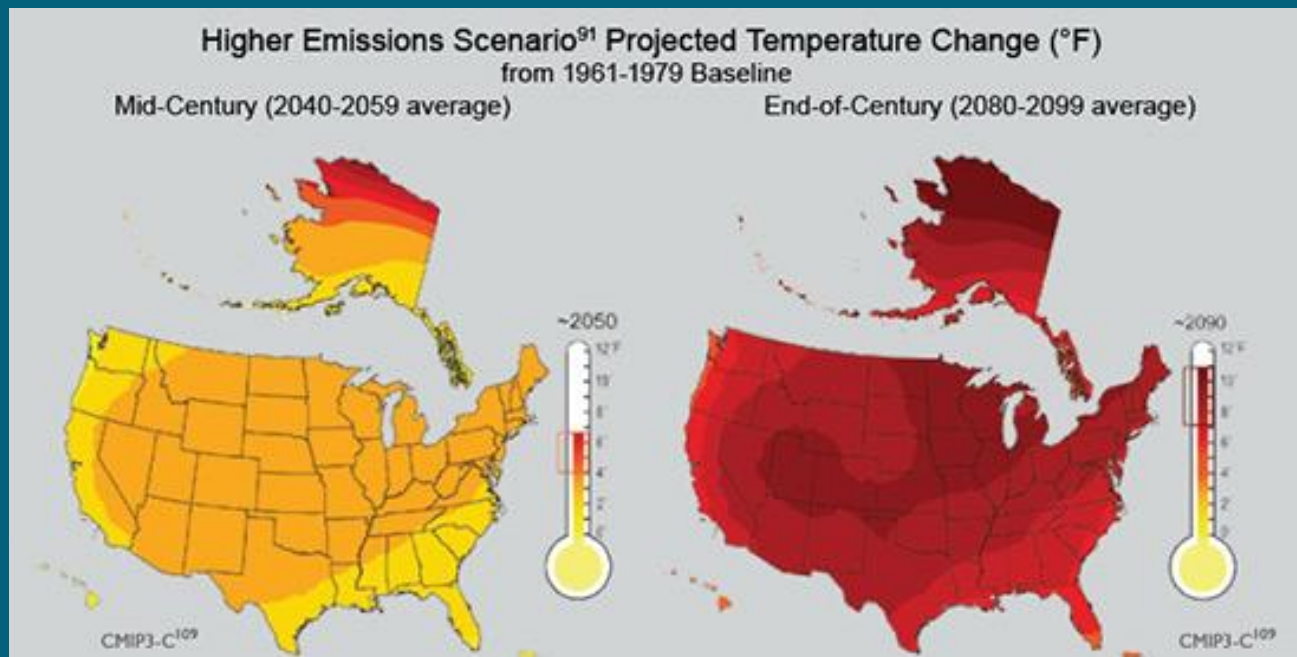


# Testing for adaptation to soil in the edaphic endemic genus *Leavenworthia* (Brassicaceae)



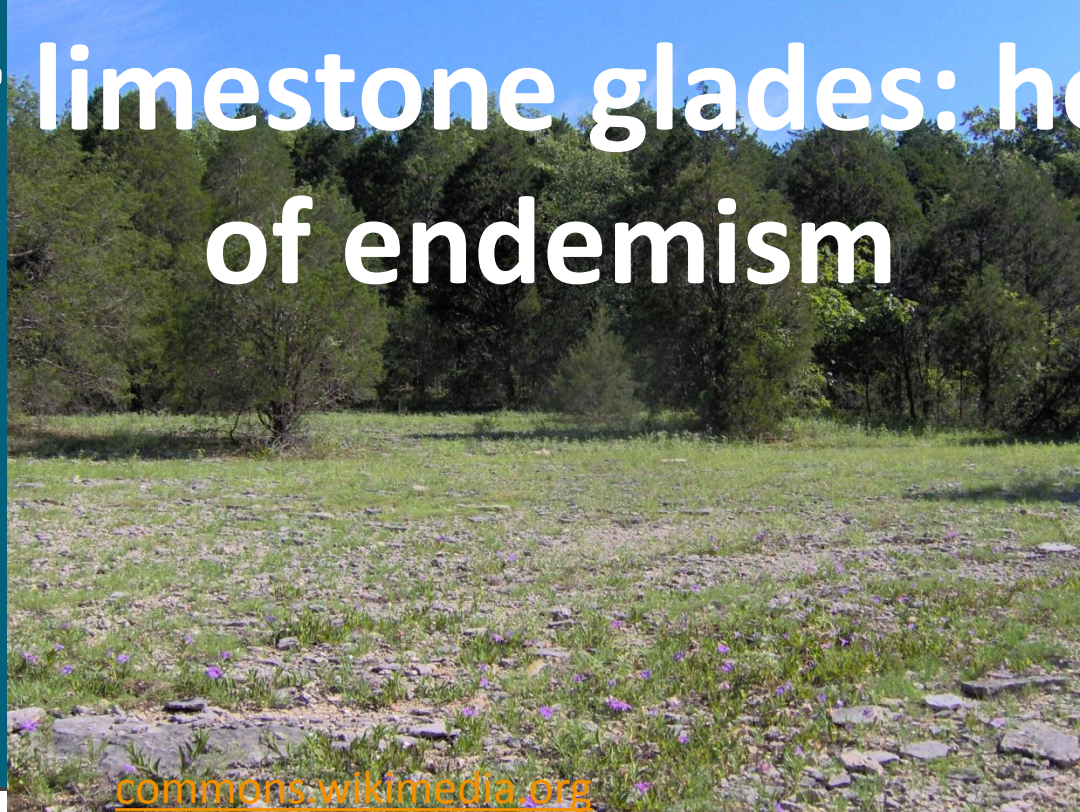
Susan Deans, Matthew Albrecht, Quinn Long, and Adam Smith

# Introduction



- Changing climate= species have to move too
- Easier for some than other
- What about edaphic edemics?

# Cedar limestone glades: hotspot of endemism



Western  
Highland Rim

**Central Basin**

Eastern  
Highland Rim

limestone/shale/chert

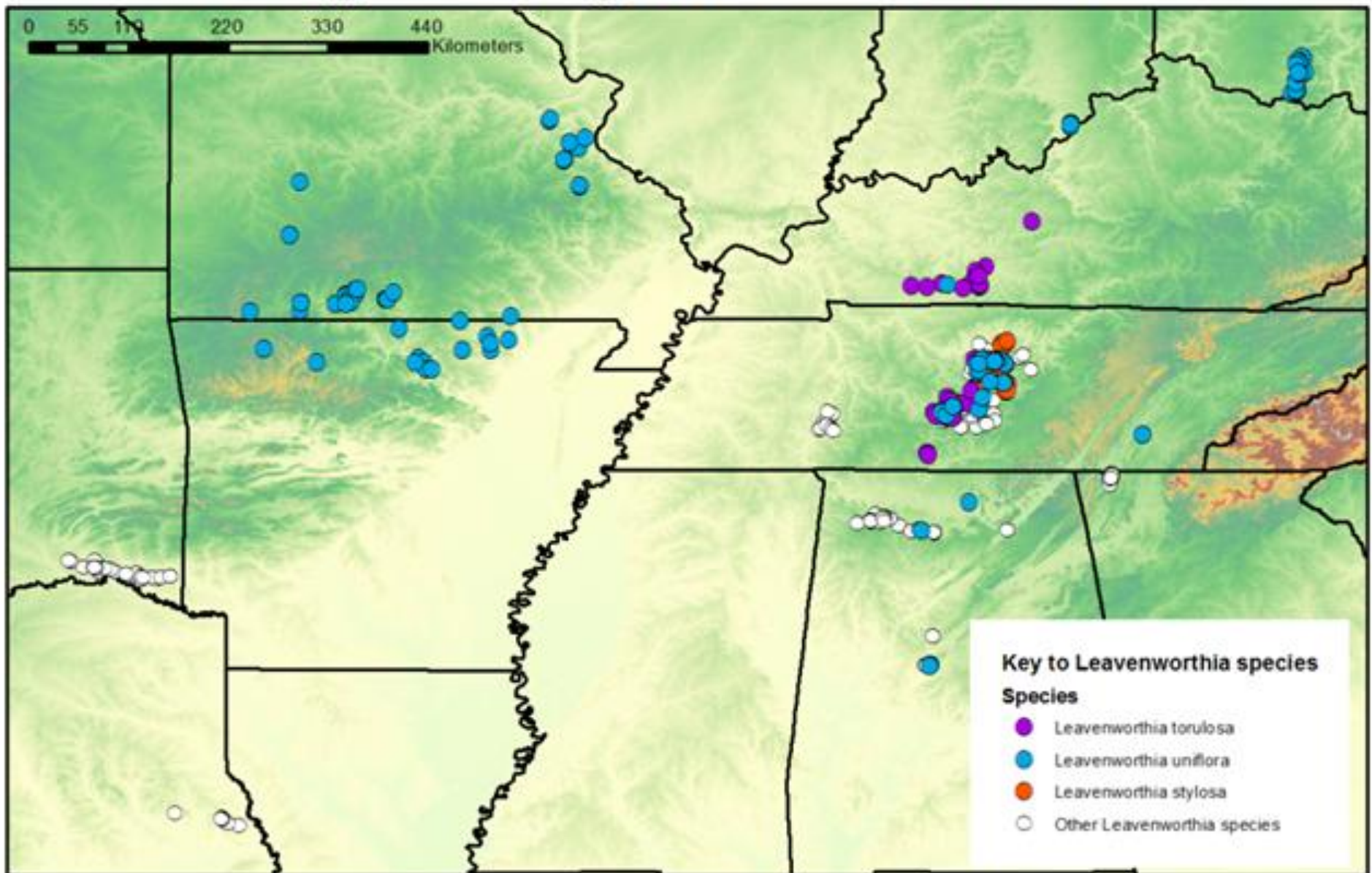
Chattanooga shale

limestone/shale

limestone/shale

Lebanon limestone

# Range of the genus *Leavenworthia*



## *Leavenworthia stylosa*



<http://www.cas.vanderbilt.edu/bioimages/image/l/lest7-flpurple96031-01-2e5434.htm>

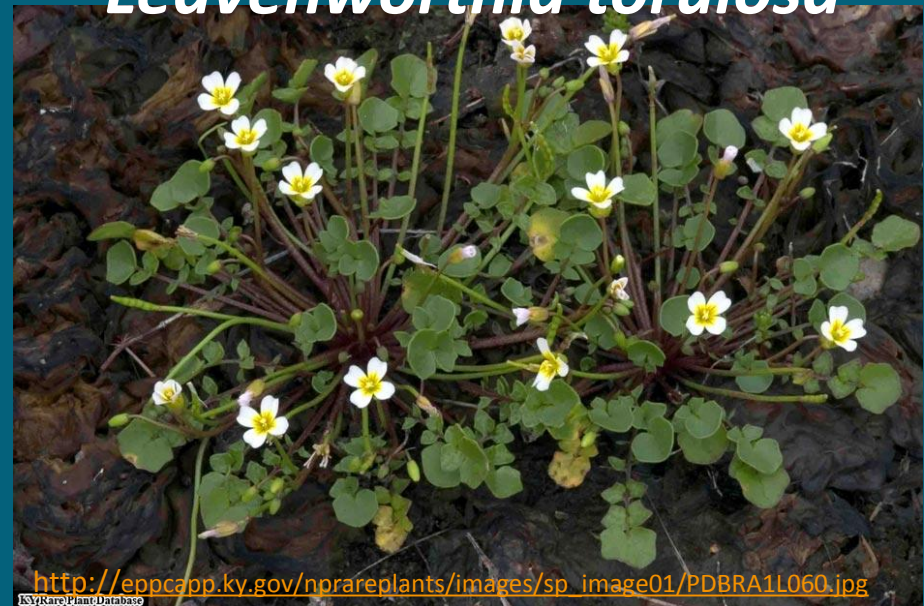
Darel Hess

## *Leavenworthia uniflora*



[http://ohioflora.blogspot.com/2011\\_03\\_01\\_archive.html](http://ohioflora.blogspot.com/2011_03_01_archive.html) Steve Wilson

## *Leavenworthia torulosa*



[http://eppcapp.ky.gov/nprareplants/images/sp\\_image01/PDBRA1L060.jpg](http://eppcapp.ky.gov/nprareplants/images/sp_image01/PDBRA1L060.jpg)

ISV Rare Plant Database

# Local Adaptation Questions

- Do populations of the self-compatible *L. uniflora* show greater adaptation to local soil conditions than the outcrossing *L. stylosa*?



# Local Adaptation Experiment

*Leavenworthia stylosa*

Seed population 1

Soil

1

Soil

2

Soil

3

Seed population 2

Soil

1

Soil

2

Soil

3

Seed population 3

Soil

1

Soil

2

Soil

3

*Leavenworthia uniflora*

Seed population 1

Soil

1

Soil

2

Soil

3

Seed population 2

Soil

1

Soil

2

Soil

3

Seed population 3

Soil

1

Soil

2

Soil

3

# Preparing the dishes

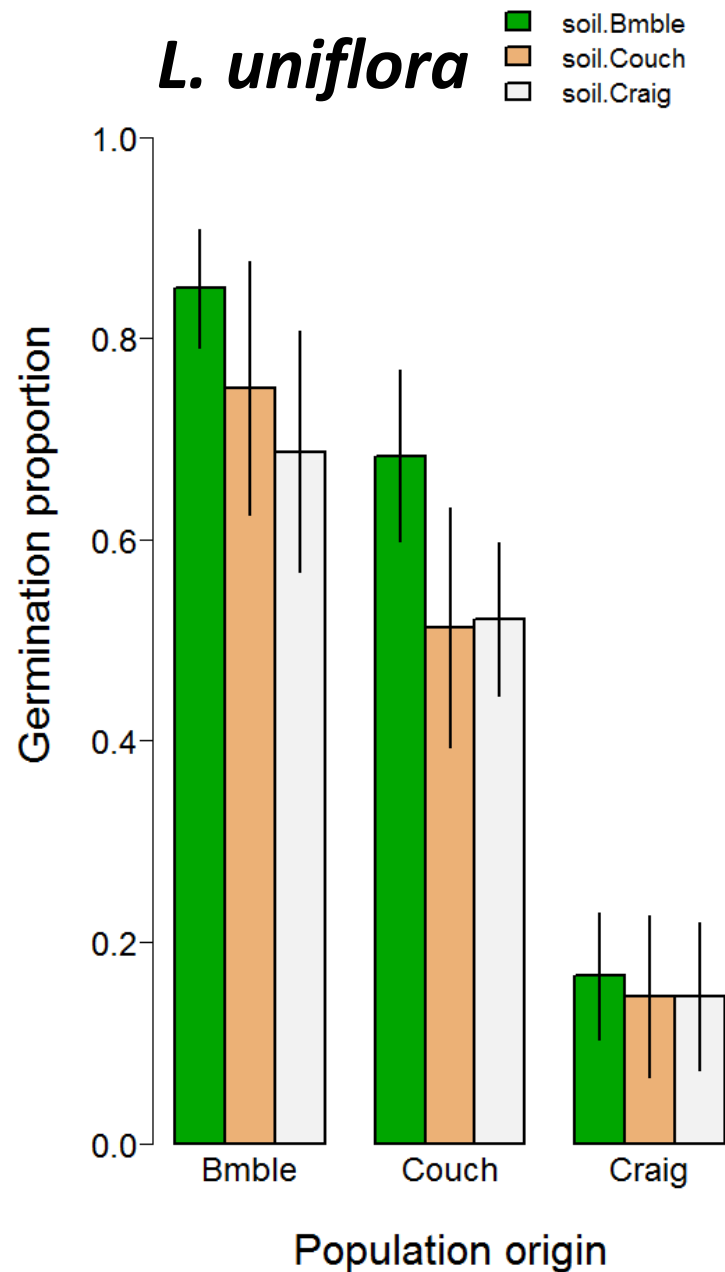
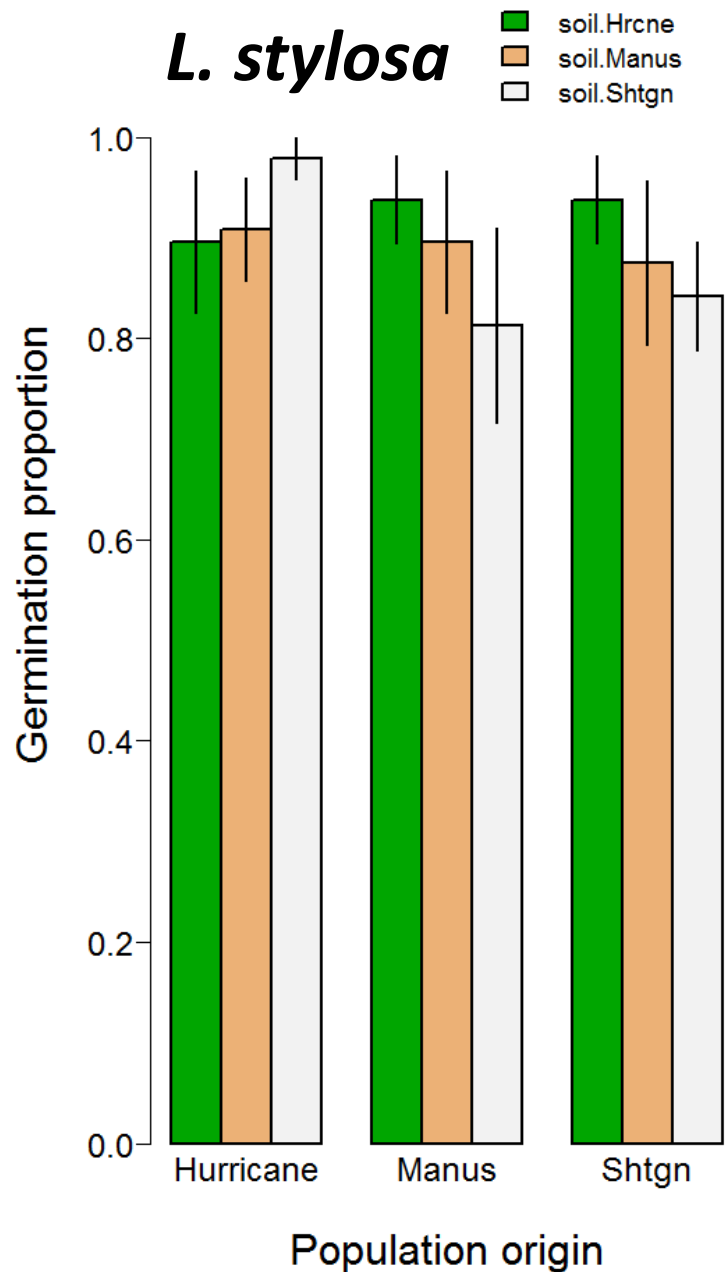




# Growth Chambers and Germinating Seeds



# Local Adaptation Experiment Results



# Genus Niche Experiment

- Question: Does *Leavenworthia uniflora* have better success germinating on Missouri dolomite glade soils than *L. stylosa* and *L. torulosa*?
- Could these other species extend their range into these dolomite glades as the climate in their current restricted distribution becomes unfavorable?

*L. stylosa* (TN origin)

*L. stylosa* soil mix

*L. uniflora* (MO) soil mix

*L. torulosa* (TN origin)

*L. torulosa* soil mix

*L. uniflora* (MO) soil mix

*L. uniflora* (MO origin)

*L. uniflora* (MO) soil mix

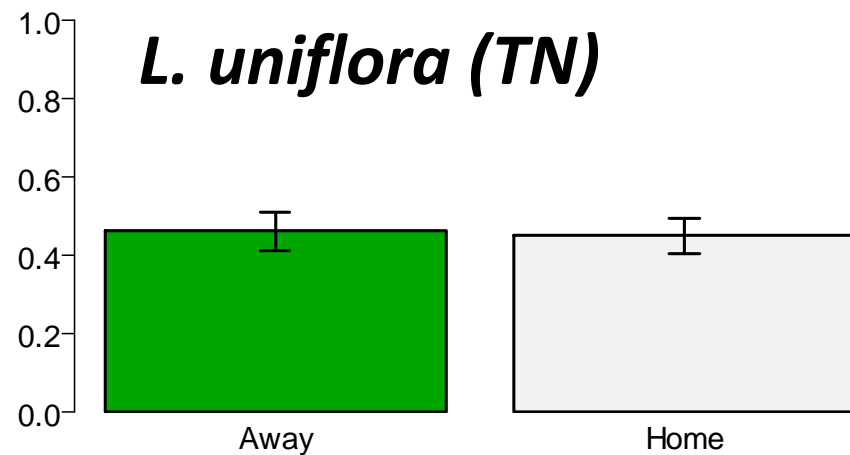
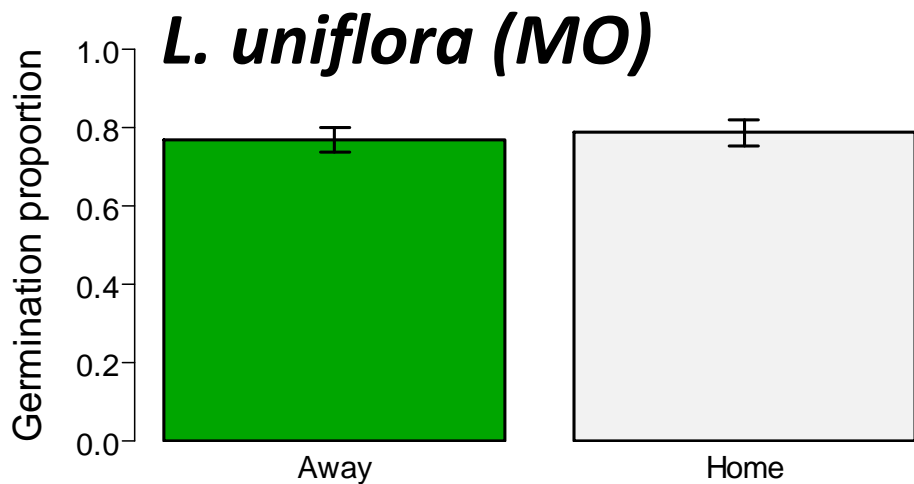
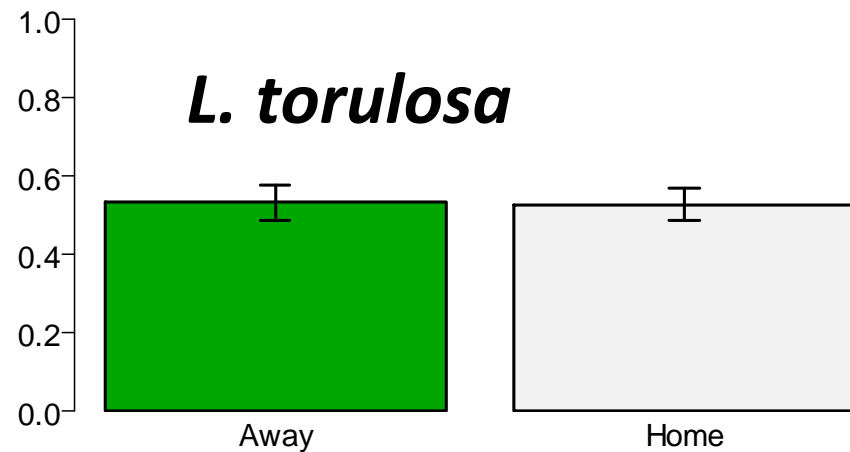
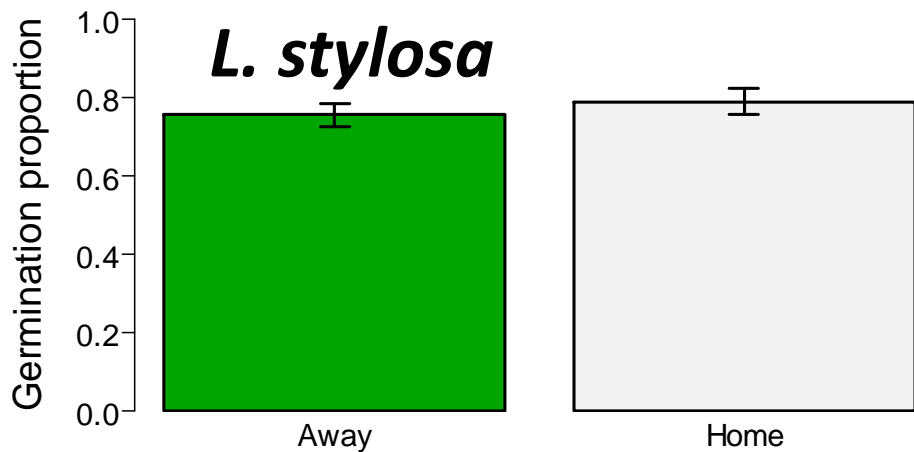
*L. uniflora* (TN) soil mix

*L. uniflora* (TN origin)

*L. uniflora* (TN) soil mix

*L. uniflora* (MO) soil mix

# Genus Niche Experiment



Soil type

Soil type

## So far...

- No evidence of local adaptation to soil in the germination of these *Leavenworthia*
- Adaptation not found at population or species level
- Could mean these species are able to adapt to new soil types...
- OR, adaptation won't become clear until they're older

# Transplanted seedlings



To be continued...





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