Hymenoptera assemblages in aspen-dominated and black spruce-dominated post-fire successional trajectories in boreal black spruce forest of interior Alaska

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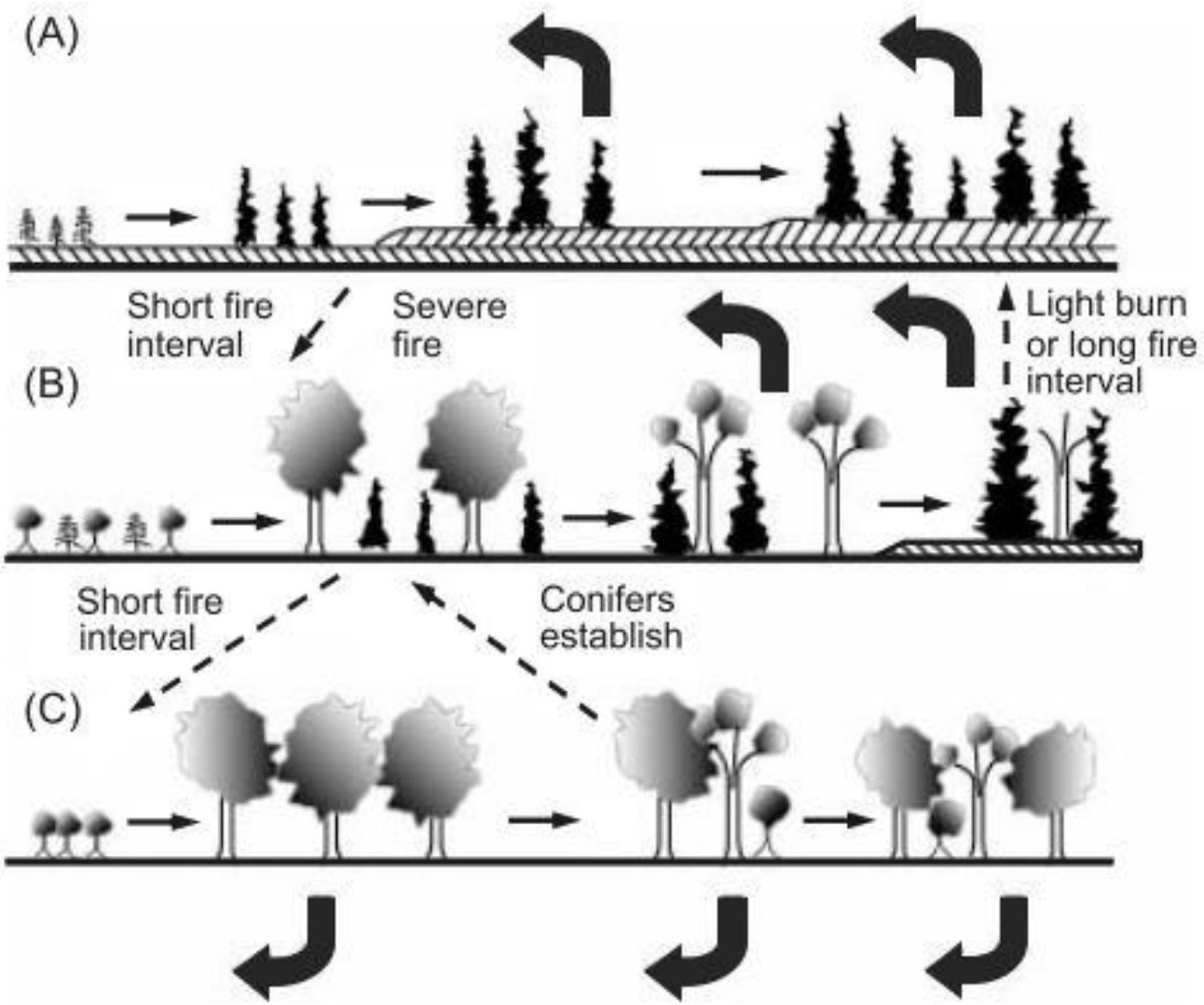
Formica subaenescens

Camponotus herculeanus

Introduction/Rationale

Post-fire successional trajectories in Alaskan boreal forests



(Johnstone *et al.* 2010: Fire, climate change, and forest resilience in interior Alaska)

Introduction/Rationale

trembling aspen

black spruce

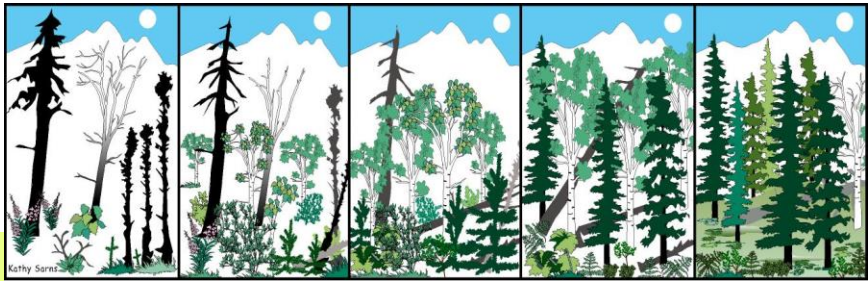
- *EFN-mediated insect herbivore defense*
- *Clonal, long-lived*

Goal/Objectives

Goal: Characterize differences in boreal Hymenoptera communities across successional time and between post-fire successional trajectories.

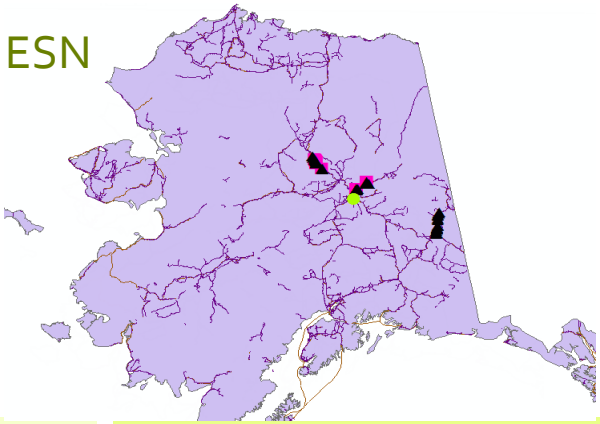
Objectives:

1. Test the hypothesis that aspen fosters high abundance and diversity of predatory Hymenoptera
2. Characterize changes in the boreal hymenopteran community during post-fire succession



Design overview

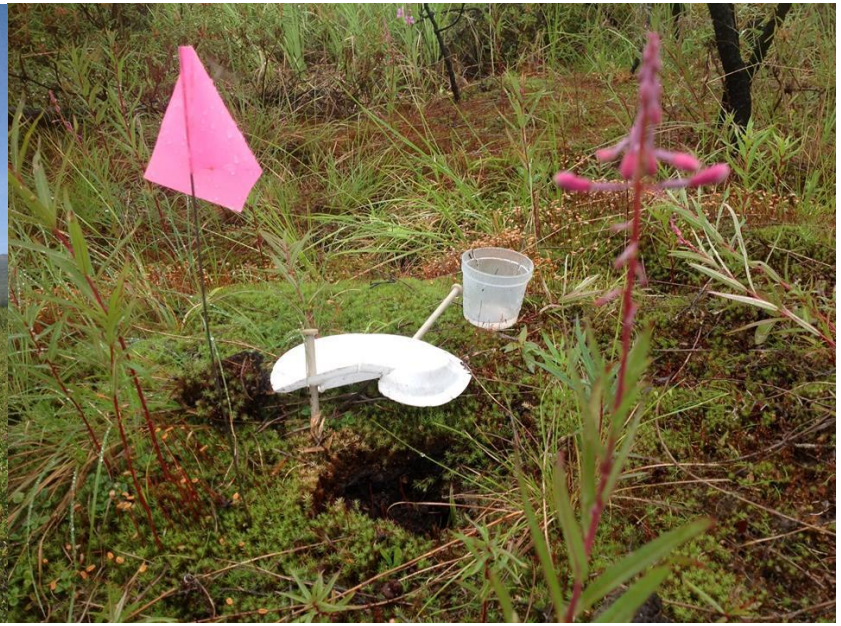
LTER ESN



Number of sites

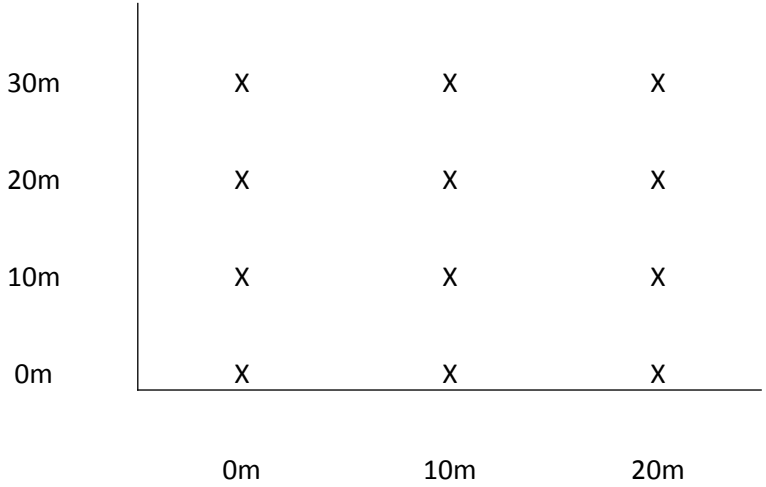
Successional trajectory → / Stand age ↓	Aspen	Black Spruce	Mixed
Young	5	4	4
Intermediate	4	4	4

Methods: Hymenoptera sampling



100 sweeps/site

Schematic of pitfall sampling layout. 3 transects, each 10 m apart, sampled every 10m along length.



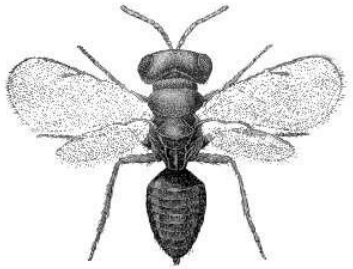
Data analysis

Does aspen foster a higher diversity/abundance/richness of predatory hymenoptera than black spruce?

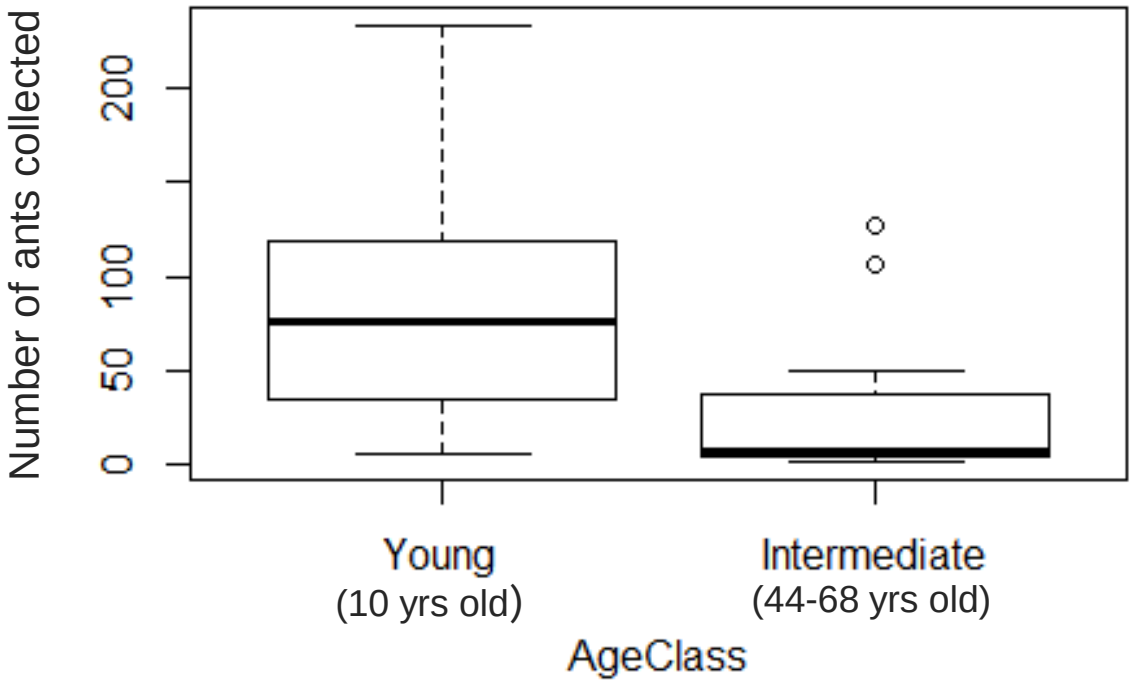
Do hymenopteran communities vary by age class?

Are there other environmental factors that explain predatory hymenopteran community composition (soil moisture/temperature, understory vegetation, canopy cover, etc.)?

Do ants and parasitoid wasps follow similar patterns across successional trajectories and time?



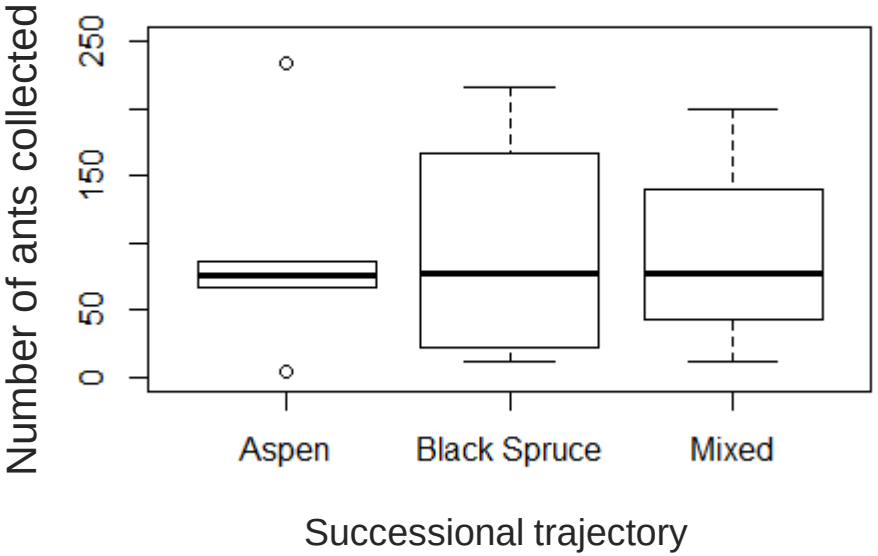
Preliminary results: ant abundance



Total number of ants collected: 1556

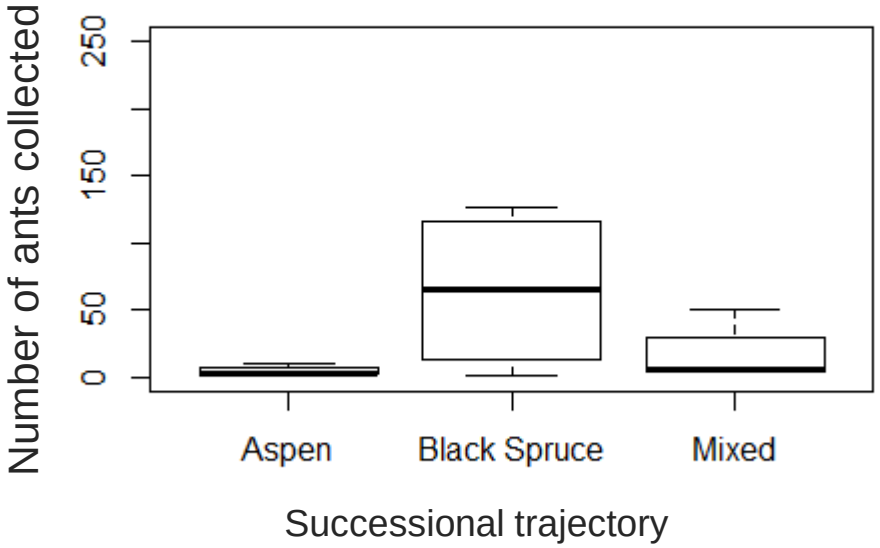
2 sample t-test, t=2.58, df=23, p=0.018

Preliminary results: ant abundance



Young (10 yrs since burn)

One-way ANOVA, f=0.001, df=2,10, p=0.998



Intermediate (44-68 yrs since burn)

Welch ANOVA, f=2.07, df=2,4, p=0.23

Preliminary results: ant species richness

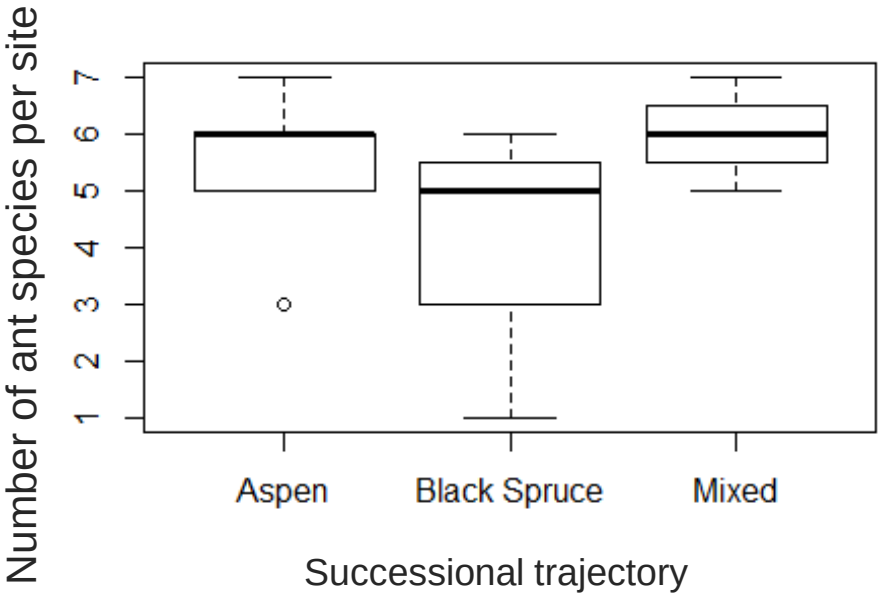
Species list:
Myrmica alaskensis
Leptothorax canadensis/ muscorum?
Camponotus herculeanus
Formica aserva
Formica neorufibarbis
Formica subaenescens
Formica podzolica

2 sample t-test, t=4.51, df=23, p=0.0002

Preliminary results: ant species prevalence by age class

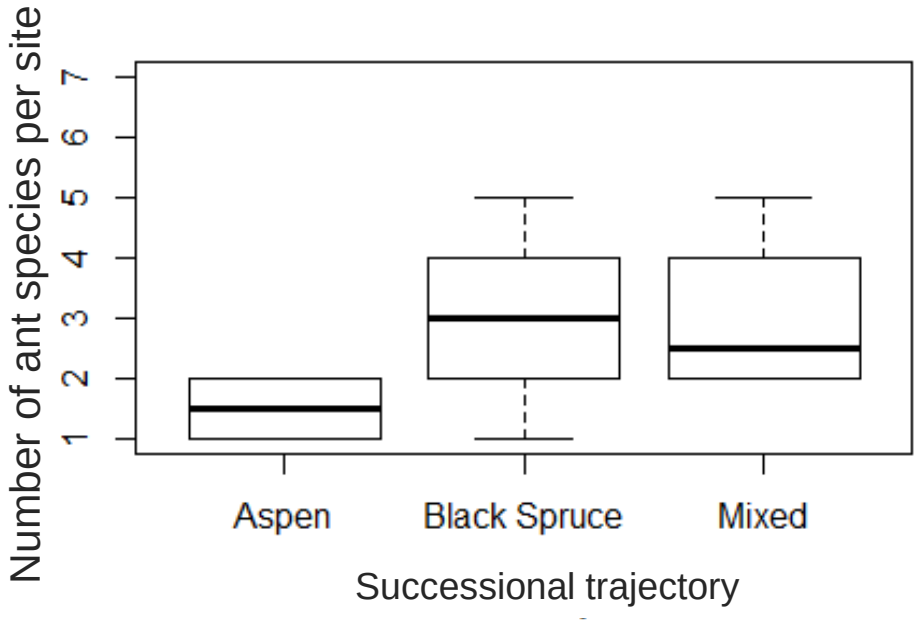
Young	*Species*	Intermediate
37%	Myrmica alaskensis	63%
51%	Camponotus herculeanus	49%
93%	Formica subaenescens	7%
96%	Leptothorax spp.	4%
96%	Formica aserva	4%
96%	Formica neorufibarbis	4%
96%	Formica podzolica	4%

Preliminary results: ant species richness



Young (10 yrs since burn)

One-way ANOVA, f=1.22, df=2,10, p=0.33



Intermediate (44-68 yrs since burn)

One-way ANOVA, f=1.8, df=2,9, p=0.22

Upcoming tasks

Sample sites in June

Collect site information (understory vegetation, canopy cover, soil and other physical characteristics)

Complete data analysis

This March: Hymenoptera Course

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Teresa Hollingsworth

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