





Preliminary Soil Seed Bank Study  
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# Upland Pine Treatment Seed Bank Study

- Seed banks can provide information on species composition which can help predict impacts of restoration and disturbance in addition to local weed populations.
- A stratified random sampling method was used with a 100m baseline. Line transects and each point on the transect line was determined by a random number generator. Six soil cores were collected from six transect lines from each treatment plot. Soil cores were collected using a 2” diameter PVC pipe with a depth of 4cm.






# NATL Grid Map

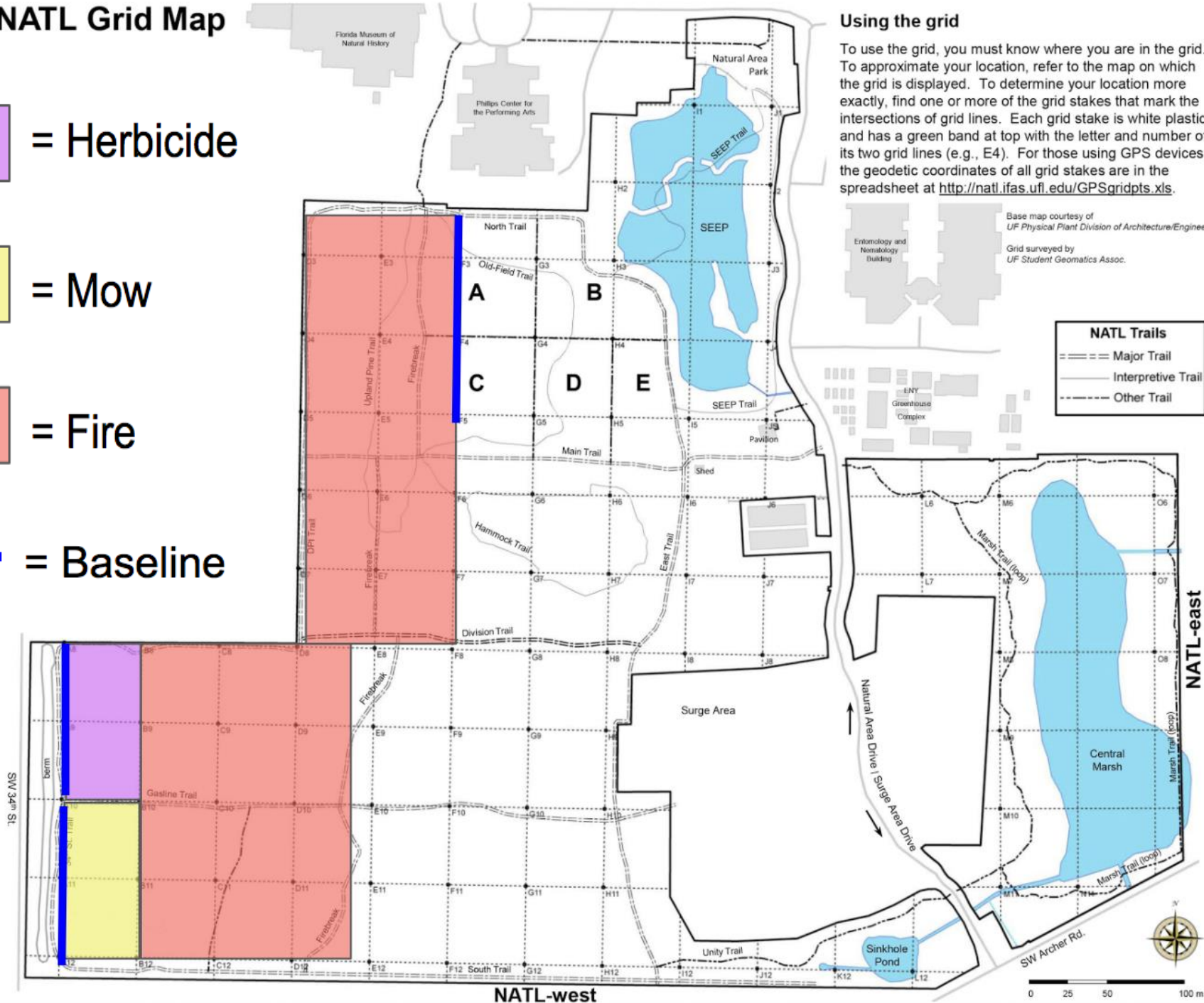
-  = Herbicide
-  = Mow
-  = Fire
-  = Baseline

## Using the grid

To use the grid, you must know where you are in the grid. To approximate your location, refer to the map on which the grid is displayed. To determine your location more exactly, find one or more of the grid stakes that mark the intersections of grid lines. Each grid stake is white plastic and has a green band at top with the letter and number of its two grid lines (e.g., E4). For those using GPS devices, the geodetic coordinates of all grid stakes are in the spreadsheet at <http://natl.ifas.ufl.edu/GPScripts.xls>.

Base map courtesy of  
UF Physical Plant Division of Architecture/Engineering  
Grid surveyed by  
UF Student Geomatics Assoc.

- NATL Trails**
-  Major Trail
  -  Interpretive Trail
  -  Other Trail



NATL-west

NATL-east

0 25 50 100 m

# Upland Pine Treatment Seed Bank Study

- Cores were then set-up to germinate at 25 ° C, in the shadehouse, or incubated at simulated seasonal temperatures (Fig. 1).
- Once seeds were germinated, seedlings were transplanted to greenhouse where they can grow and be identified (Fig. 2).



Fig. 1 Soil cores in the incubation chambers



Fig. 2 Plants growing in shadehouse



# Asteraceae

*Gamochaeta pensylvanica*

Pennsylvania everlasting

## Description:

- Has basal and cauline leaves
- Leaves are spatulate to oblanceolate-obovate
- Lightly tomentose
- Inflorescence is spike-like arrays with
- Nonnative



# Asteraceae

*Gamochaeta antillana*

Caribbean purple everlasting

## Description:

- Basal and cauline leaves
- Leaves are spatulate to narrow-lanceolate or linear
- Loosely tomentose
- Inflorescence is spikelike with a circular array
- Nonnative





# Asteraceae

*Ambrosia artemisiifolia*

common ragweed

Description:

- Opposite or alternate
- Leaves are pinnately divided, but not all the way down to the central axis.
- Stems usually purple
- Seedlings densely pubescent
- Seeds rich in oil content



# Cyperaceae

*Cyperus croceus*

Baldwin's flatsedge



## Description:

- 3-ranked leaves
- Triangular stems
- Leaves are M-shaped
- Smooth margins
- Spikes in the shape of a sphere





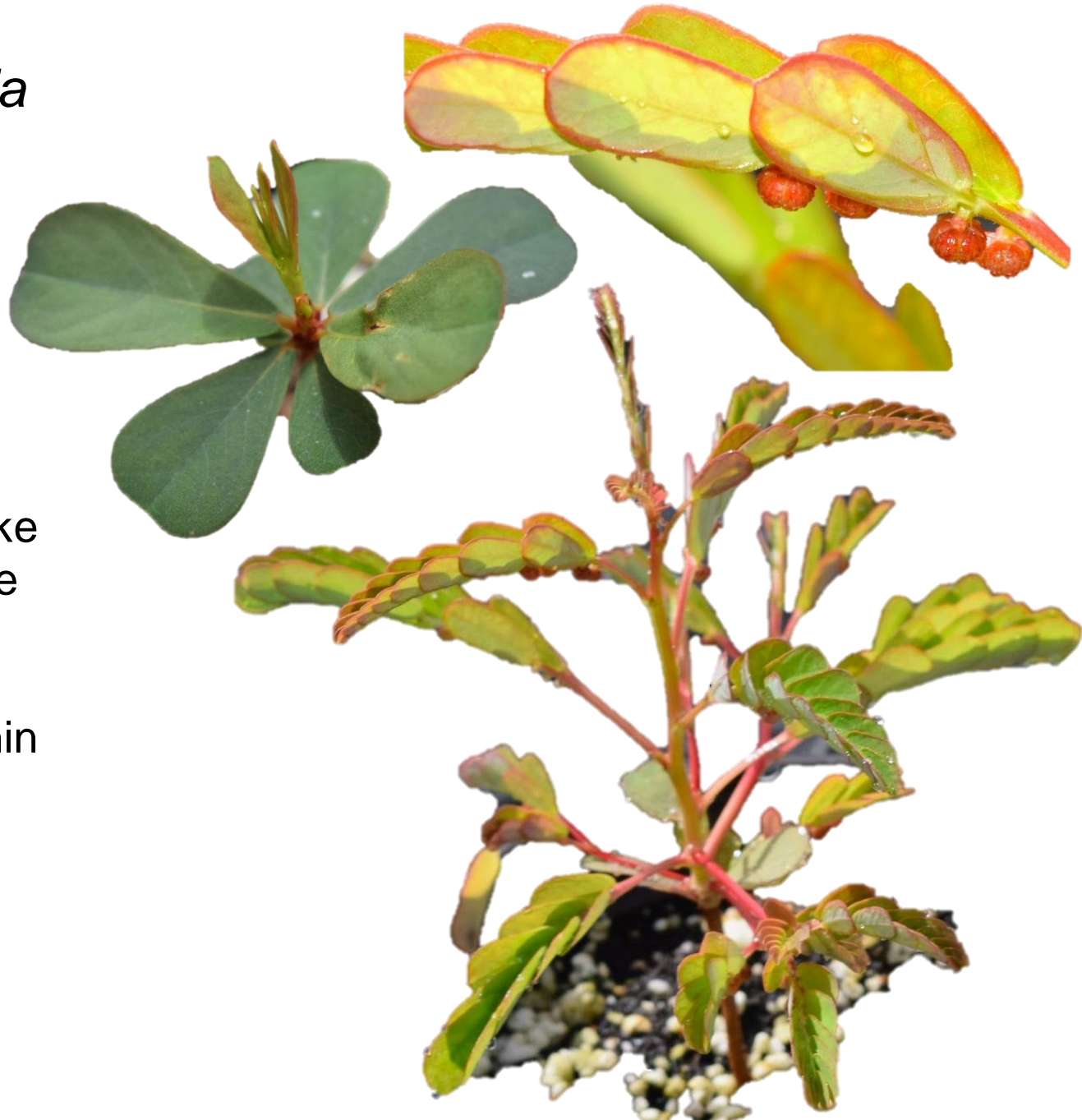
# Euphorbiaceae

*Phyllanthus urinaria*

chamberbitter

## Description:

- Broad-leaf annual
- Alternate leaves
- Green-red warty-like fruit underneath the leaves
- Oblong leaflets— thin and smooth
- Produces a milky sap when broken



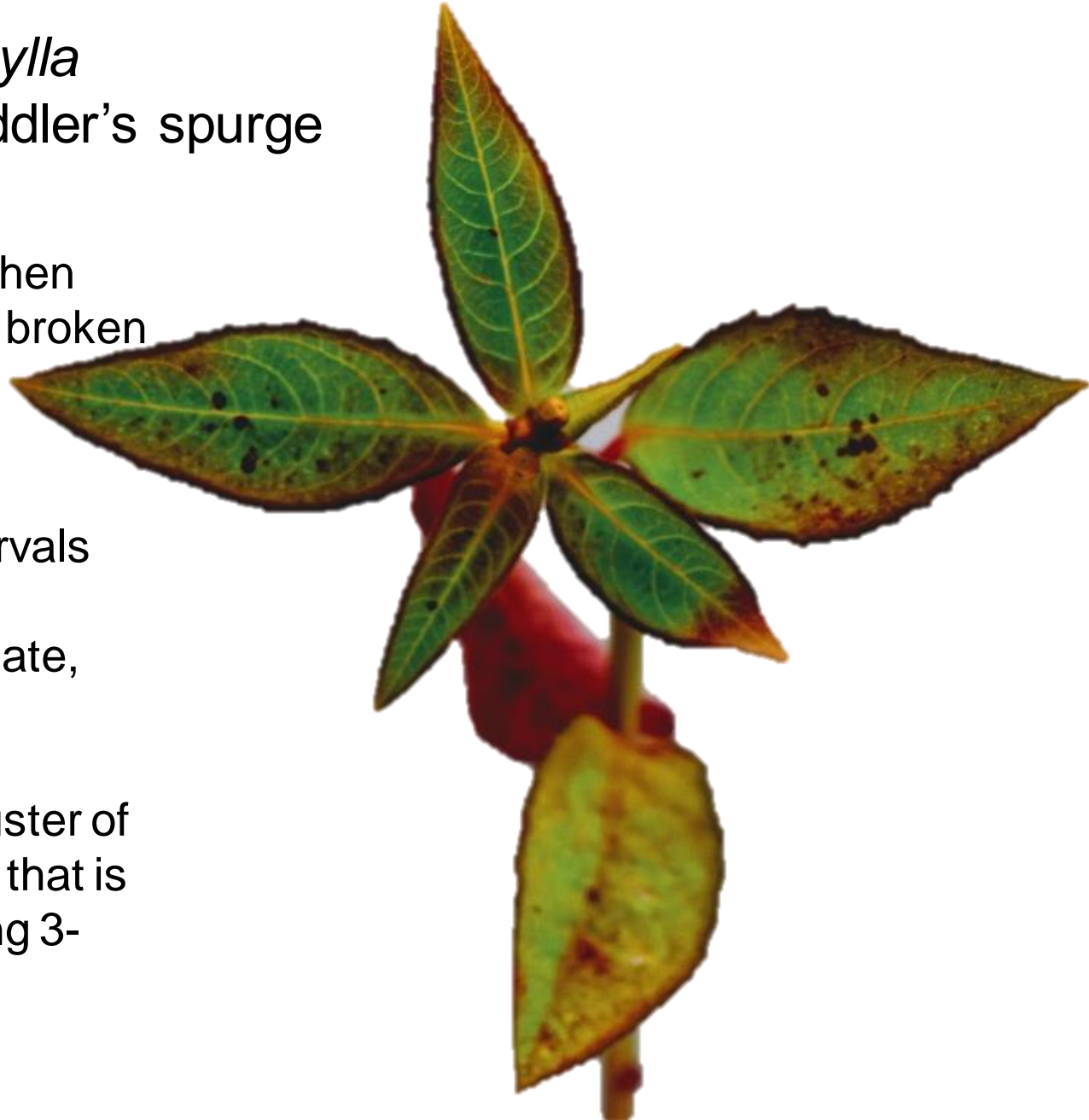
# Euphorbiaceae

*Poinsettia heterophylla*

Mexican fireplant/fiddler's spurge

## Description:

- Milky latex present when parts of the plant are broken off
- Cylindrical stem with nodes at regular intervals
- Leaves can be alternate, opposite, or whorled
- Inflorescence is a cluster of short-stalked cyathia that is cup-shaped producing 3-lobed yellow fruit





# Lamiaceae

*Stachys floridana*

Florida betony

## Description

- Opposite leaf arrangement
- Lanceolate leaf shape
- Rounded, scalloped margins
- White to pink flowers that occur in clusters
- White, segmented tuber underground (edible)



# Poaceae

*Digitaria ciliaris*

Crabgrass

Description:

- Coarse textured leaves
- Broad collar, hairy sheaths, membranous ligules
- Can produce lateral roots
- Stems may be purple or tan in color
- Inflorescence has spike-like branches that can be whorled at stem tip





# Poaceae

*Eleusine indica*

goosegrass

## Description:

- Alternate leaves
- Grows in tufts or clumps
- Culms or stems are flat
- Each stem produces a whorl of 2-8 floral spikelets
- Each spike has 2 rows of sessile (directly attached) spikelets
- Silvery red spikelets when mature



Spikelet



# Poaceae

## *Megathyrsus maximus*

### guineagrass

#### Description:

- Grows in clumps (bunchgrass)
- Leaves can be glabrous or tomentose
- Inflorescence is an open panicle
- Small, greenish seeds with wrinkles
- Faint mid-rib, micro-toothed leaf margins
- Can grow up to 3 meters tall





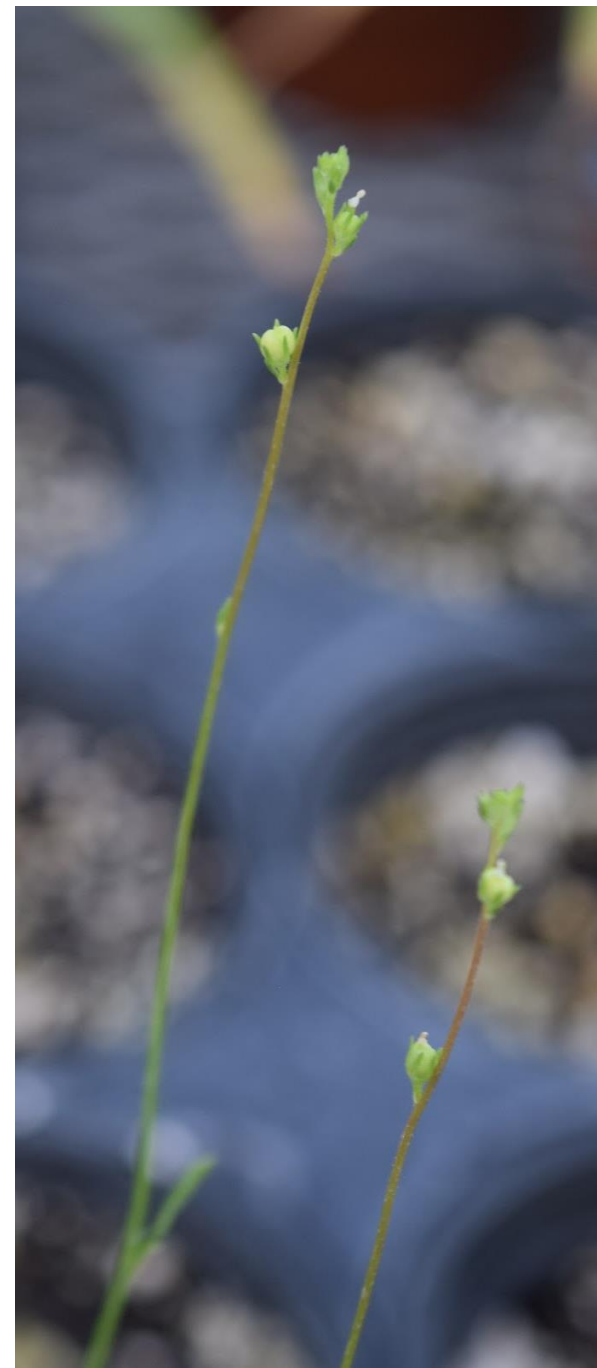
# Plantaginaceae

*Linaria canadensis*

toadflax

## Description:

- Opposite or whorled leaves
- Linear to oblong leaves; smooth
- Light-blue, white, purple flowers
- Flowers are on a terminal raceme
- Two lipped – two lobes on top, three lobes on the bottom



Polygonaceae  
*Oxalis stricta*  
yellow woodsorrel

Description:

- Heart-shaped leaflets, trifoliate
- Each leaflet has a center crease which allows it to fold in half at night or when stressed
- Bright yellow flowers
- Edible in small quantities – tastes sour due to oxalic acid presence





# Presence of plants in each treatment and temperatures

√ = Present	Mow	Herbicide	Fire		25°C	Spring	Summer	Fall	Winter	Shadehouse
<i>Oxalis stricta</i>	√	√			√		√	√	√	
<i>Cyperus croceus</i>	√	√	√				√		√	√
<i>Ambrosia artemesiifolia</i>	√	√	√		√	√	√	√	√	
<i>Digitaria ciliaris</i>	√	√	√		√	√		√		
<i>Gamochaeta pensylvanica</i>	√	√	√			√		√	√	
<i>Stachys floridana</i>			√		√	√			√	
<i>Gamochaeta atiliana</i>	√	√	√					√	√	
<i>Poinsettia heterophylla</i>		√			√					
<i>Phyllanthus urinaria</i>	√				√	√	√			
<i>Linaria canadensis</i>	√								√	
<i>Megathyrus maximus</i>		√	√		√	√	√	√	√	
<i>Eleusine indica</i>	√					√		√		

(Table 1)

# Conclusions and Future Work

After two months, 12 species emerged (Table 1). Many of the species were weedy species and appeared in multiple treatments and temperatures. The plants that germinated in the chambers coincided with the season of their natural germination (i.e. *Phyllanthus urinaria*).

An invasive species, *Megathyrsus maximus*, only germinated in the herbicide and fire plots. However, this plot is not invaded with guineagrass as much as the other plots which may explain why it did not emerge.

Although the containers had drainage slits, the shadehouse containers became inundated with water after a rain event or quickly dried out during the day. This may explain why there are few germination events in this category.

Other future work includes re-conducting the experiment in the future to see what has changed. In addition, having the germination chambers run for a longer period may allow for other species to emerge.



# Acknowledgements

Many thanks to NATL for the minigrant award that made this project possible and to the Division of Plant Industry for identifying the plants after germination.

## Sources

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*Gamochaeta pensylvanica* (Willdenow) Cabrera (1961). Bol. Soc. Argent. Bot. 9:  
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