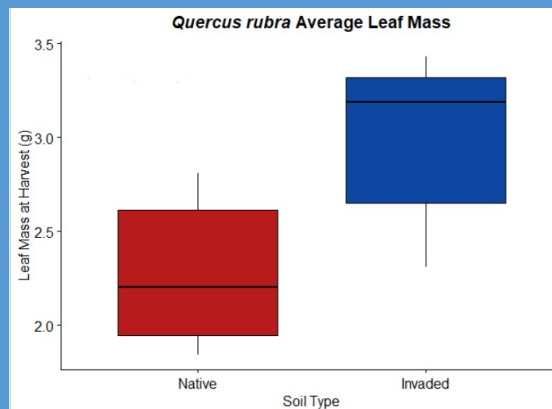
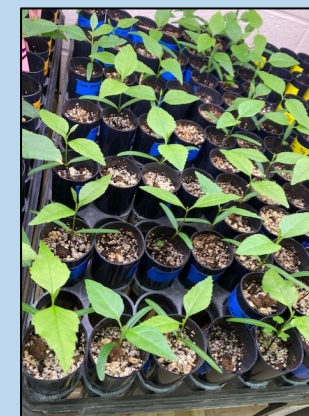


Fig 2 Red oak shows significant differences between invaded vs native soils when analyzed through a paired t-test. $t = -2.6121$, $df = 9$, $p\text{-value} = 0.0281$



Above: *F. pennsylvanica* during harvest
Left: Growing time of *F. pennsylvanica*

Conclusions

- Invasive species are known to inhibit native flora growth, not enhance growth.
- The *M. vimineum* is altering the biota in the soil – resulting in more aboveground mass, through more leaf mass.
- In the invaded soils, microorganisms could be helping the native plants, or there could be more nutrient distribution to native plants.



Above: *Q. rubra* during their growing time
Left: aboveground growth of *Q. rubra*