Effects of Burn Severity on Taxonomic and Functional Trait Diversity in Pinelands Ecosystems

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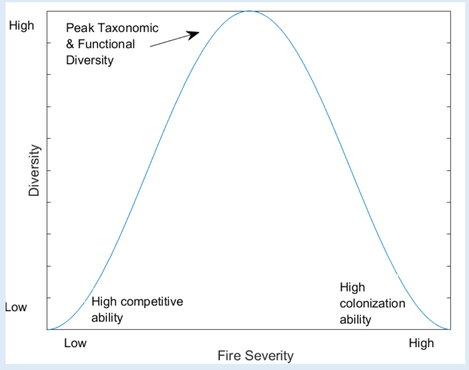
Introduction

- Intermediate Disturbance Hypothesis (Connell 1978) predicts maximized species diversity at moderate disturbance regimes
- Frequency, intensity of wildland & prescribed fire events increasing due to climate change
- How does fire disturbance affect taxonomic and functional diversity of soil-dwelling arthropods?
- This project: analyze taxonomic, functional diversity of arthropods in NJ Pinelands to describe community response to fire-severity gradient

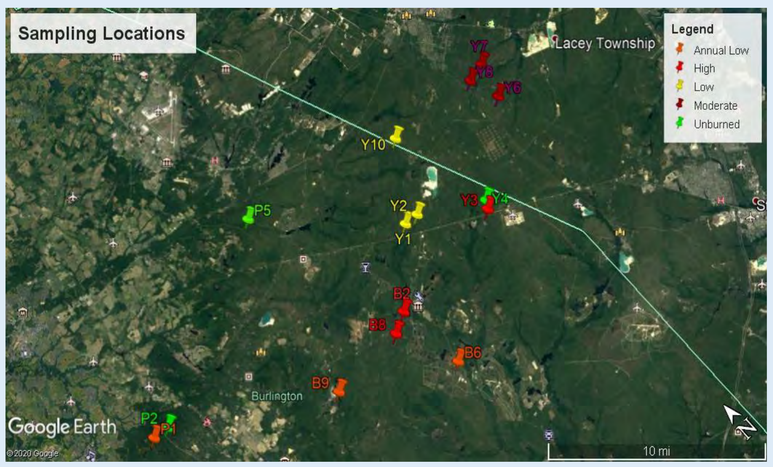
Hypotheses



H1: Moderate fire disturbance will favor high taxonomic and functional diversity of soil-dwelling arthropods in NJ Pinelands;

H2: Species functional traits will be significant drivers for post-fire community assemblage

Study Area



Materials and Methods

- Arthropods sampled via pitfall traps (Fig. A) in July, August 2020
- Plot Characterization: avg. litter depth, avg. soil carbon, loss-on-ignition, description of vegetation
- Morphospecies ID
- Functional Trait ID: Body Size, Dispersal Mode, Trophic Guild

Ongoing Tasks

- Convert morphospecies ID to taxonomic ID
- Complete functional trait analysis
- Complete soil chemical analyses

Preliminary Results

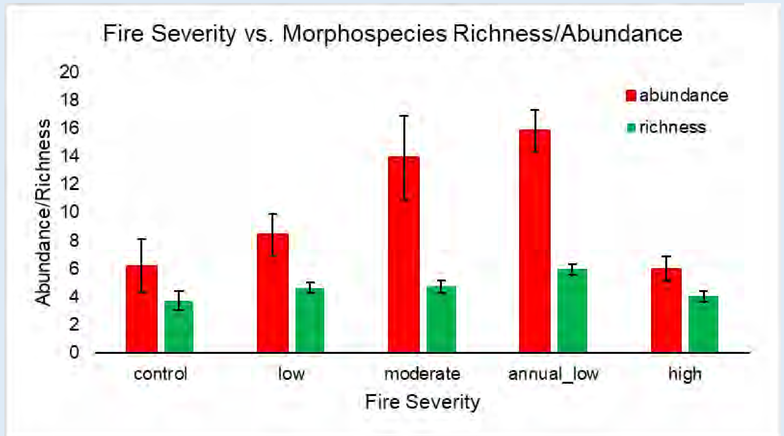


Fig. 1: Richness and abundance of arthropod communities by morphospecies across fire severity gradient (n = 12).

Preliminary Results cont.

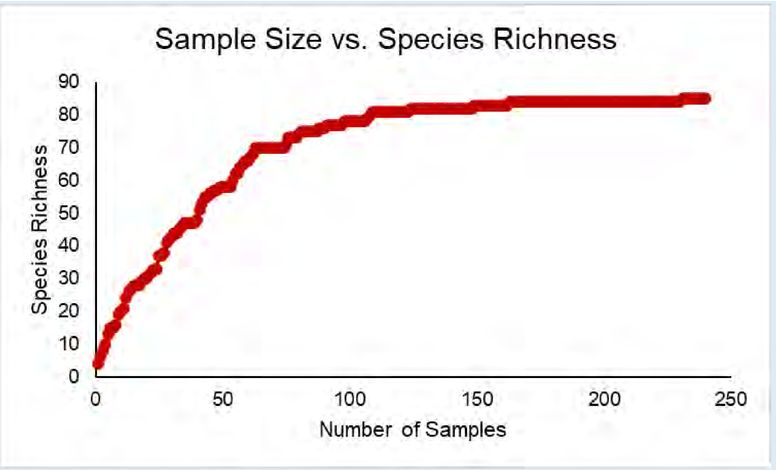


Fig. 2: Rarefaction curve indicates that sampling efforts sufficiently represent arthropod community in NJ Pinelands.

Discussion

- Preliminary data indicates that abundance peaks at moderate fire severity & low severity when burned annually (Fig. 1)
- Little variation in morphospecies richness across fire severities
- Moderate-severity or low-annual fire regimes may support greater arthropod productivity
- Future work: analysis of functional traits (dispersal mode, trophic guild, body size)
- Expect correlation between low-severity fire and competition (trophic guild), high-severity fire and colonization (dispersal mode)

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