

# The Effects of Microhabitat Characteristics on *Echinacea angustifolia* Seedling Survival

## The Echinacea Project

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# Background: the Echinacea Project

- Prairie ecology research lab with field sites in rural western MN
- Interested in conservation and evolutionary ecology in fragmented prairie habitats
- Investigate these questions using the model species *Echinacea angustifolia*
- Why Echinacea? Long-lived, self-incompatible perennial plant



**Team Echinacea summer 2020**

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# Seedling establishment research

- Tracks seedlings that originated between 2007-2013 in prairie remnants
- Investigates the factors contributing to seedling establishment and fitness
- Started with 955 seedlings; 69 surviving today



# My project: seedling establishment and microhabitat



# Do microhabitat characteristics differ between living and dead juvenile *Echinacea*?

- Fieldwork took place at 14 different prairie remnant sites ranging from small roadside remnants to a Nature Conservancy preserve
- Data collected: litter depth, vegetation cover, slope, aspect, distance to roads and fields, community composition, and floral neighborhood<sup>1</sup>



# Descriptive statistics

- Most abundant flowering species was *Andropogon gerardii* with an average of 41 inflorescences per circle, while the rarest were *Dalea candida* and *Pediomelum argophyllum* which each had 1 flower at 1 circle
- Floral diversity per circle ranged from 2 to 18 flowering species



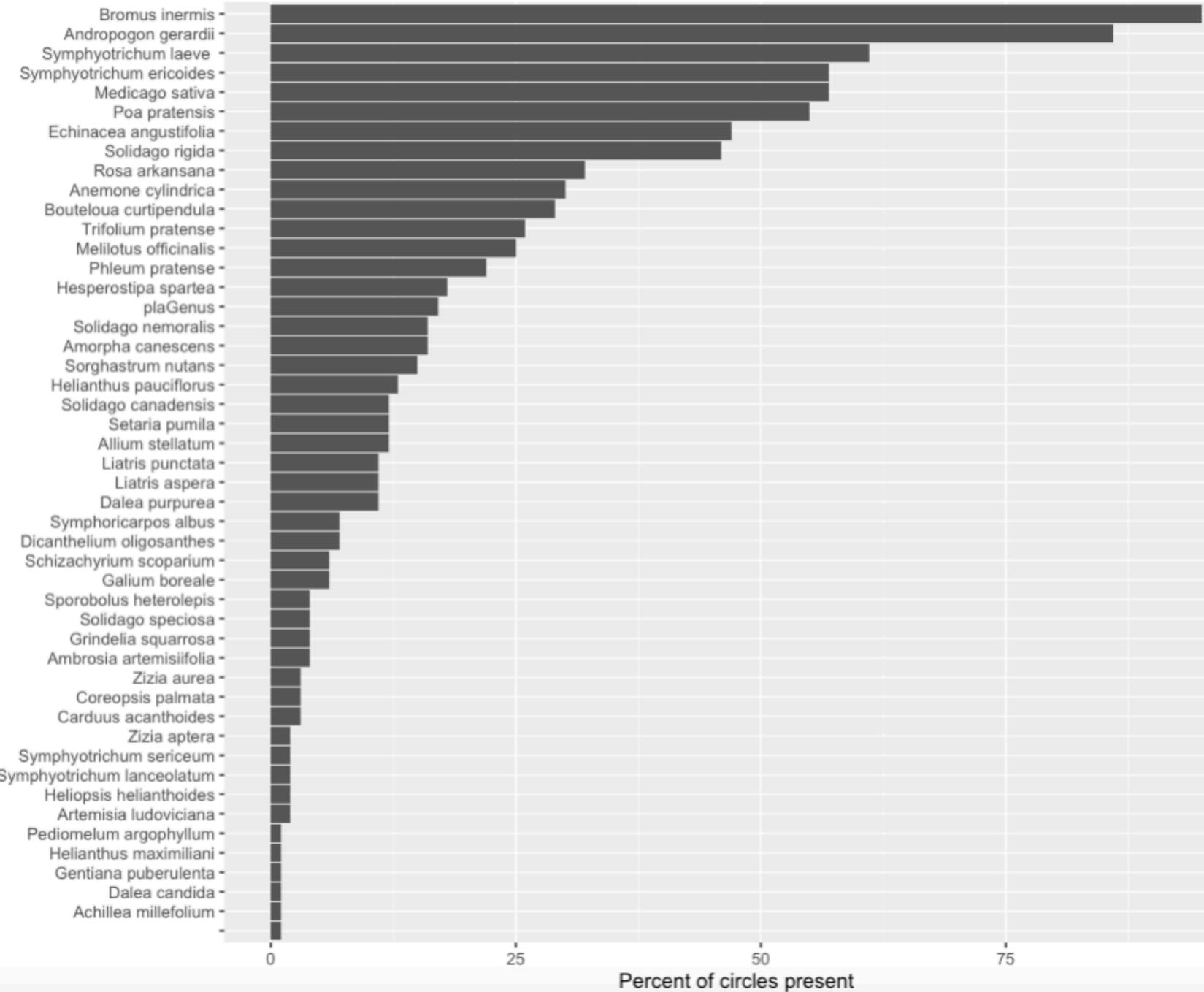
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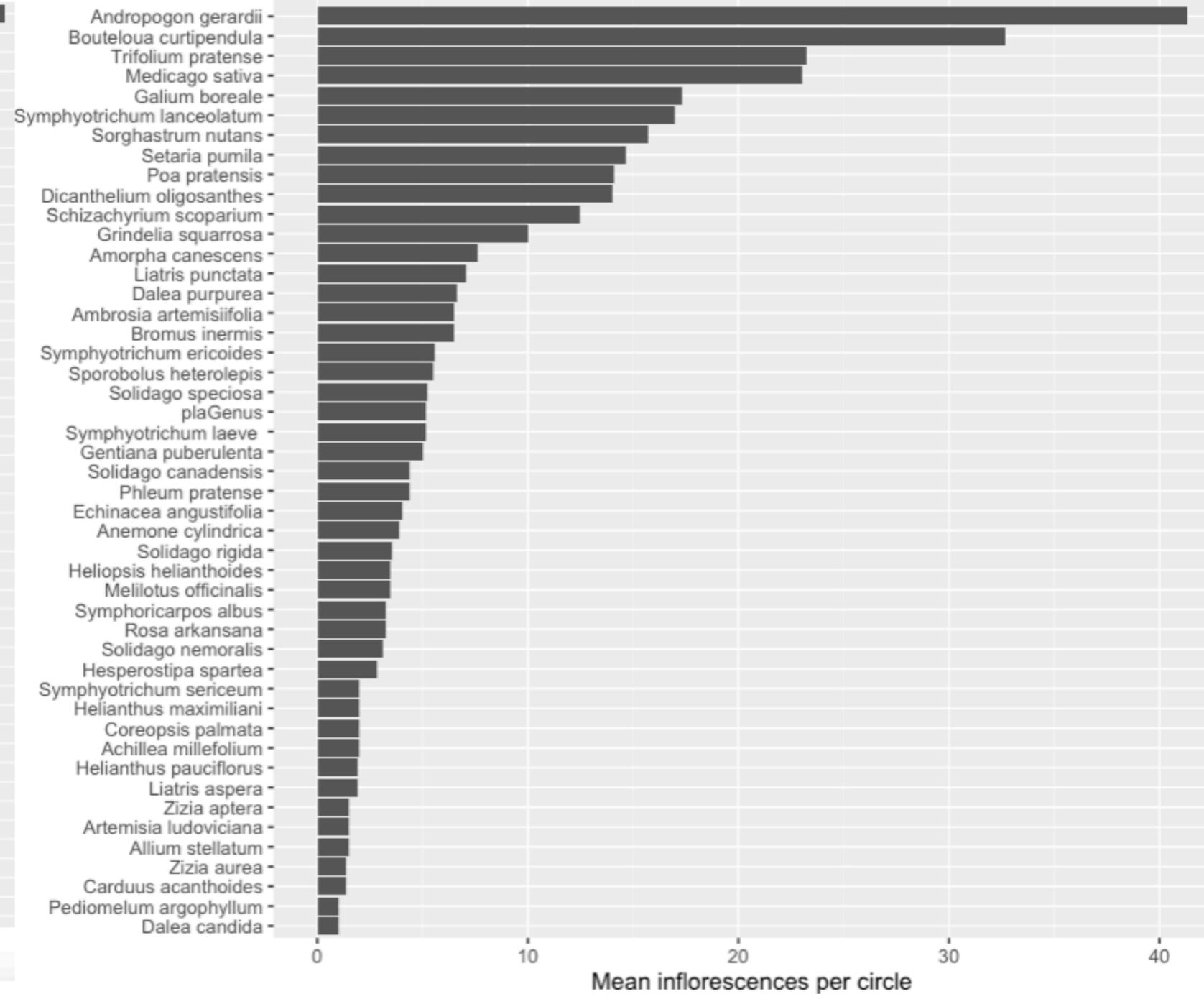


# Floral neighborhood

Species abundance



Inflorescence abundance





*Solidago speciosa*



*Gentiana puberulenta*



*Symphyotrichum laeve*



*Symphyotrichum ericoides*



*Symphyotrichum sericeum*

# Results: Microhabitats of surviving vs. dead juvenile *Echinacea*

## No significant difference:

- Species richness ( $p=0.09$ )
- Inflorescence count ( $p=0.21$ )
- Distance to roads ( $p=0.24$ )
- Distance to fields ( $p=0.80$ )
- Litter depth ( $p=0.38$ )

## Statistically significant difference:

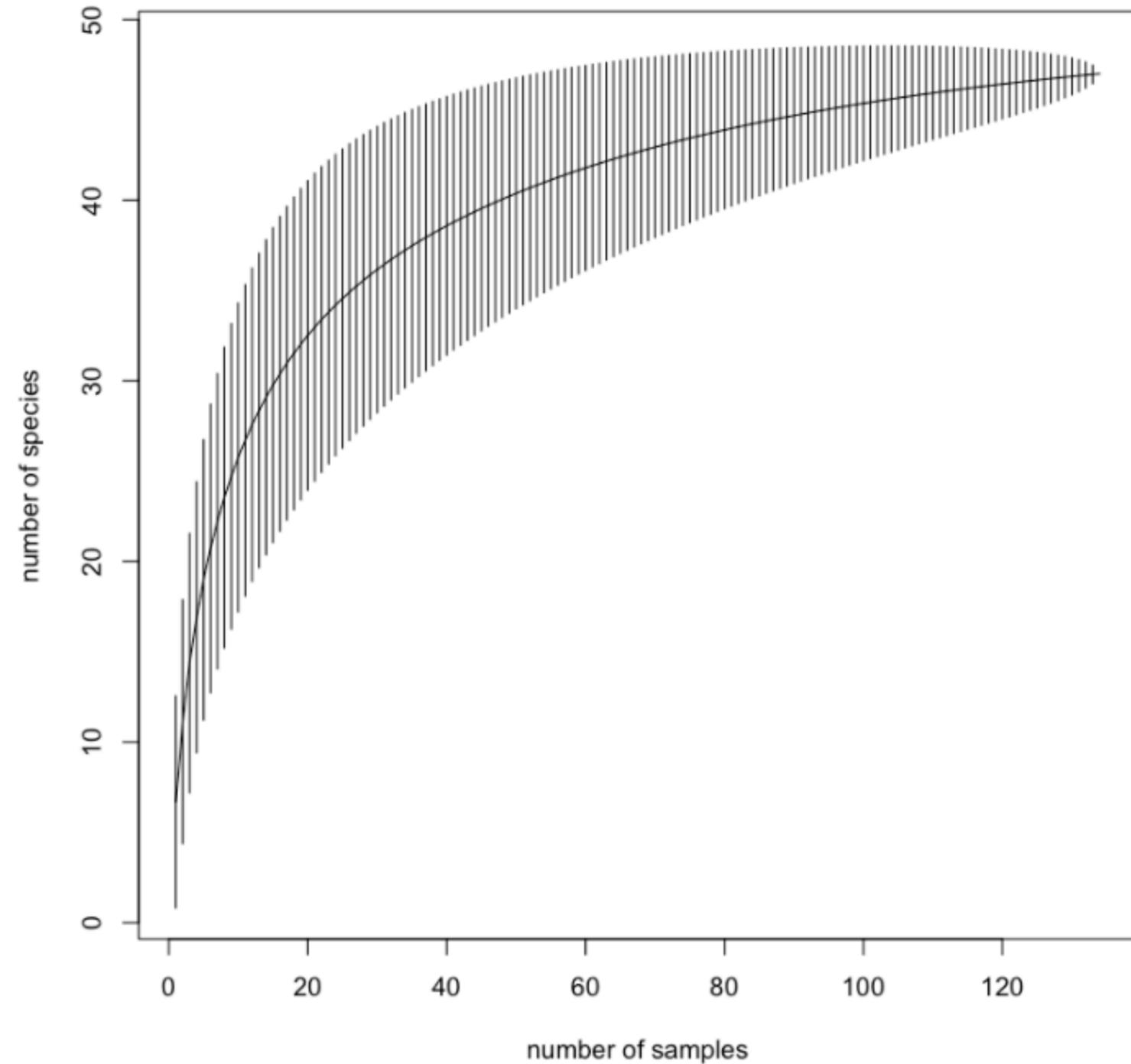
- Vegetation cover ( $p=0.02$ )

Living group mean: 8.55 cm  
Dead group mean: 11.41 cm

- Slope ( $p=0.04$ )

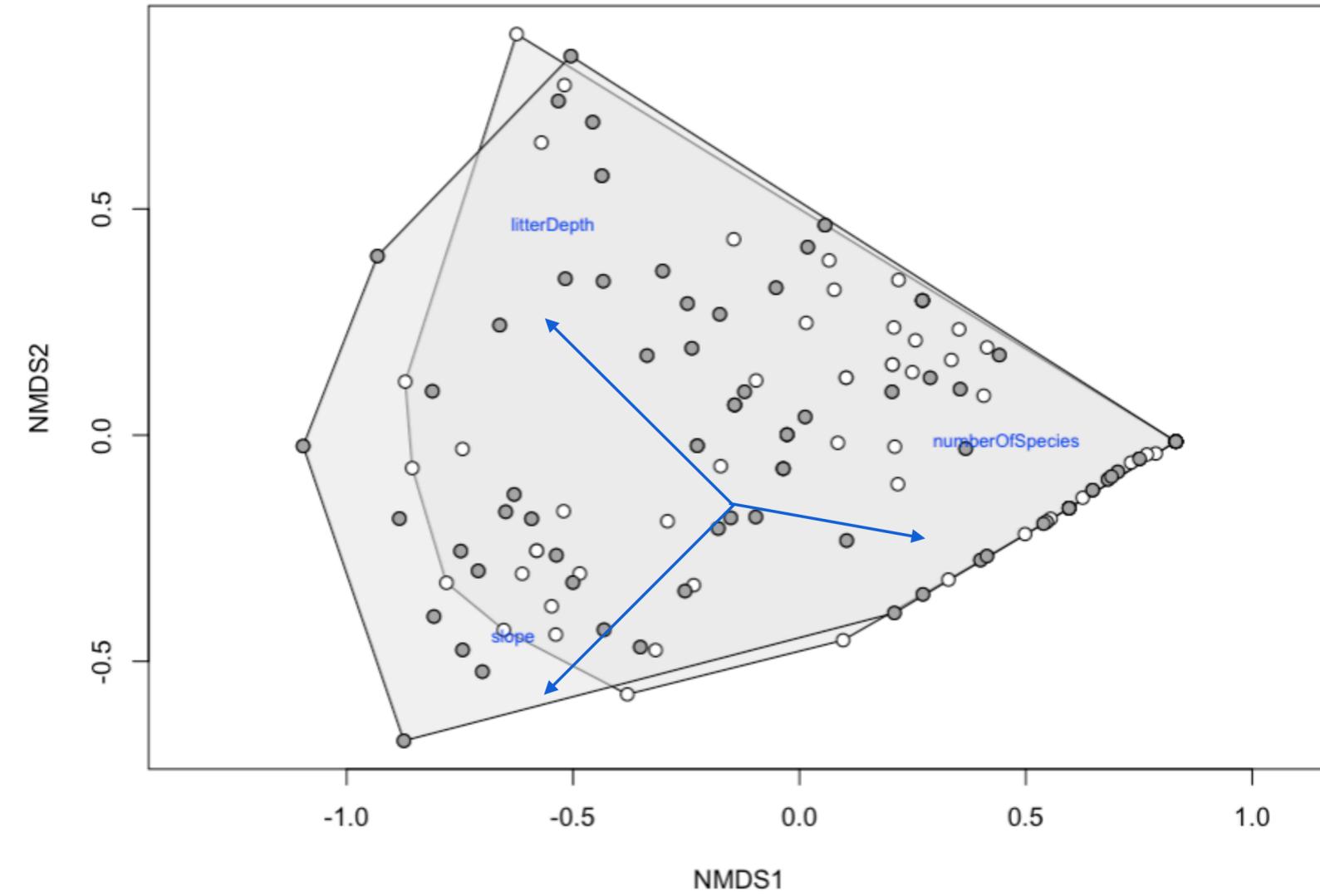
Living group mean: 8.38°  
Dead group mean: 7.15°

# Diversity data

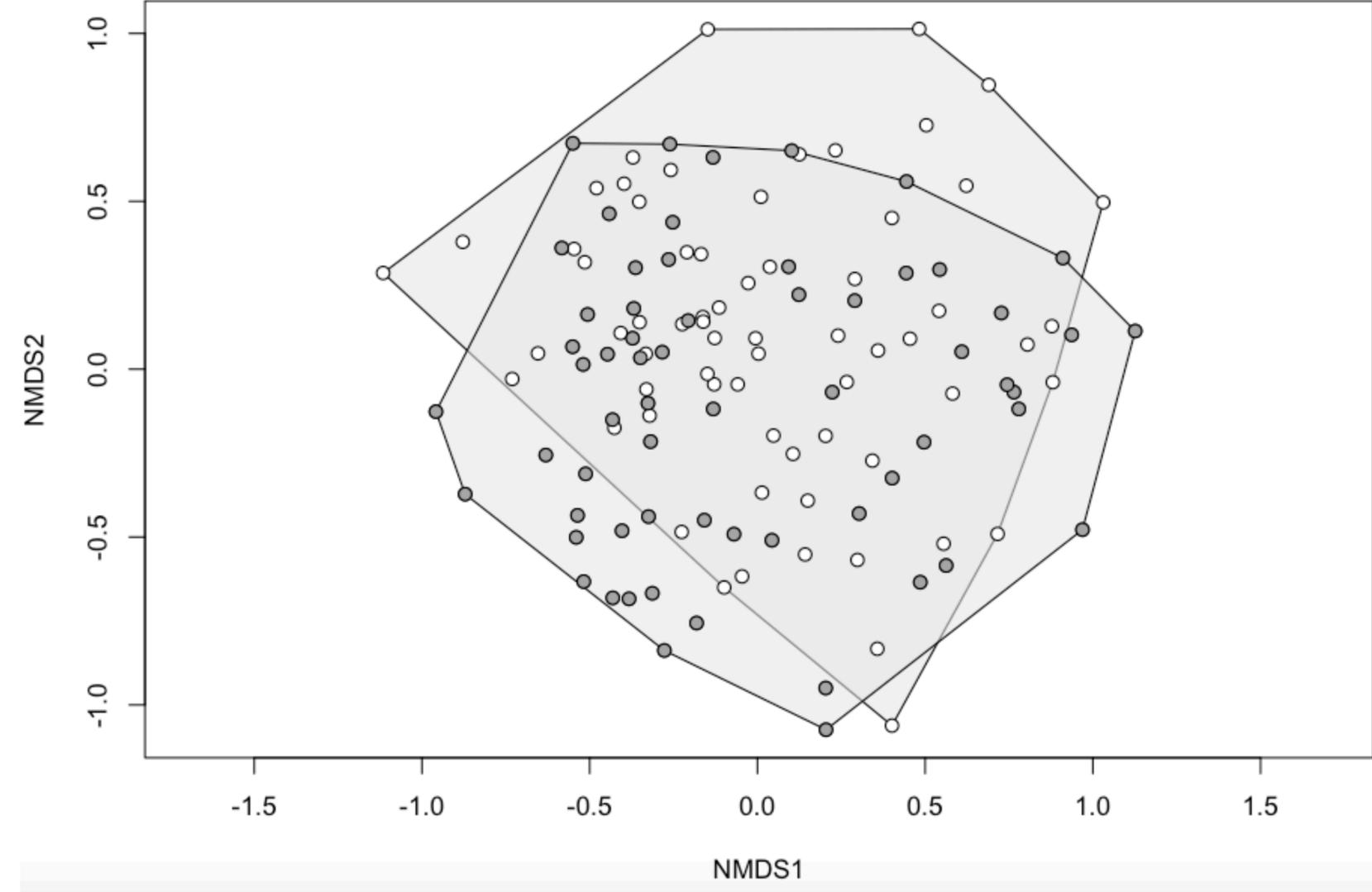


<b>Diversity index</b>	<b>Surviving circles mean</b>	<b>Dead circles mean</b>
<b>Shannon's</b>	1.18	1.37
<b>Simpson's</b>	0.56	0.64

# High similarity between living and dead groups



Ordination with litter depth, slope, and species richness

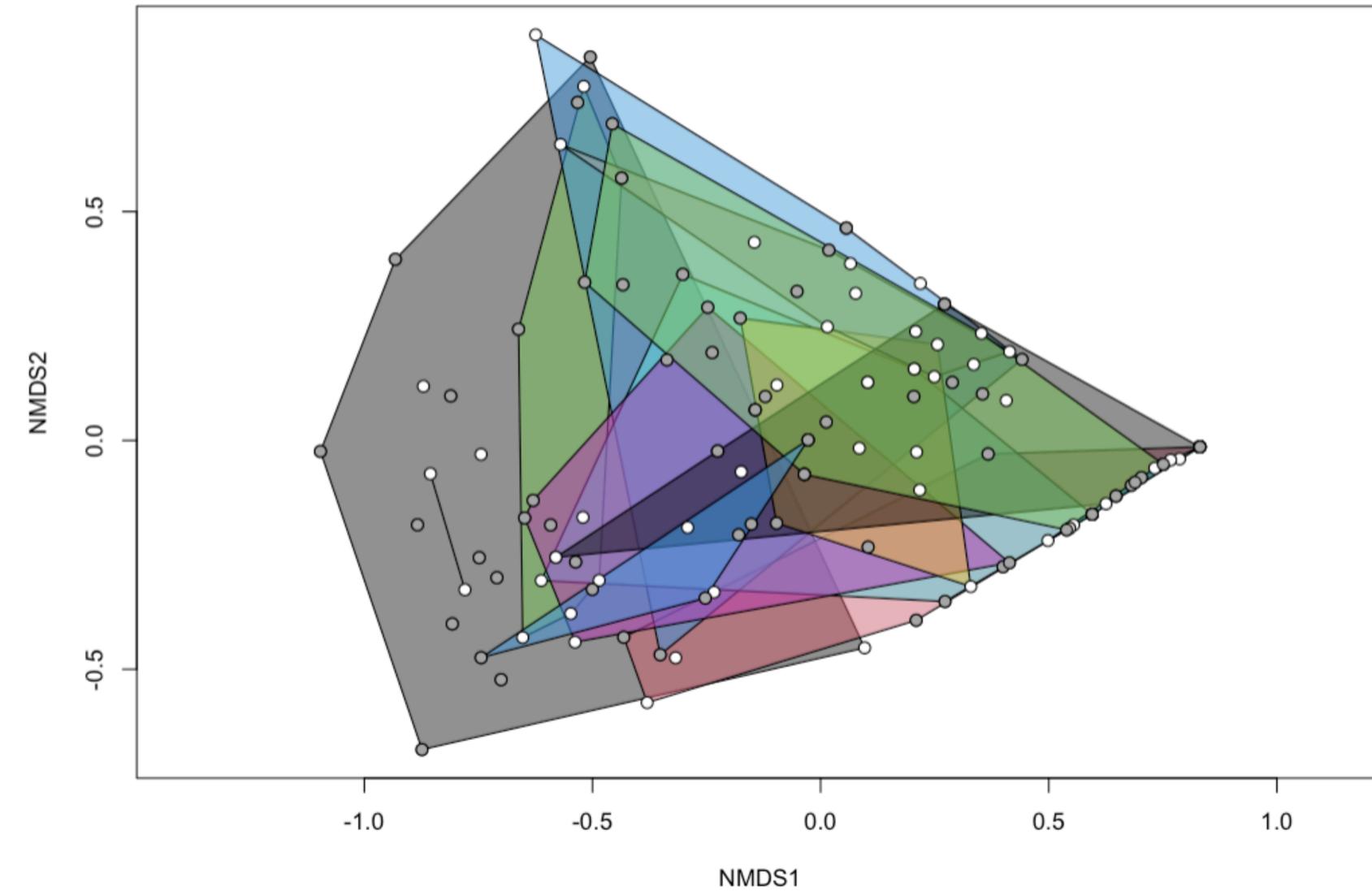


Ordination with floral neighborhood data

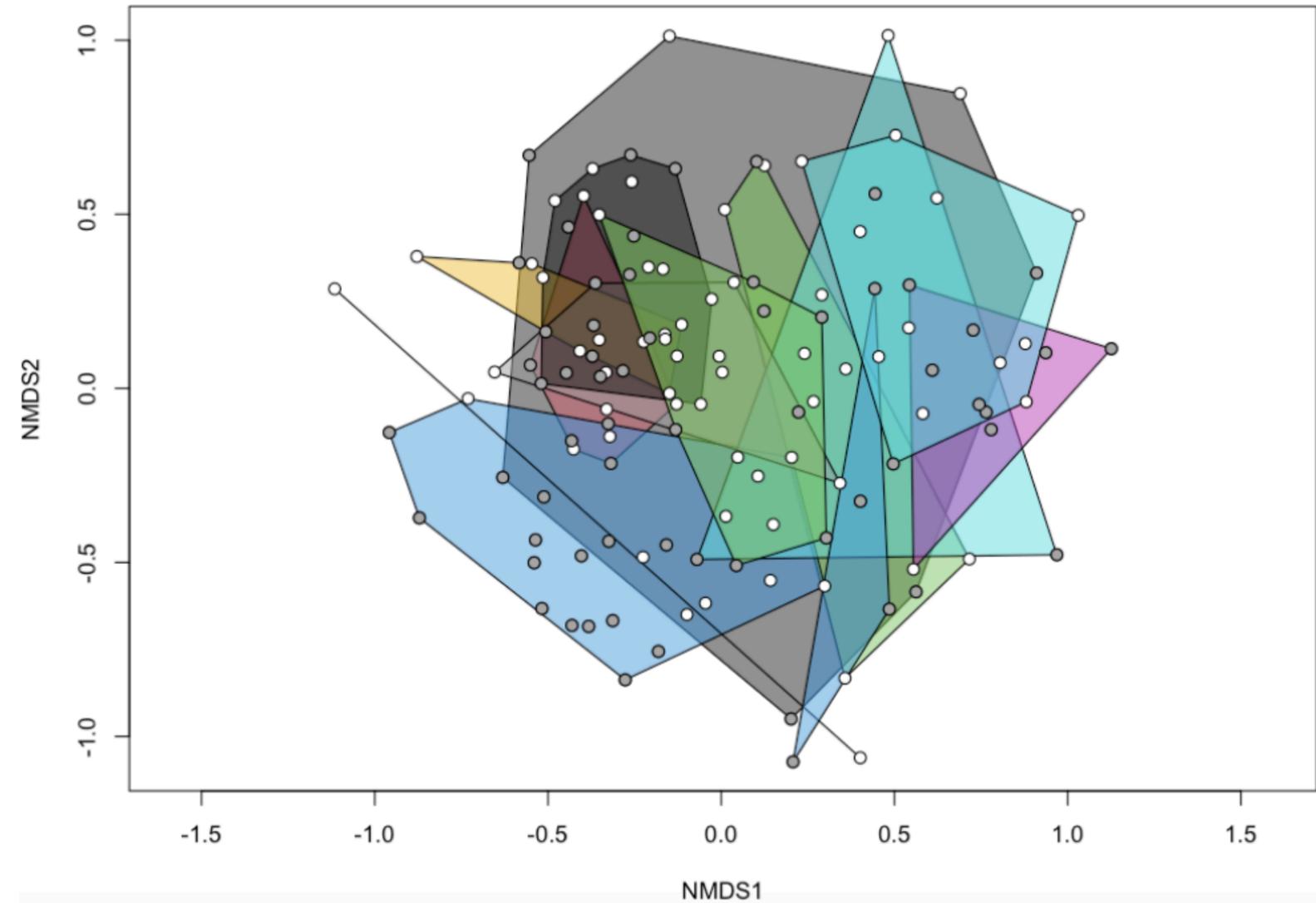
- Living circles
- Dead circles

Hulls represent living  
and dead groups

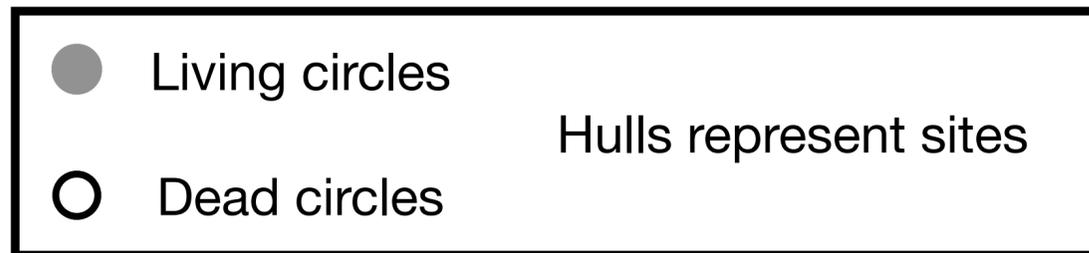
# High similarity among sites



Ordination including litter depth, slope, and species richness



Ordination using floral neighborhood data



# Discussion

- Little evidence of microhabitat differences between living and dead groups
- No evidence of differences in seedling survival by site
- Other characteristics that may affect seedling survival—climate, soil moisture & nutrients, pesticide drift, light limitation, herbivory, genetic factors



**Thank you for listening!**

**For more information on the Echinacea Project, visit  
<http://echinaceaproject.org>**



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Questions?

