SURVIVING THE DROUGHT:

COMPARING RESILIENCE BETWEEN NATIVE AND INVASIVE SPECIES

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Introduction:

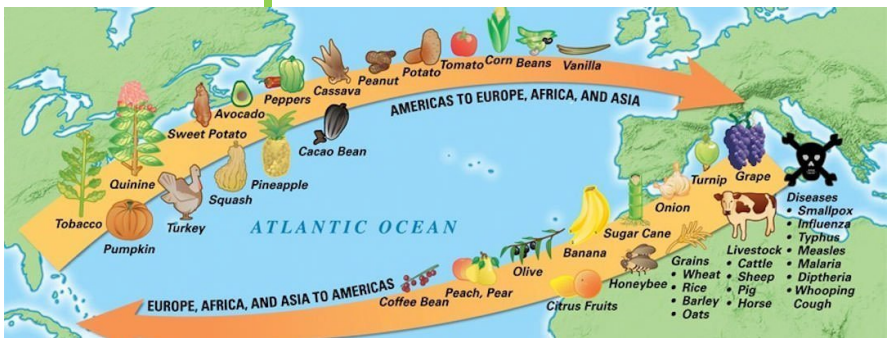
16th century transatlantic exchange begins

Invasive species thrive in new environment

- No natural predators
- More aggressive growers
- Wipe out native populations

Overall lack in biodiversity

- Decline in ecosystem health
- Lack of resources



Global Warming

Predicted Increase in frequency and intensity of droughts and floods

How will these new conditions affect the invasive and native populations?

Question:

Are invasive plants more resilient to drought conditions than a native plants?

NATIVE:

Persicaria virginiana

INVASIVE:

Persicaria longiseta

Hypotheses:

- 1) If the RWC for both native and invasive species is calculated, then the RWC will be higher for the invasive species.
- 2) If the RWC is higher for the invasive species, then the invasive species will exhibit signs of drought stress later than the native species and recover quicker from the damage.

Study Design: Experiment 1 (RWC)

Purpose: To determine the RWC between native and invasive plants

6 different species were used

-3 native and 3 invasive pairings

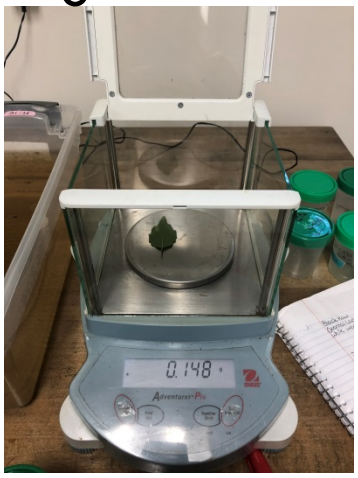
Methods: Experiment 1 (RWC)

1) Collect 4 leaves per plant

2) Determine the fresh weight of each leaf

3) Saturate each leaf in water for 4 hours

4) Determine the turgid weight for each leaf

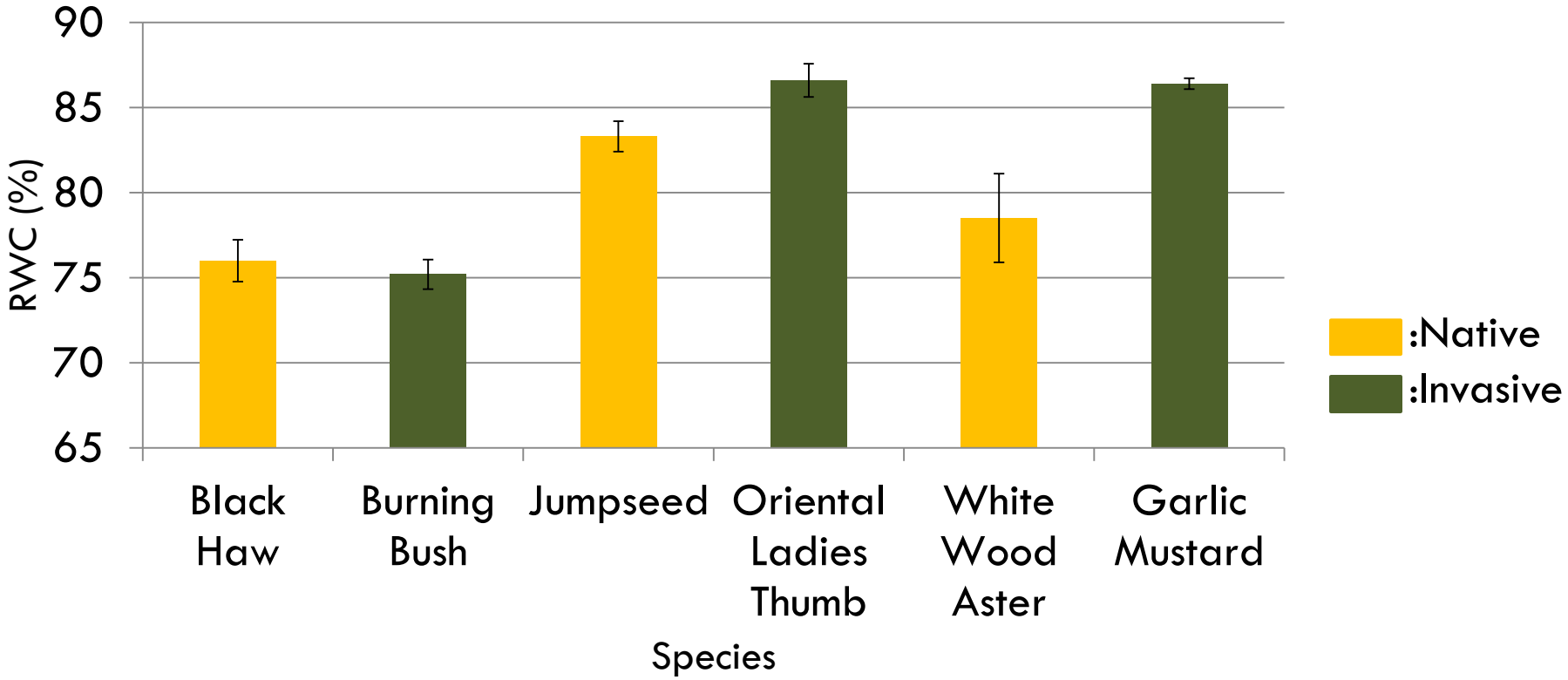


5) Dry each leaf for 24 hours at 80°C

6) Determine the dry weight for each leaf

Results: Experiment 1 (RWC)

Figure 1. Mean RWC in Native and Invasive Plants



Study Design: Experiment 2 (Drought)

Purpose:

To determine whether native or invasive plants,

-exhibited signs of drought stress slower

-recovered from drought stress faster

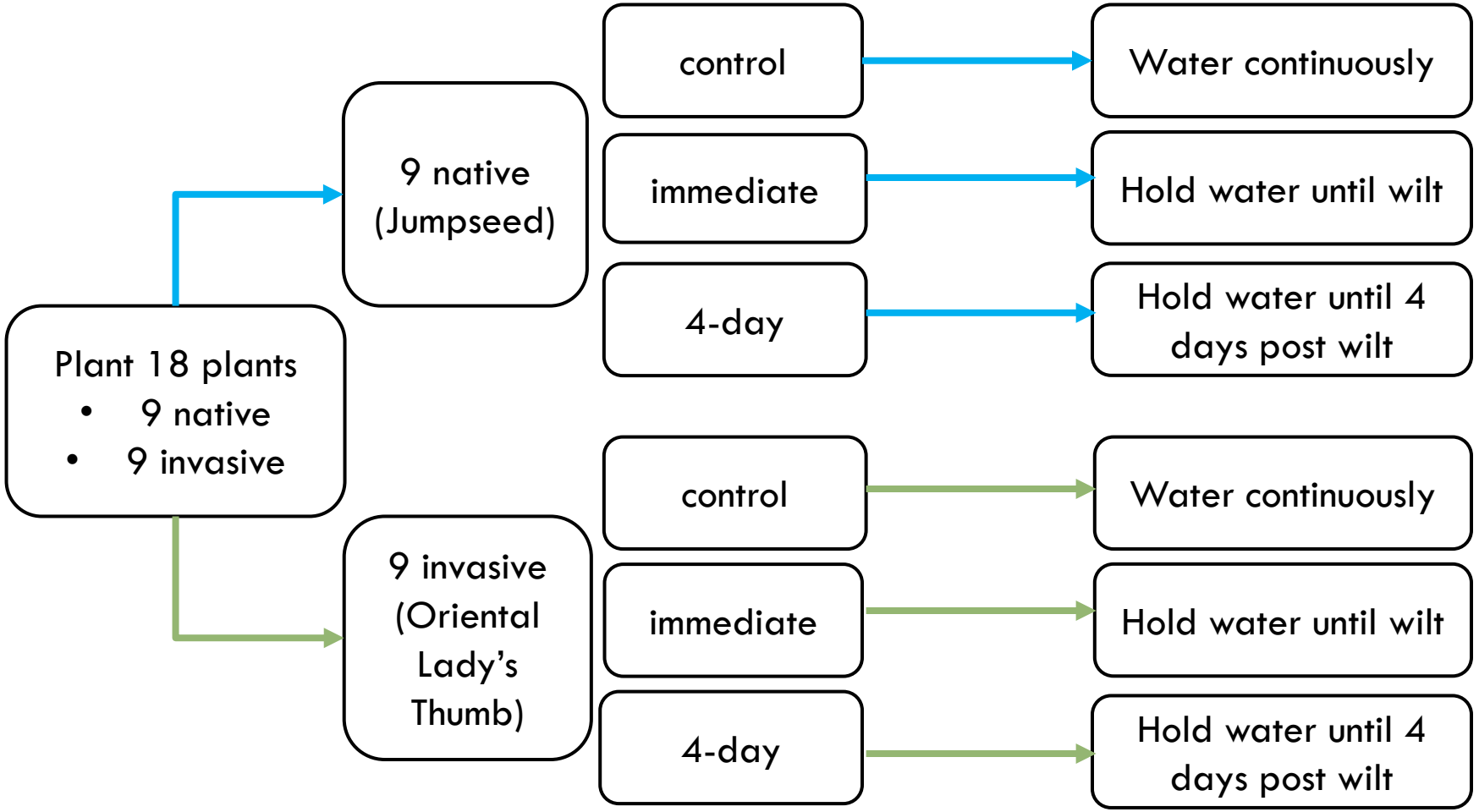
Control variables:

-Soil

-Sunlight

-Location

Methods: Experiment 2 (Drought)



Methods: Experiment 2 (Drought)

Day:1 time:12:00pm

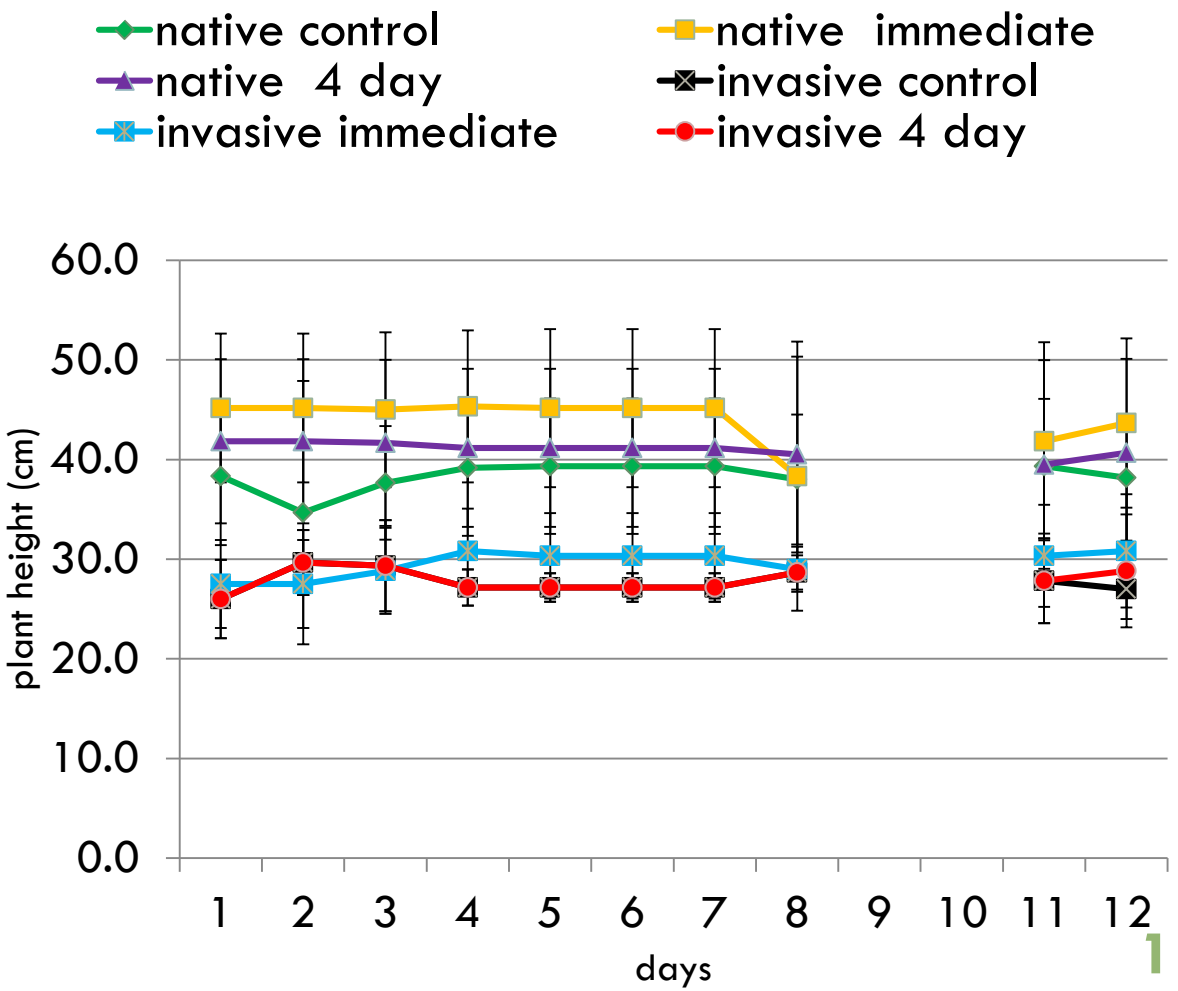
group	plant	treatment	Width (cm)	Height (cm)	Dd avg	# of leaves
native	1	Control	25	45	1.5	18
native	2	Control				
native	3	Control				
native	1	Immediate				
native	2	Immediate				
native	3	Immediate				
native	1	4-day				
native	2	4-day				
native	3	4-day				

Results: Height

Data= not statistically significant over time

The height of the plants stayed relatively constant the entire time, and any variation in height was unrelated to the experiment

Figure 2. Height



Results: Leaf Number

Data= not statistically significant over time

Over time both the native and invasive plants did not exhibit leaf loss due to the experimental conditions

Figure 3.Leaf Number

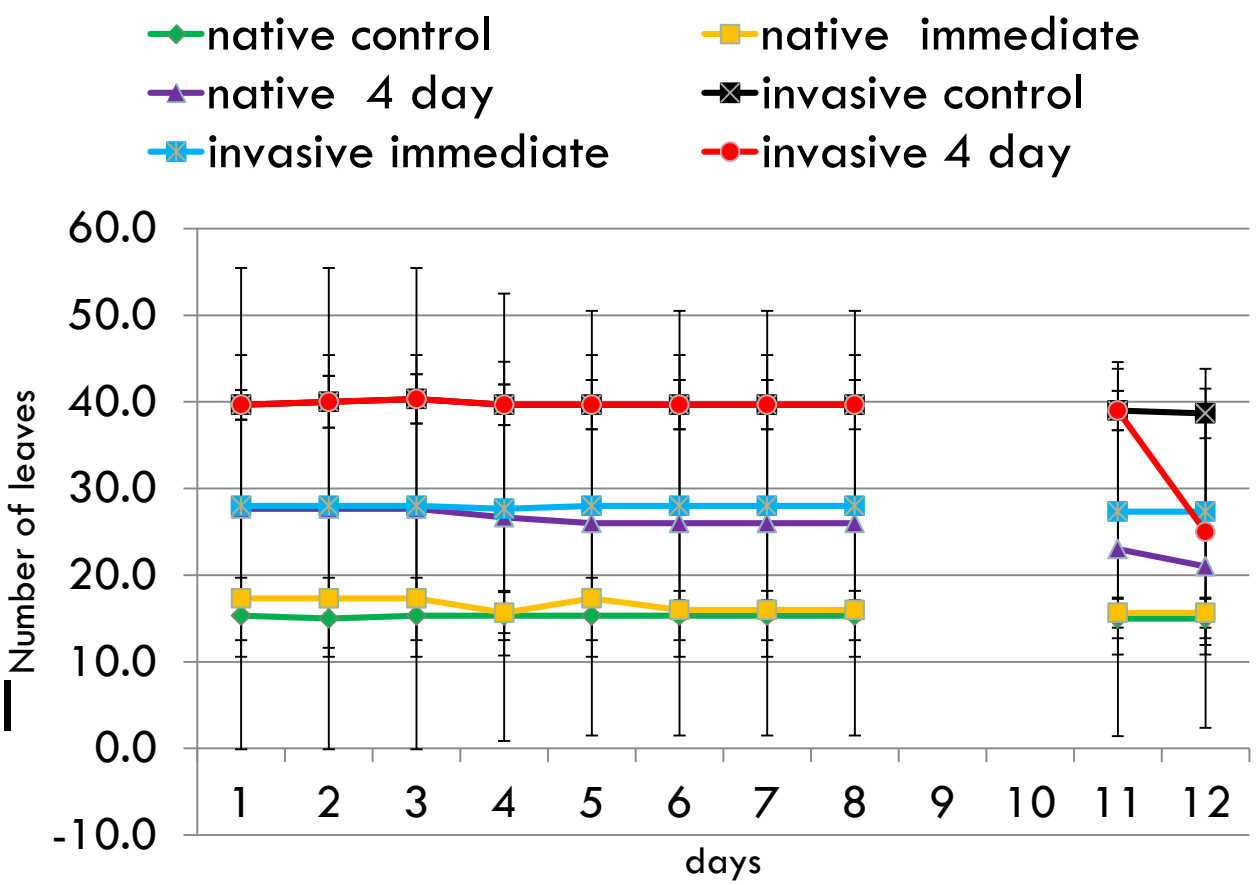


Figure 4. Droop Distance

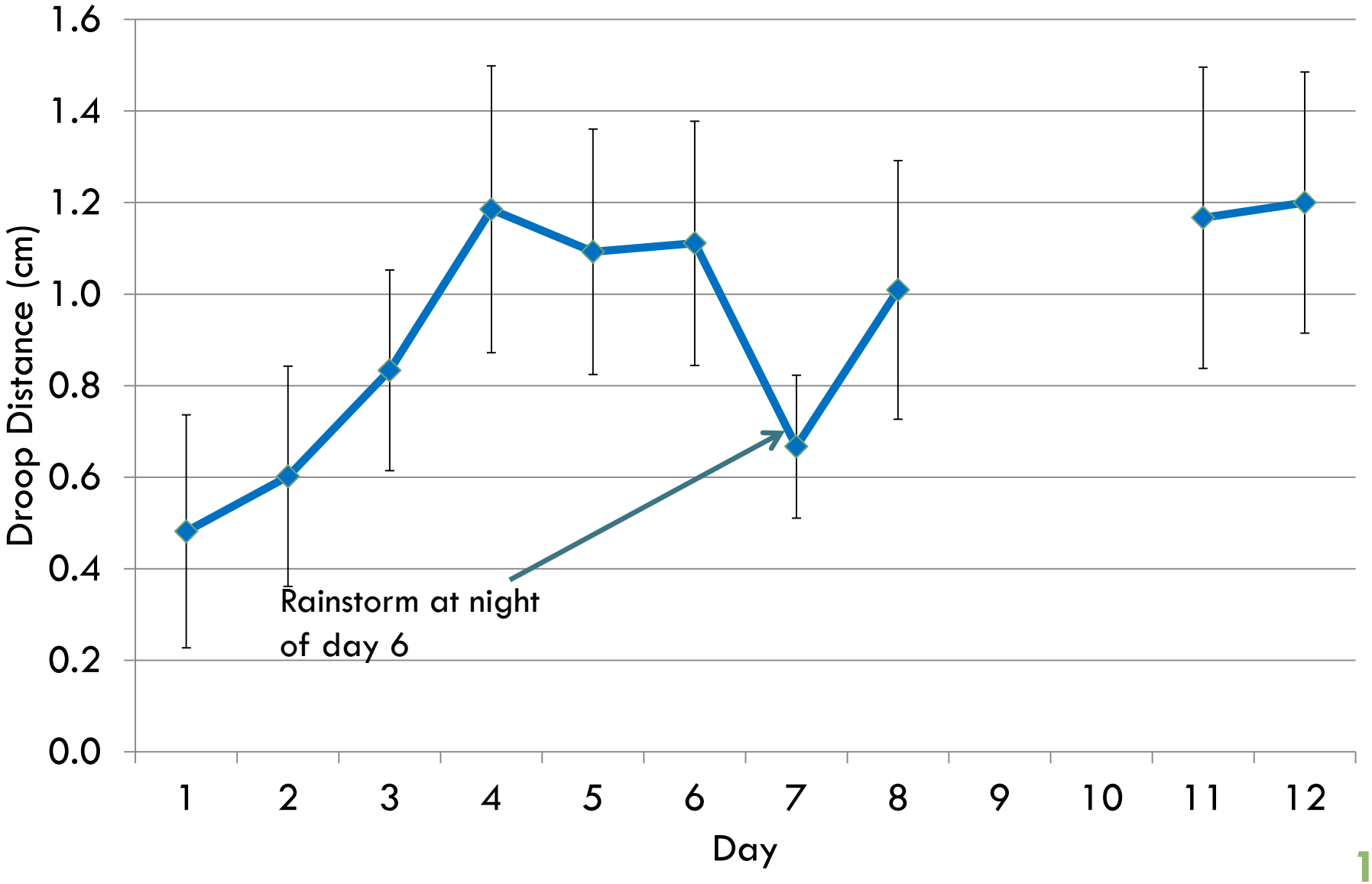
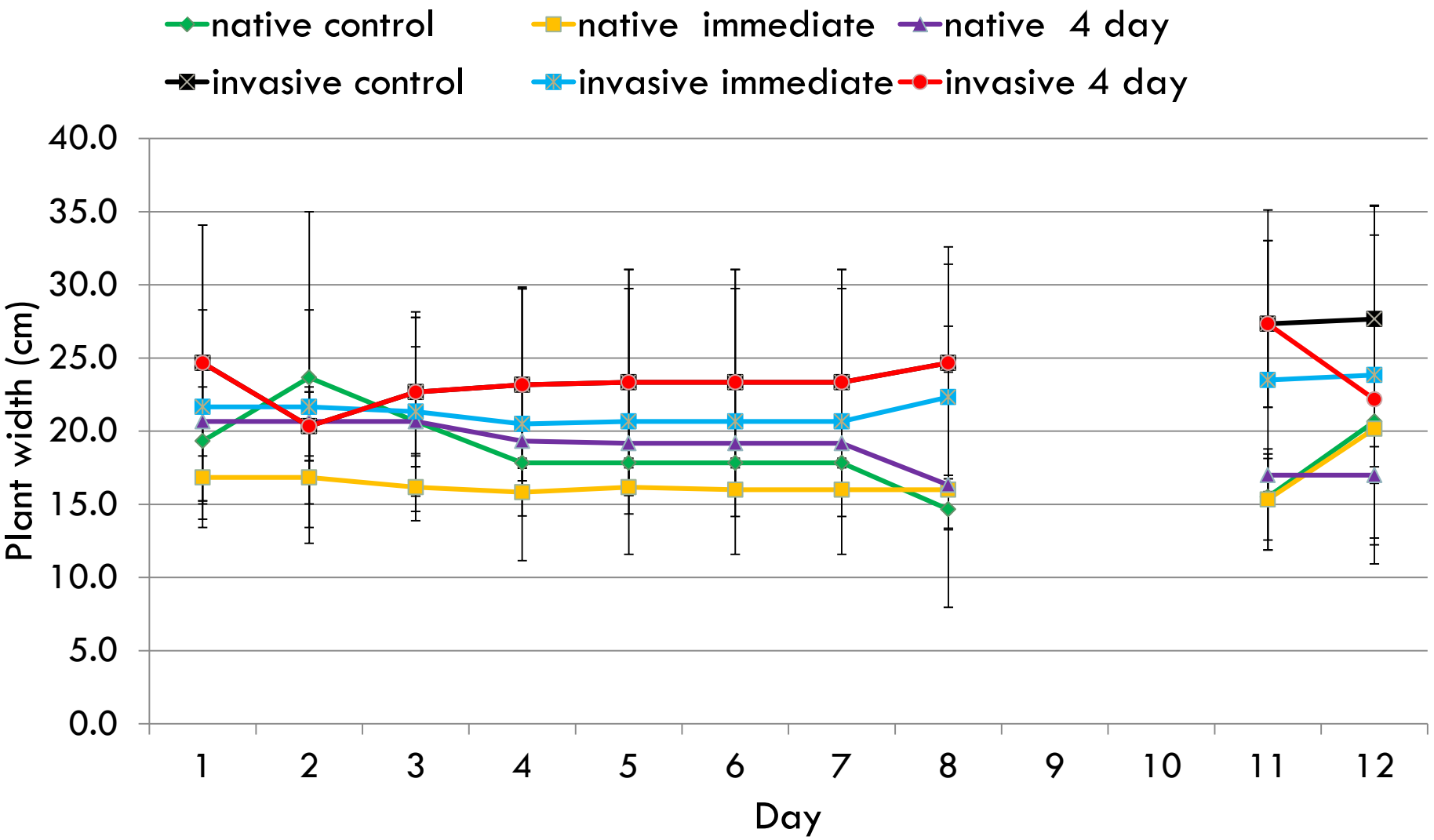


Figure 5. Width



Overtime native width decreases while invasive width remains constant

Discussion:

- Data is mostly statistically insignificant
- Visual observations indicate the invasive was more resilient
  - Due to short duration of study wilt point was never reached for invasive plants

Discussion:

-Some invasive plants are likely more resilient to droughts

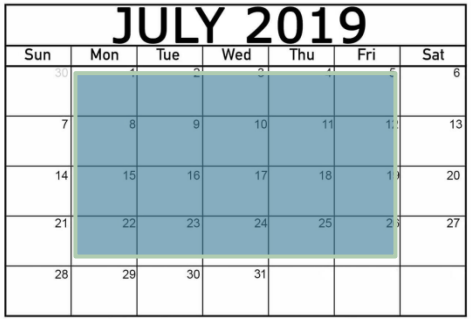
-Invasive plants may be better able to withstand the predicted future climate

Sources of Error:

- Humidity/ weather

- Human error

- Short Time span
  - Only 1 trial
  - Experiment was incomplete



Future Research:

- Use other native/ invasive pairings
- Create more subgroupings to test resilience threshold
- Add in other drought conditions
  - Increased sunlight
  - Control air moisture

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Any Questions?