

Less conventional approaches to IPM: Novel strategies for effective weed management in California



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Techniques and considerations that can improve weed management on California grasslands



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Multiple control efforts in a single season



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Use of seeding for weed management



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Taeniatherum caput-medusae (Medusahead)

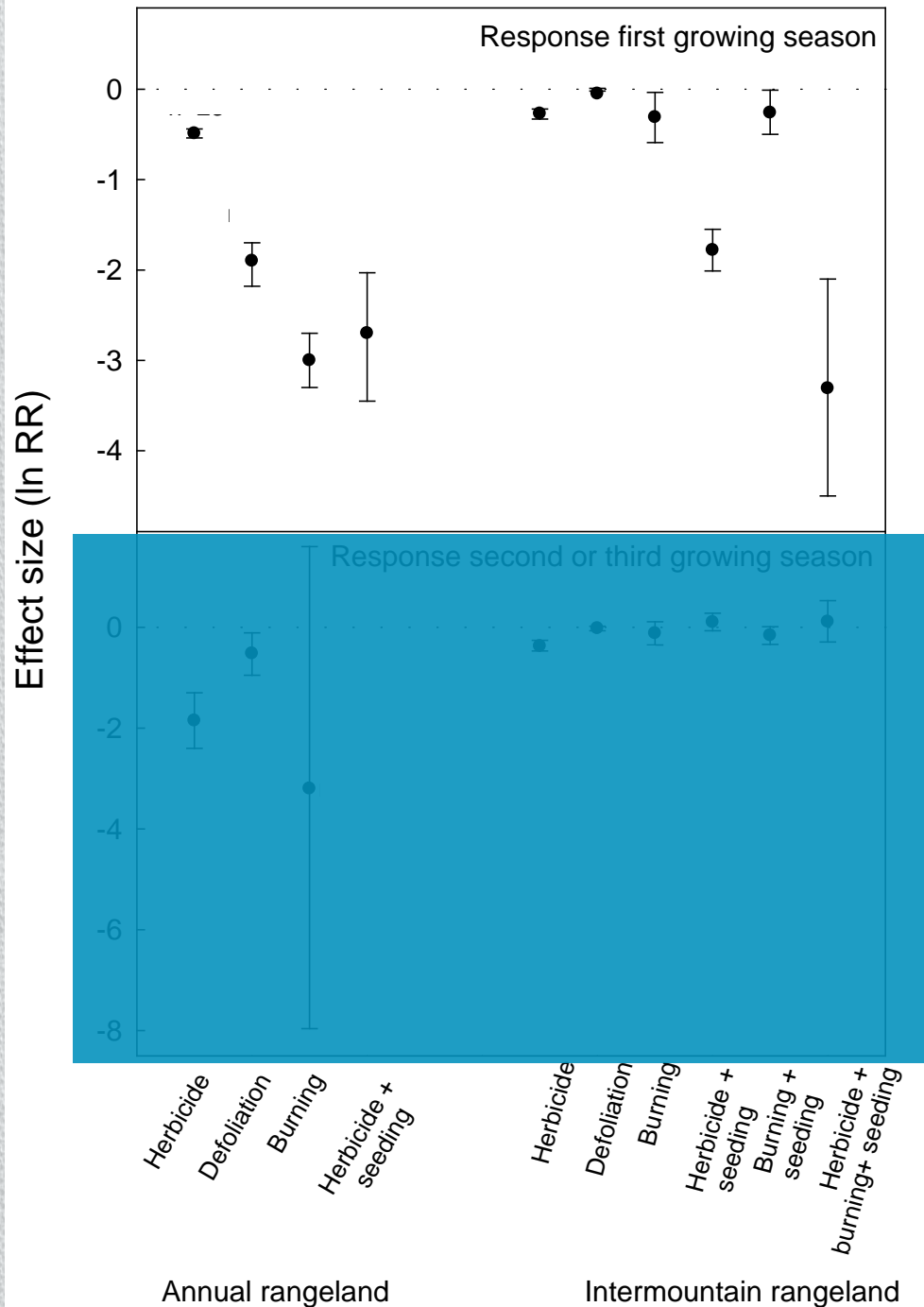


Invaded 17 western US states

Spreads at a rate of 12% per year

Can grow to 2,000 plants per square ft

Livestock grazing losses can reach \$20/acre



What demographic processes might play a role in mediating medusahead dominance?



Methods

Oak woodland



Open grassland



habitat

Methods

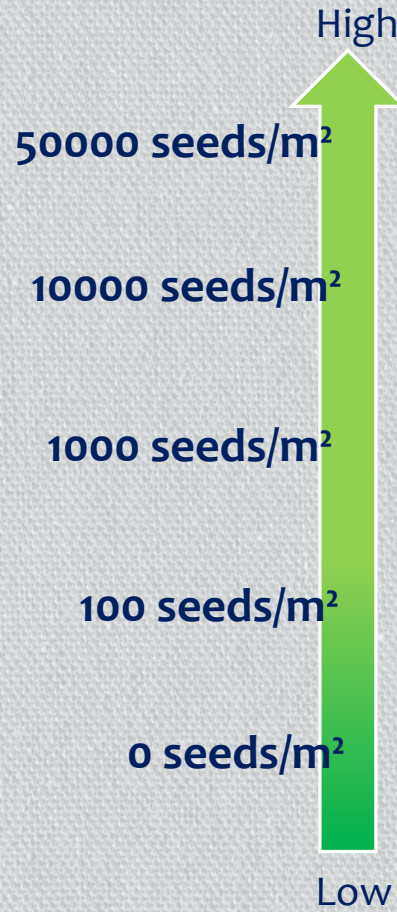
Oak woodland



Open grassland



habitat



seed density

Methods

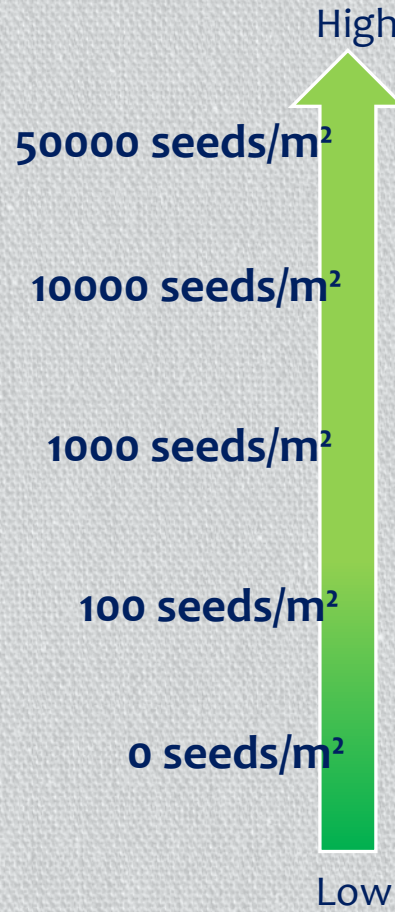
Oak woodland



Open grassland

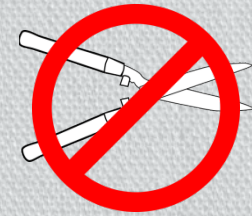


habitat

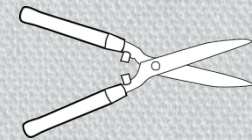


seed density

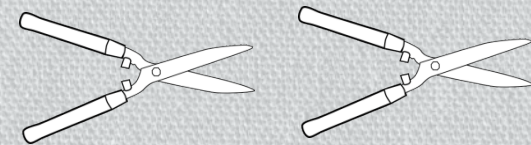
not clipped



clipped once



clipped twice

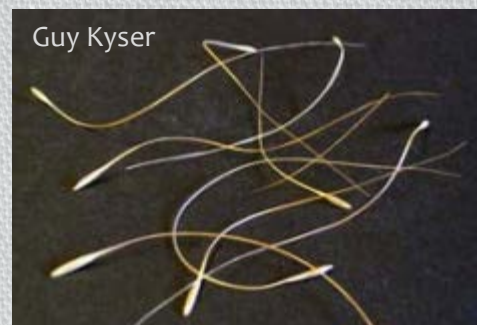
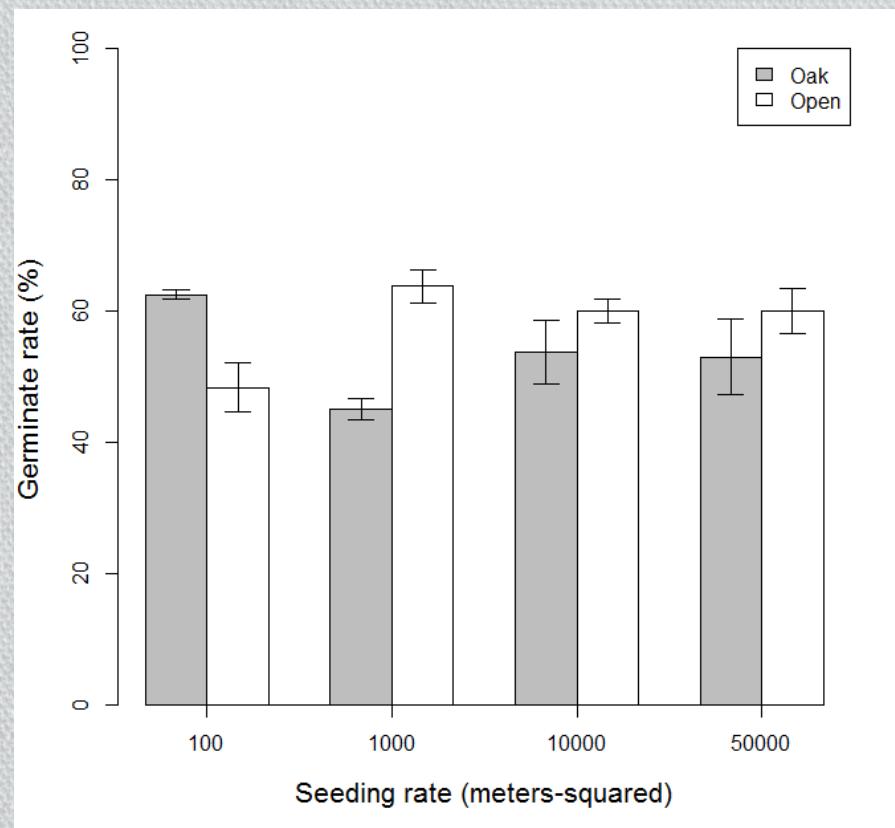


management

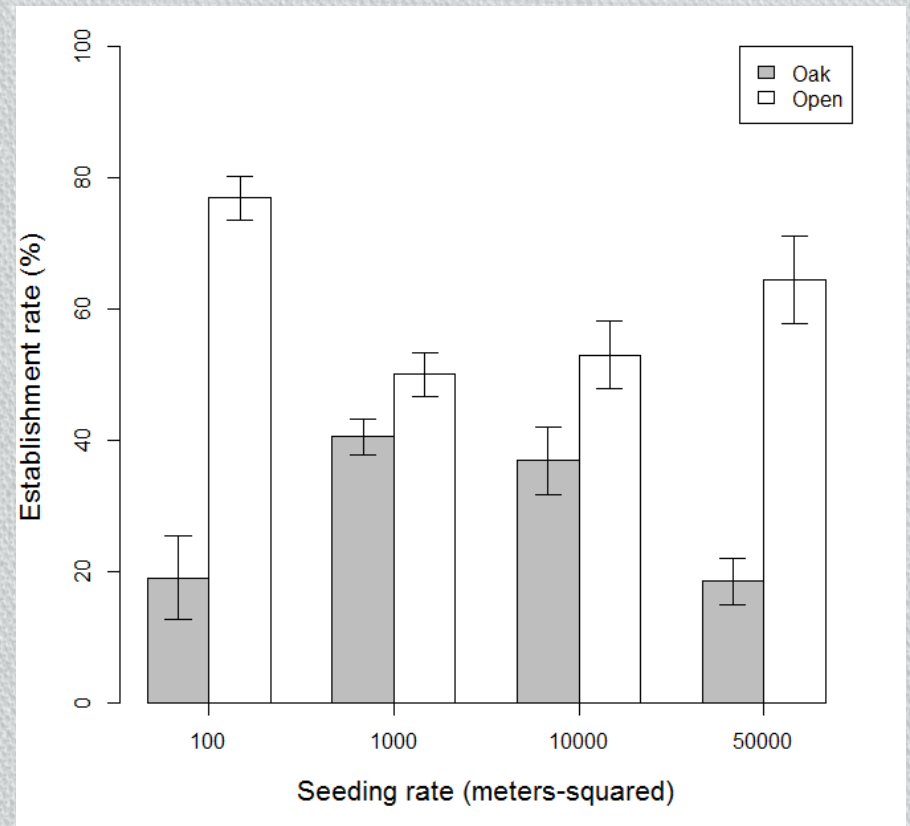
Results

❖ Before clipping ❖

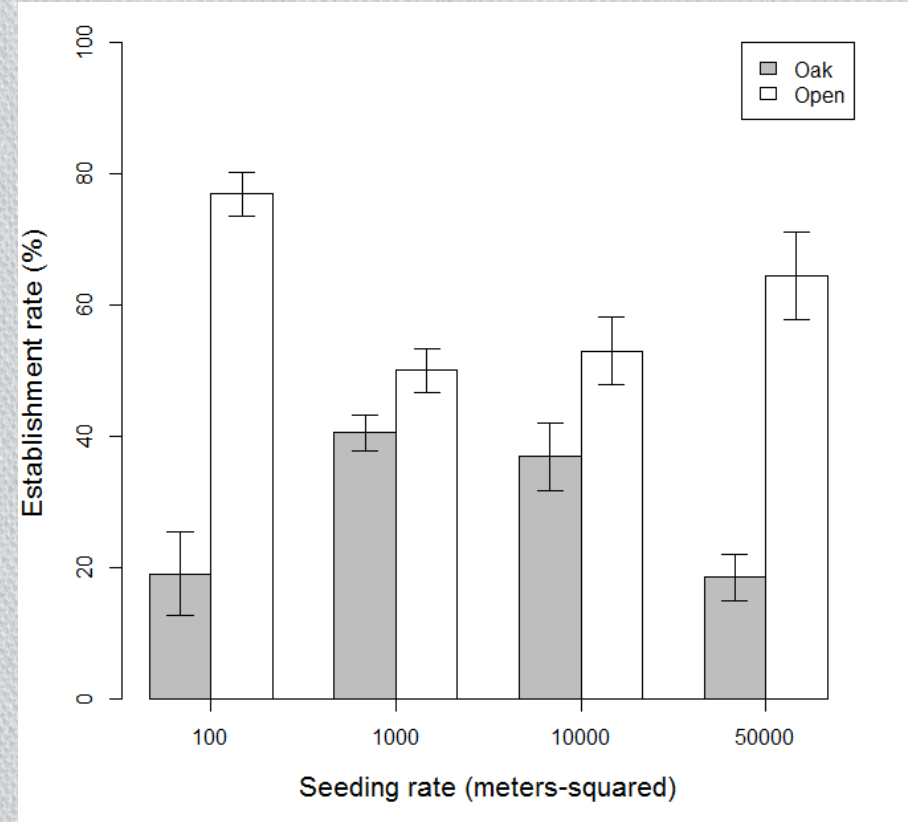
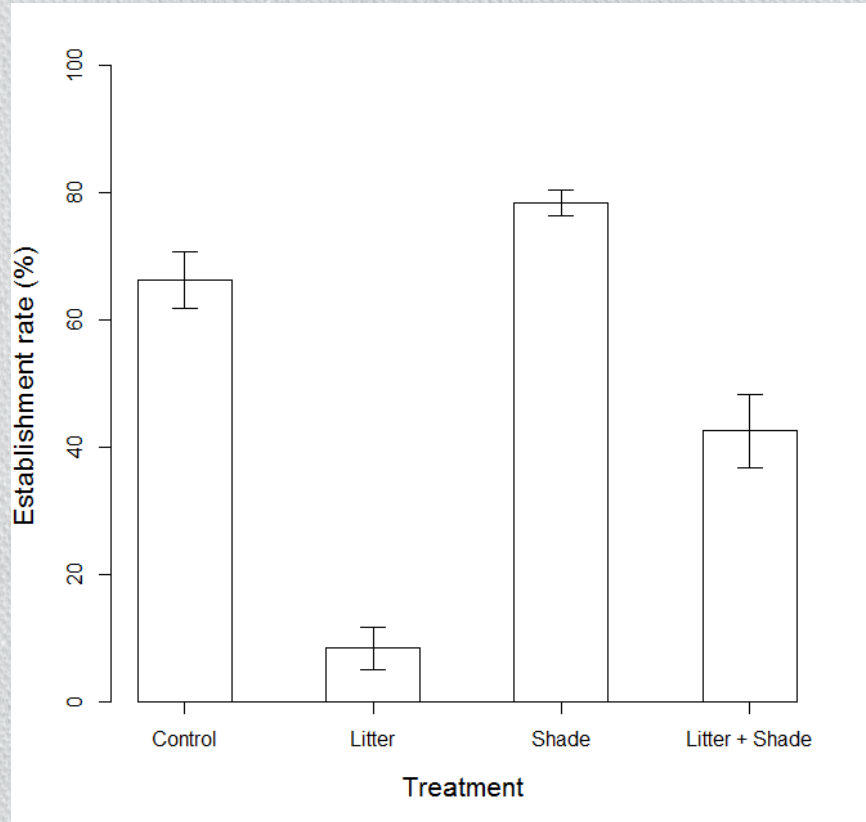
Results



Results

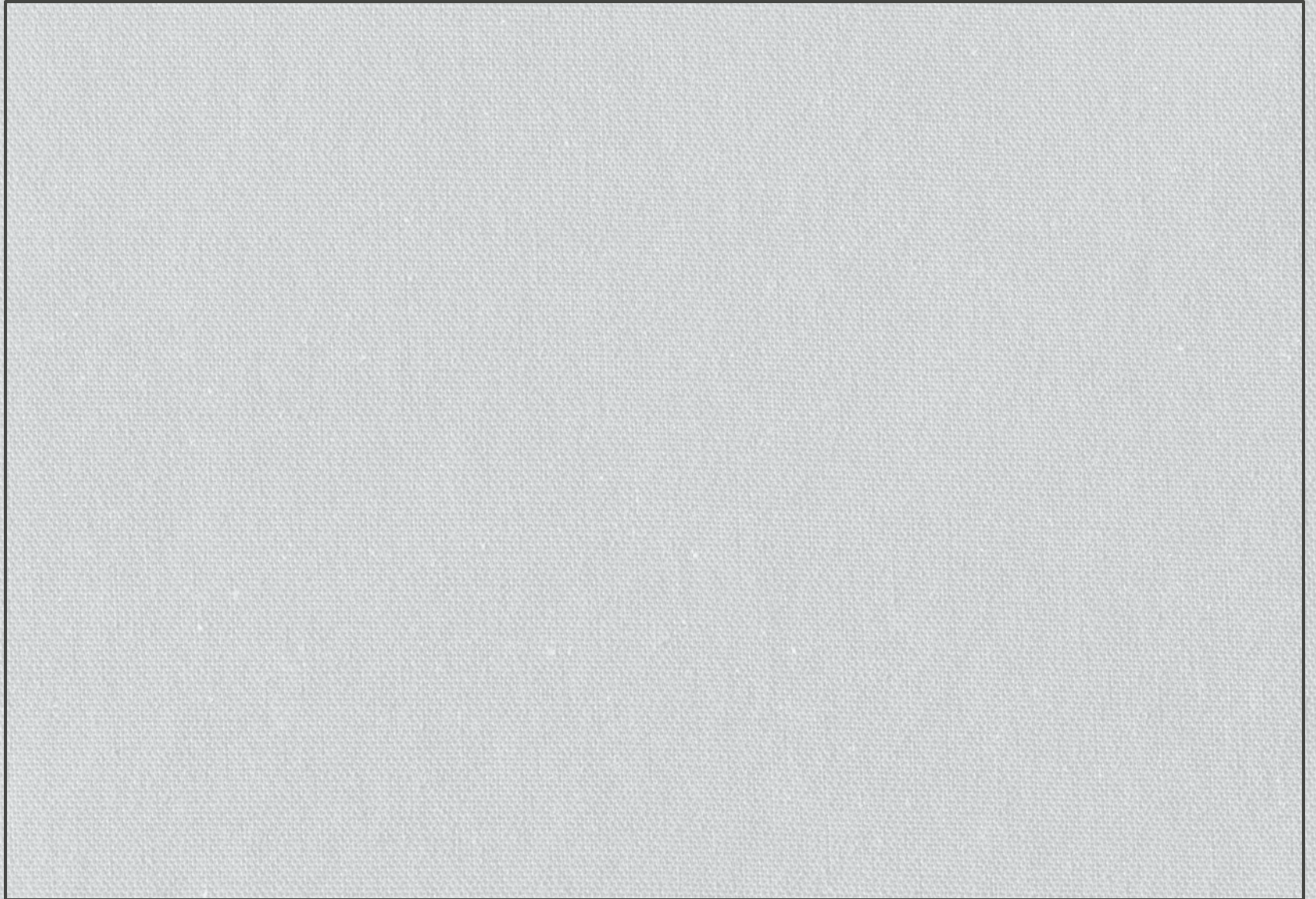


Results

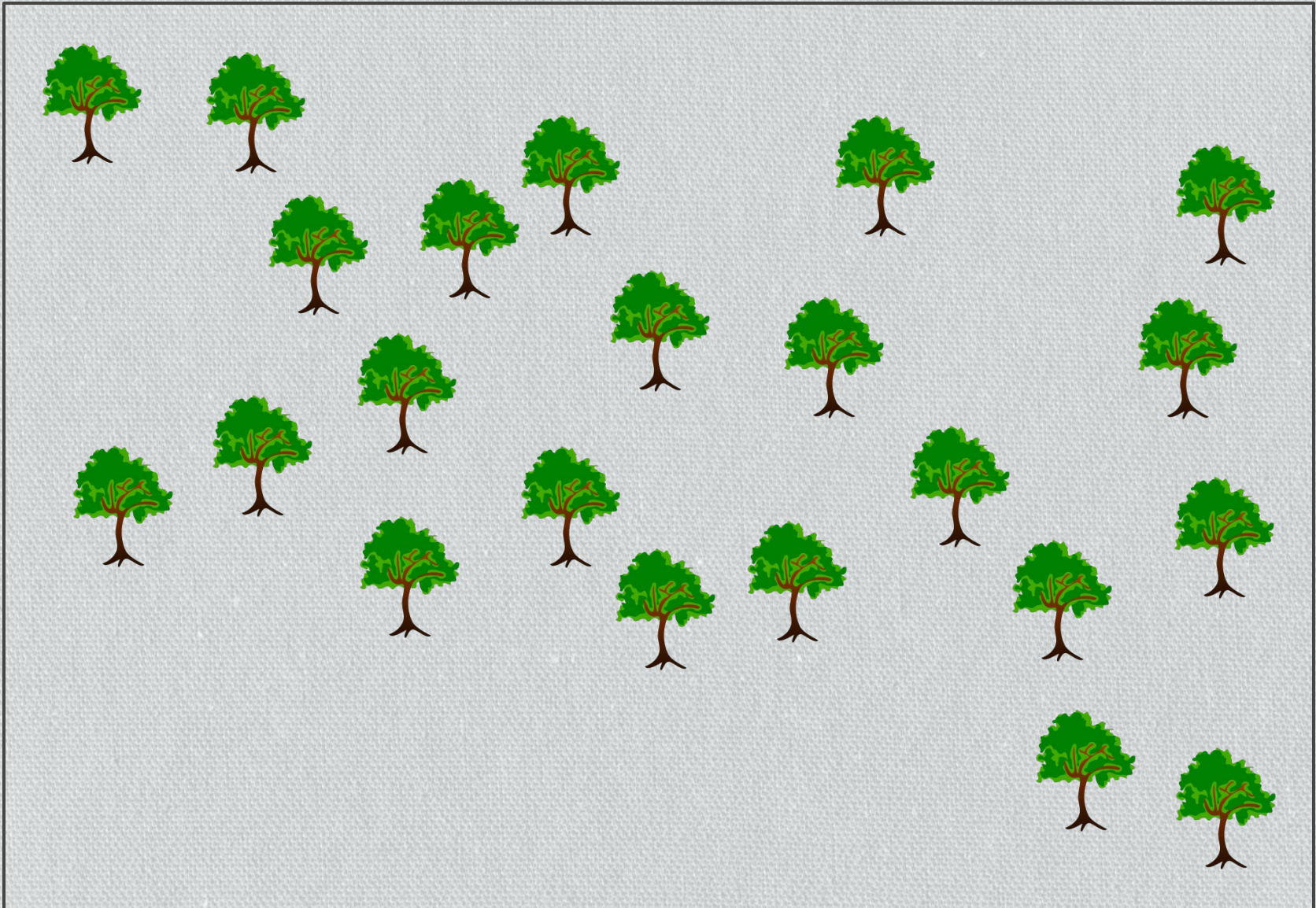


Management implications

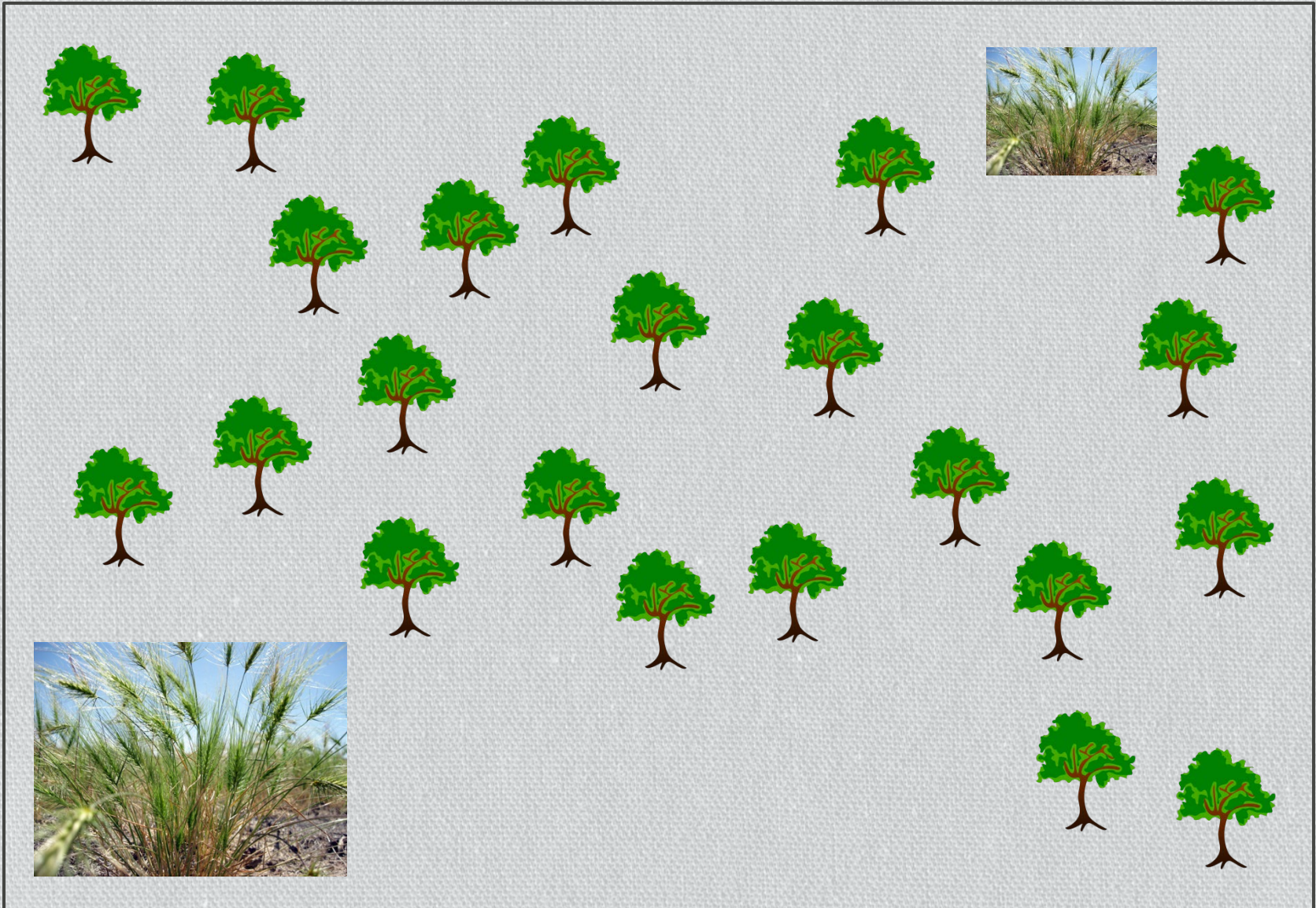
Management implications



Management implications



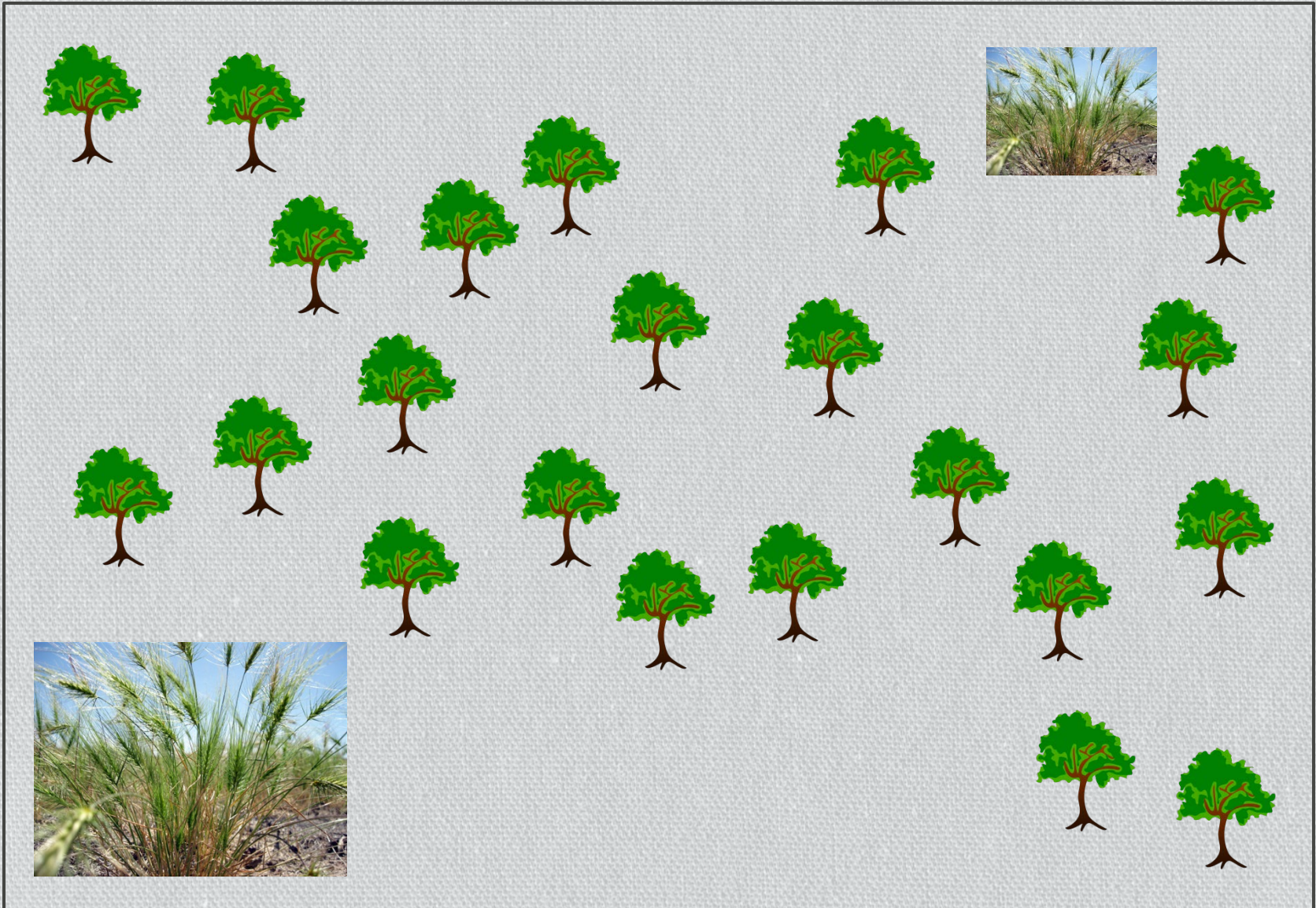
Management implications



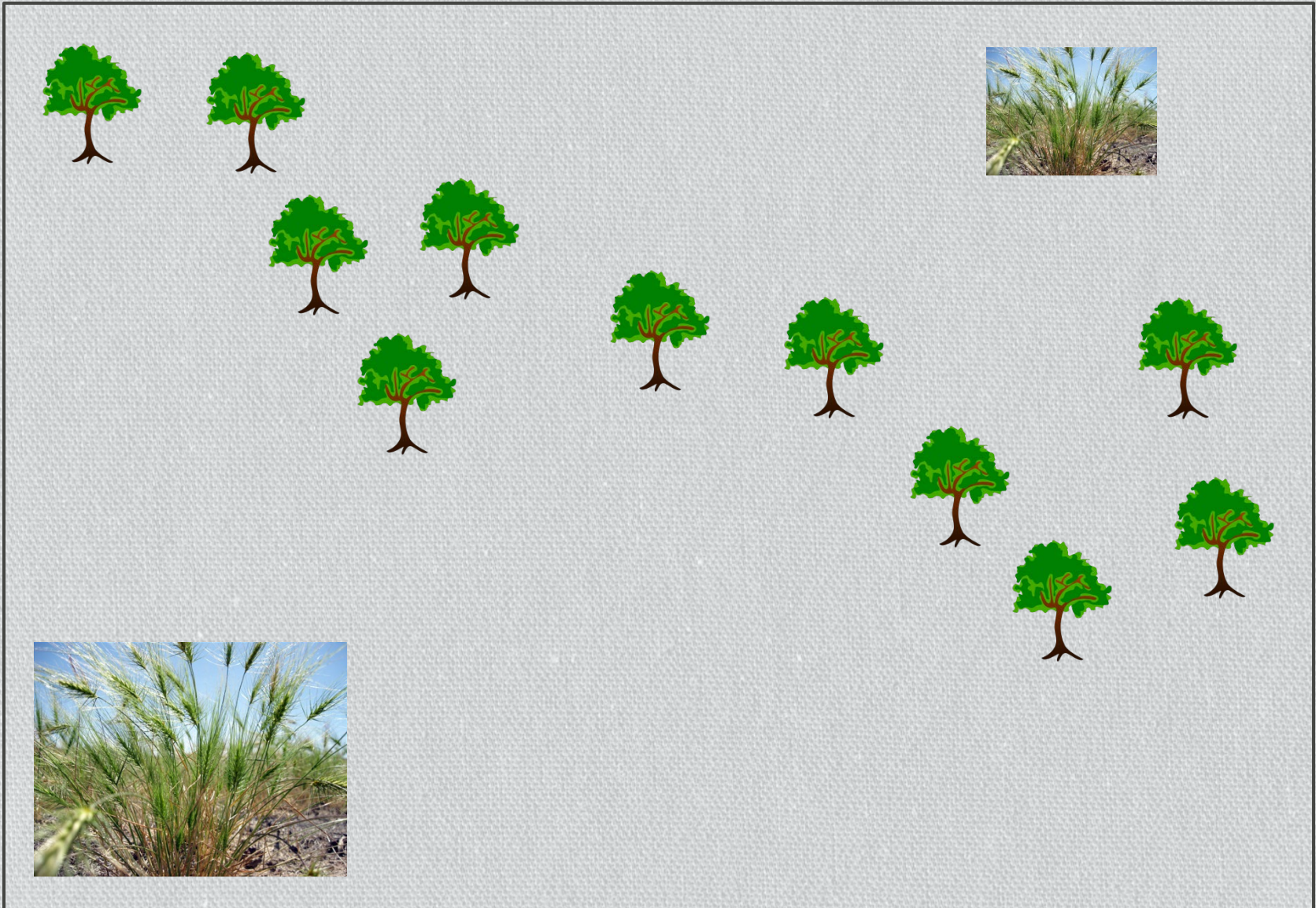
Management implications



Management implications



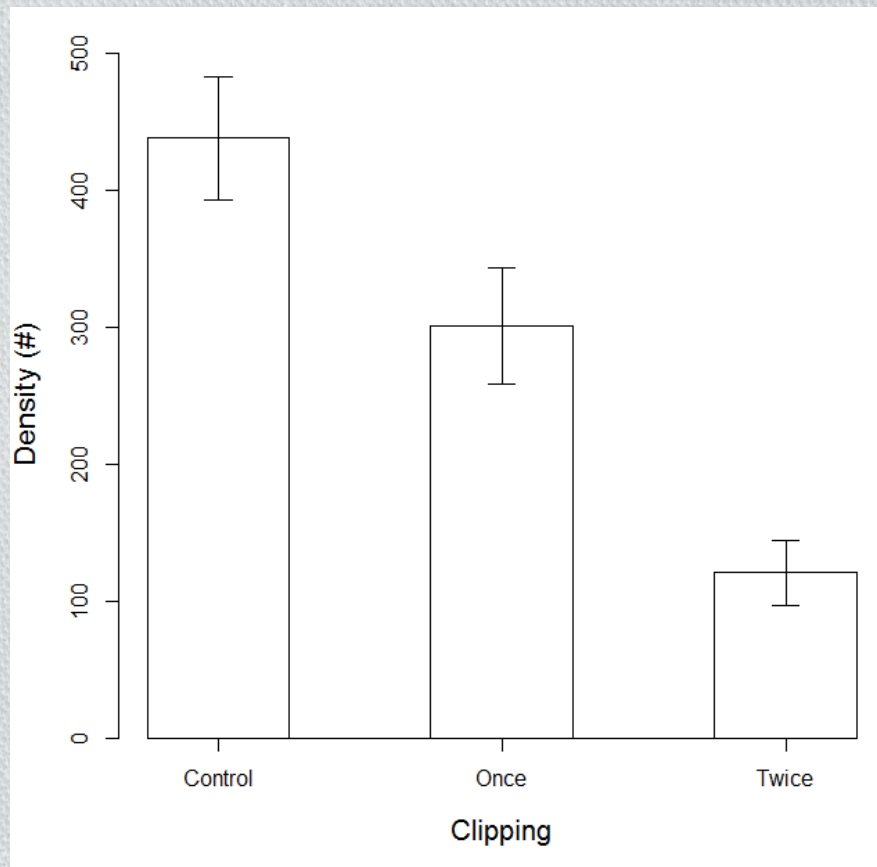
Management implications



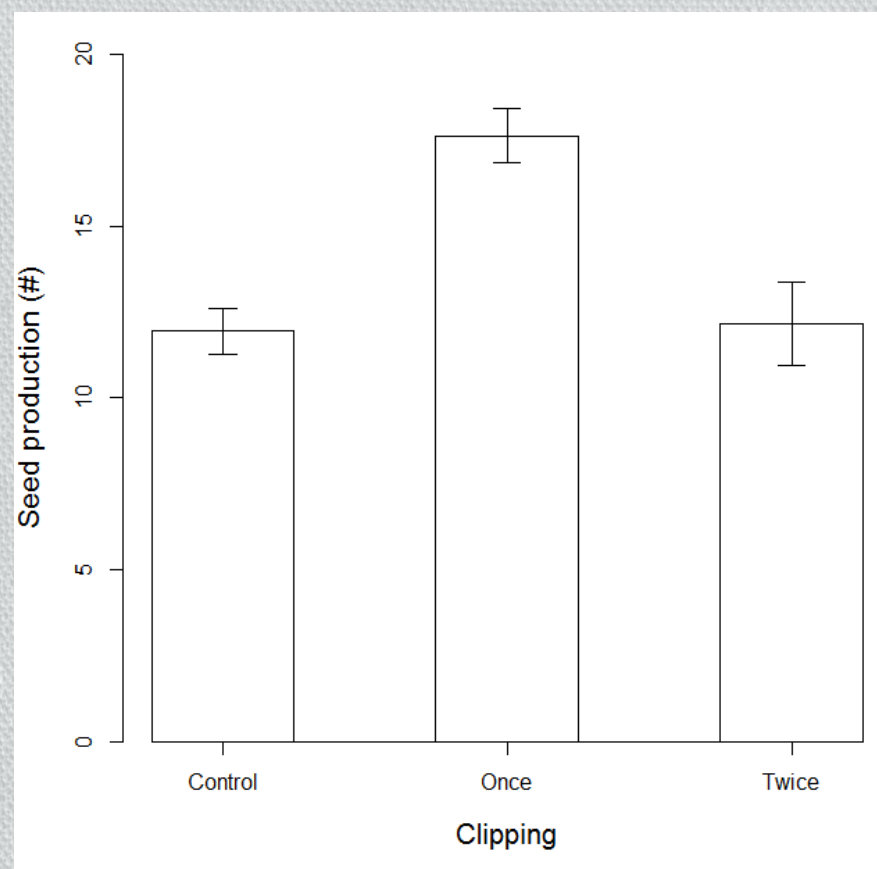
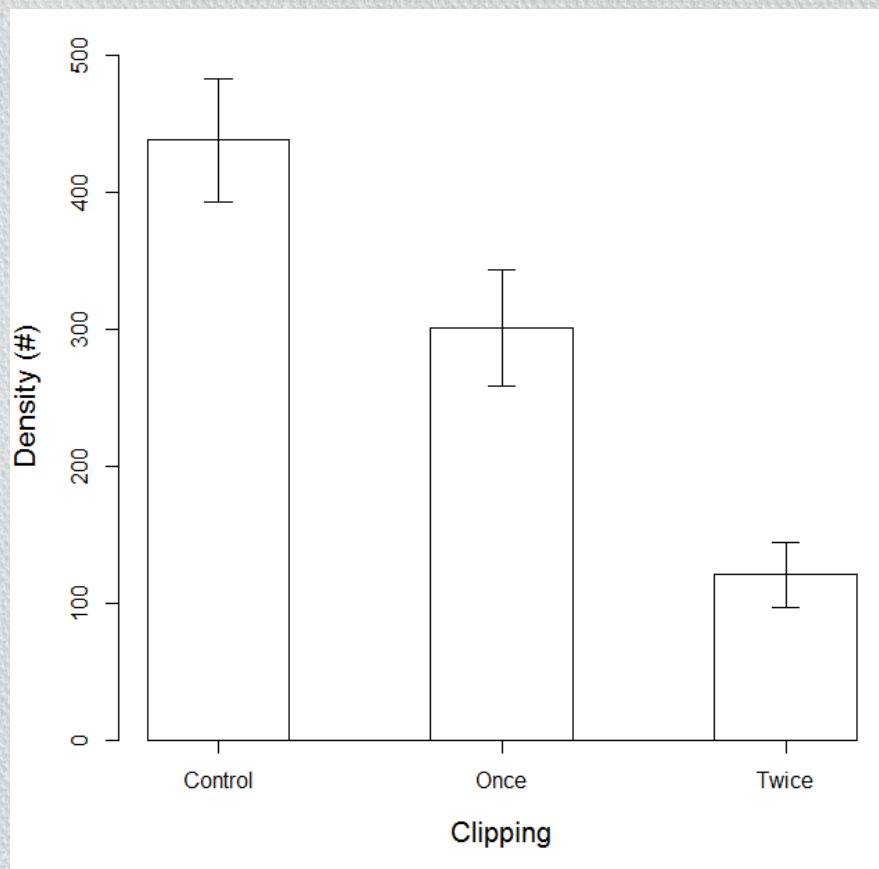
Results

❖ After clipping ❖

Results

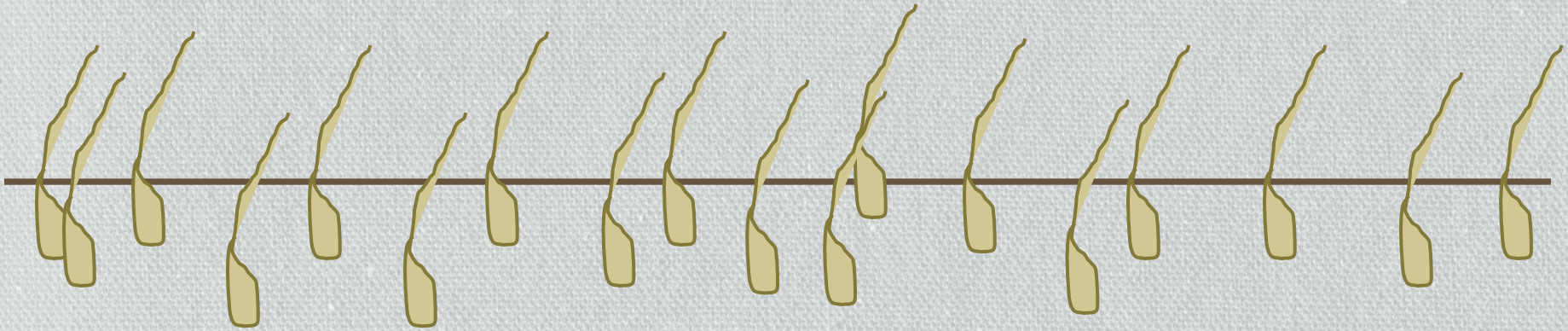


Results



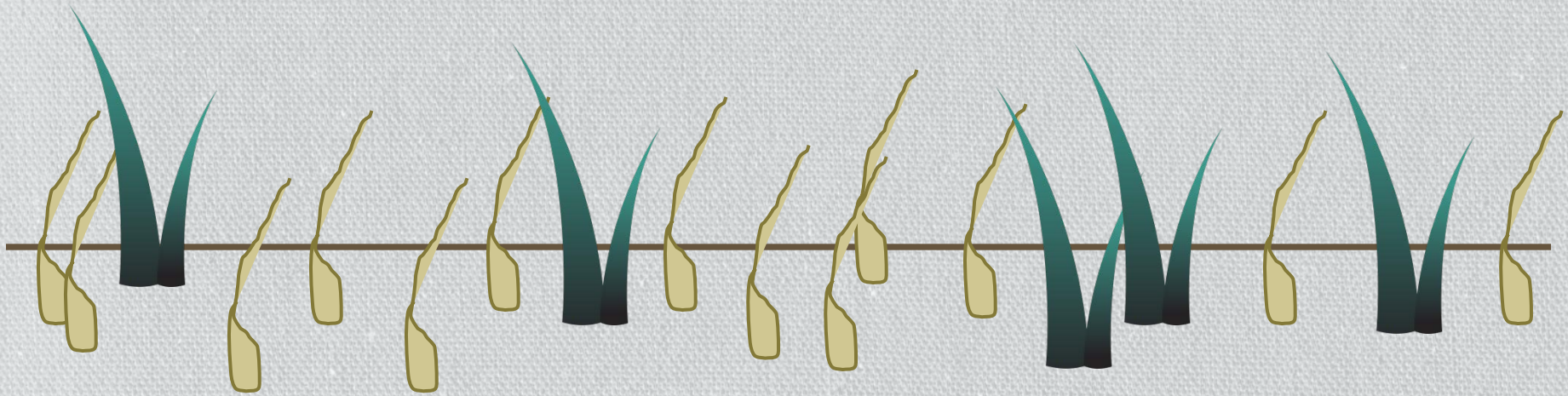
Potential mechanism

Potential mechanism



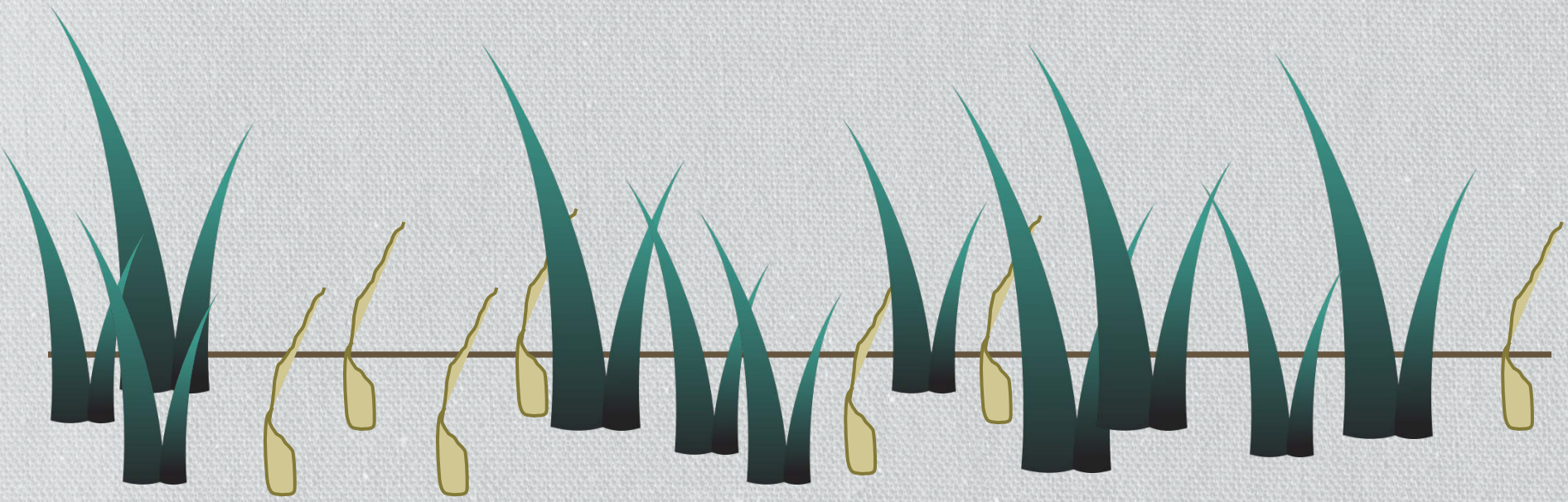
November

Potential mechanism



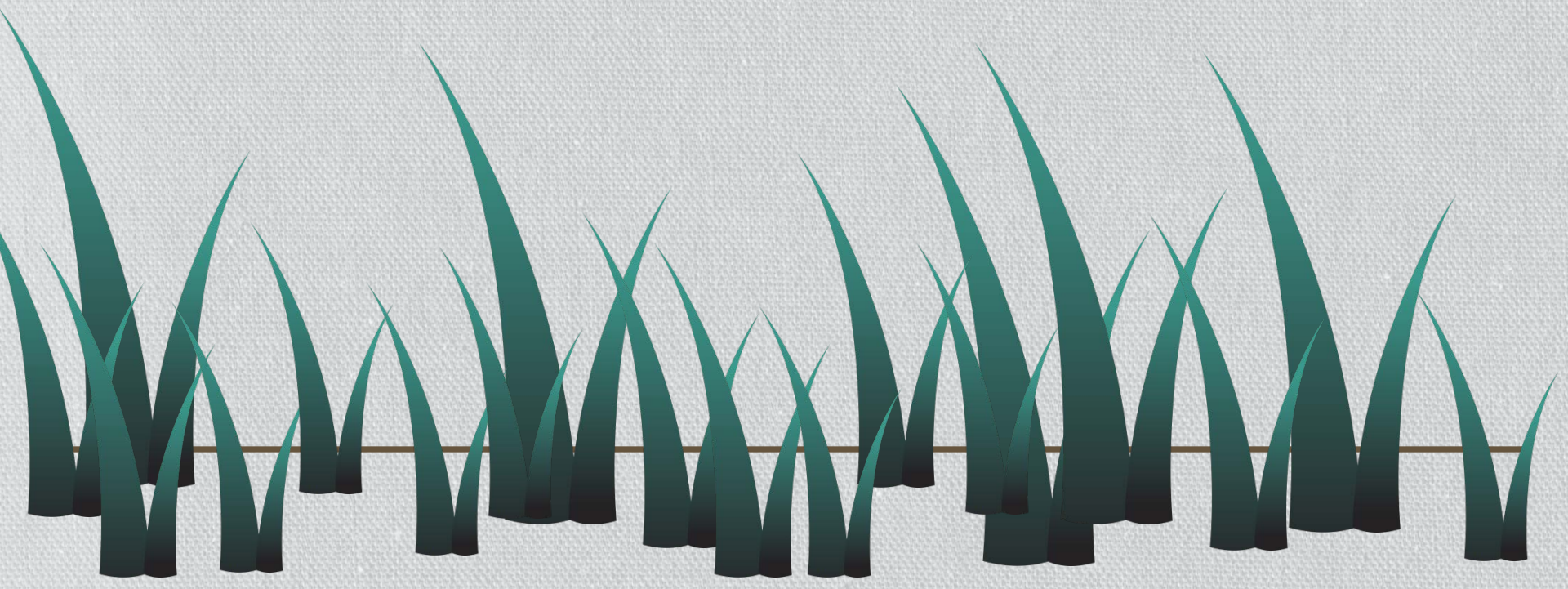
December

Potential mechanism



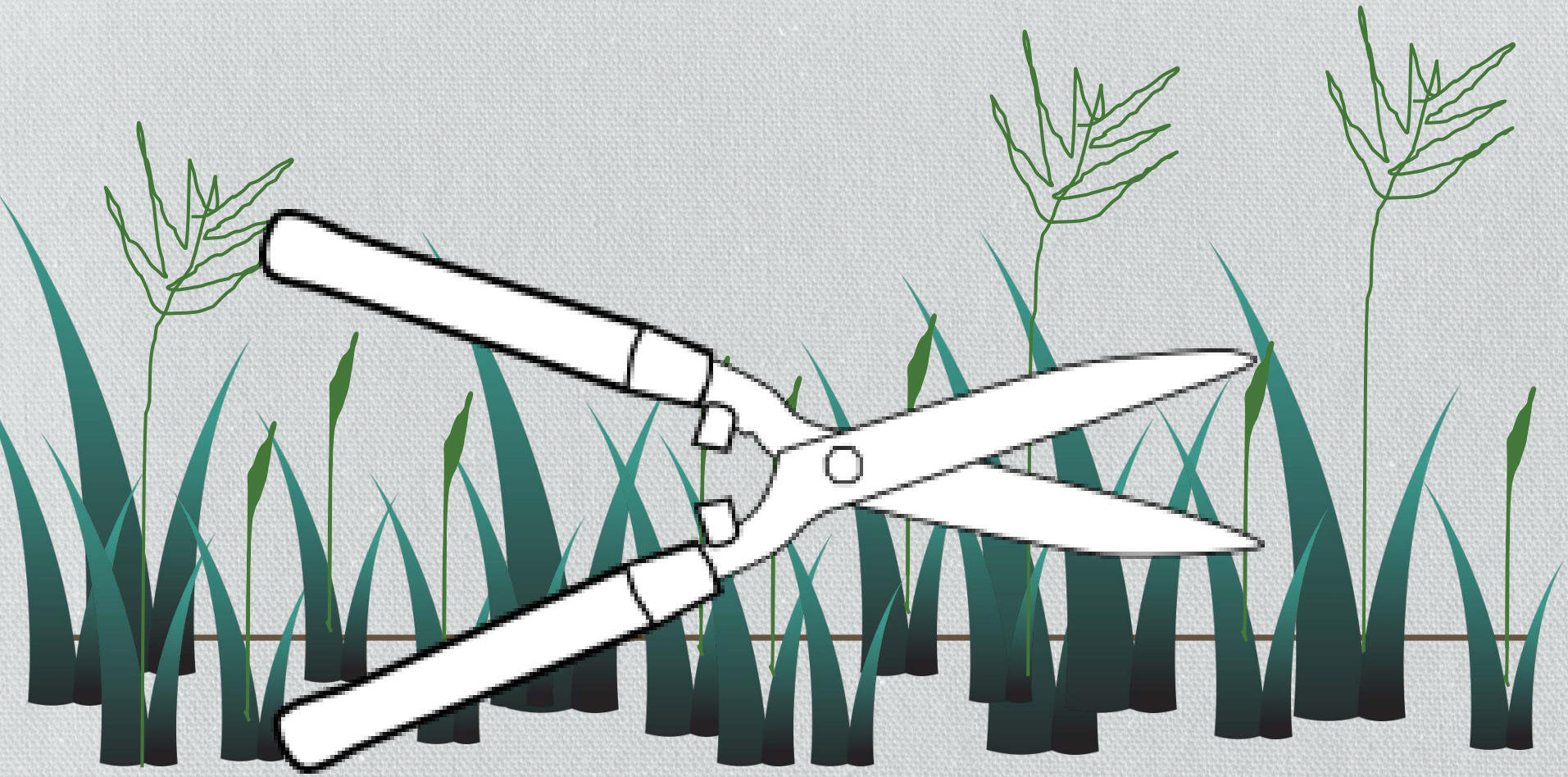
January

Potential mechanism



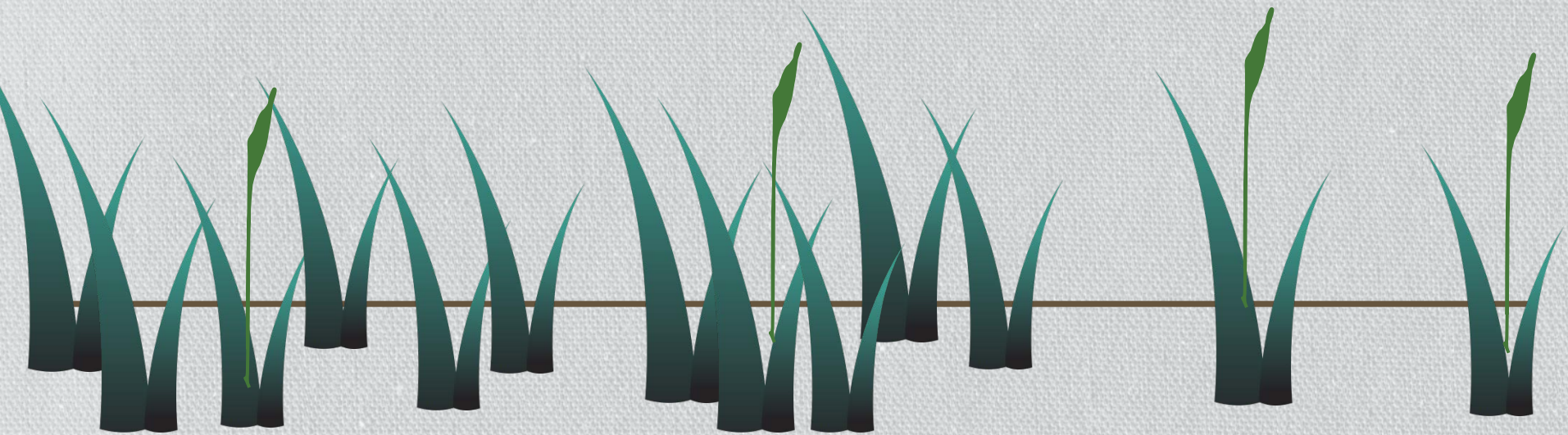
March

Potential mechanism



March

Potential mechanism



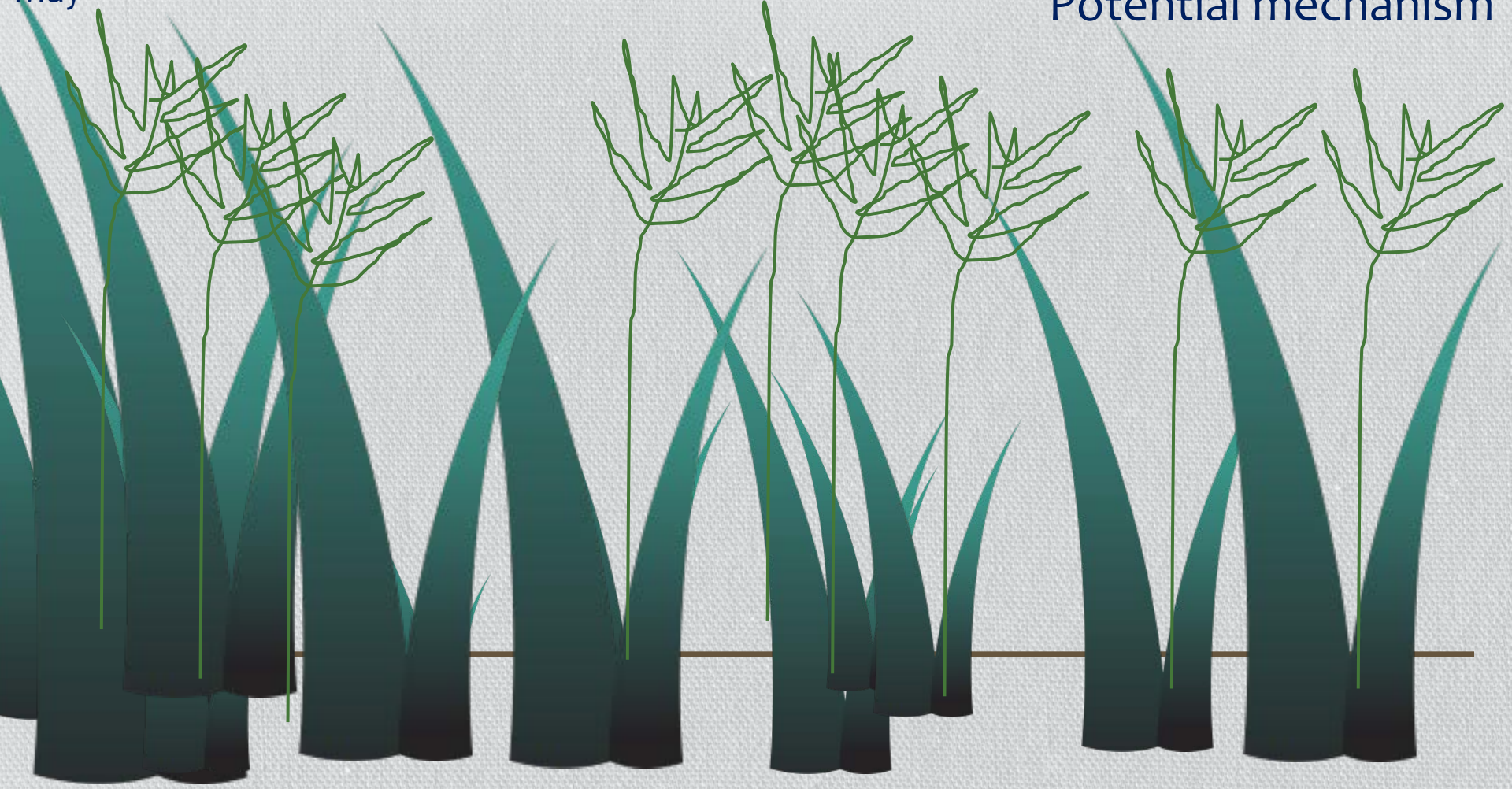
April

Potential mechanism



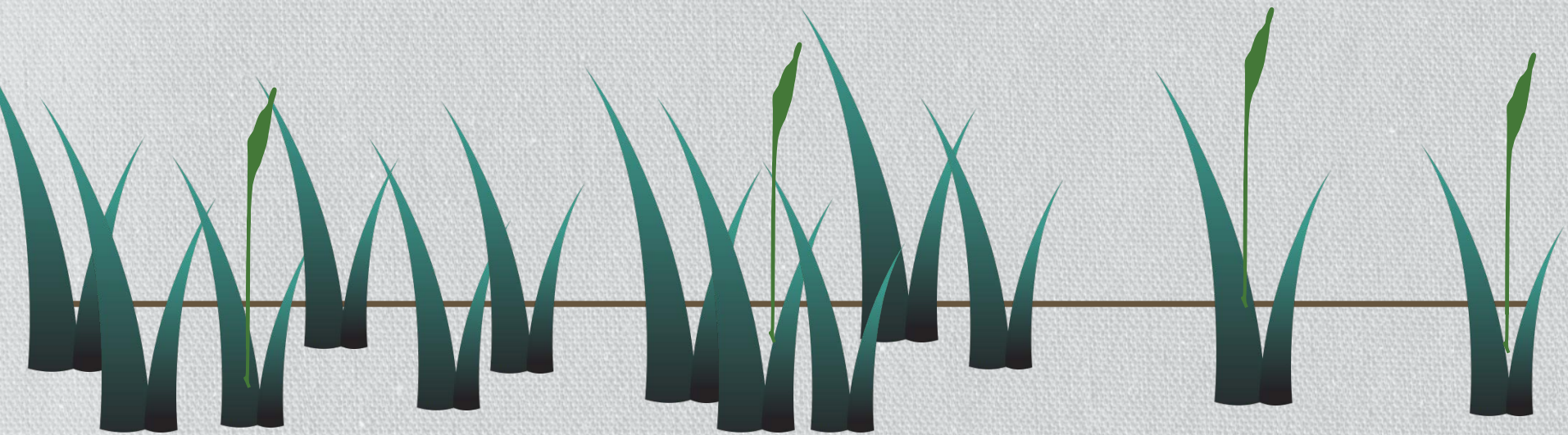
May

Potential mechanism



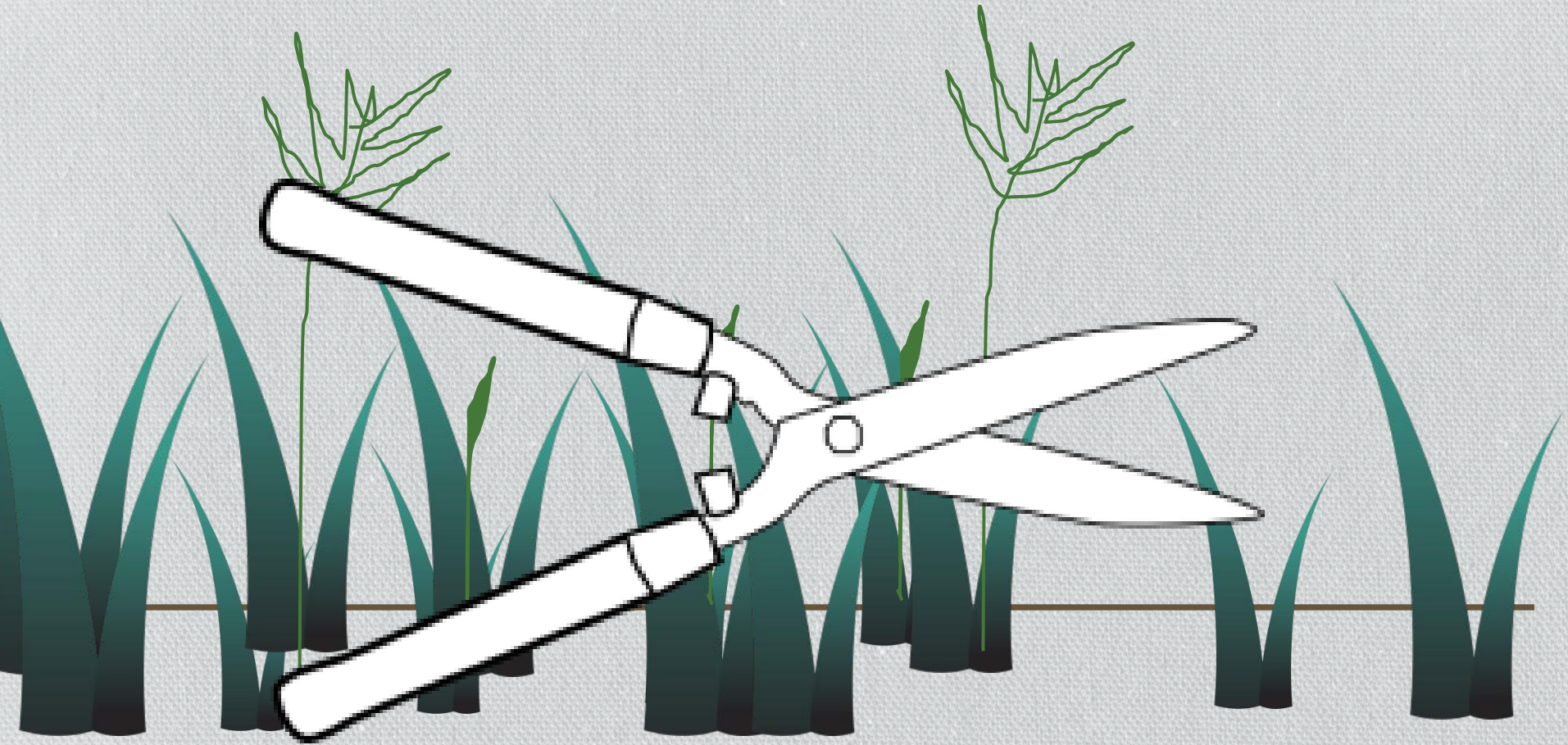
March

Potential mechanism



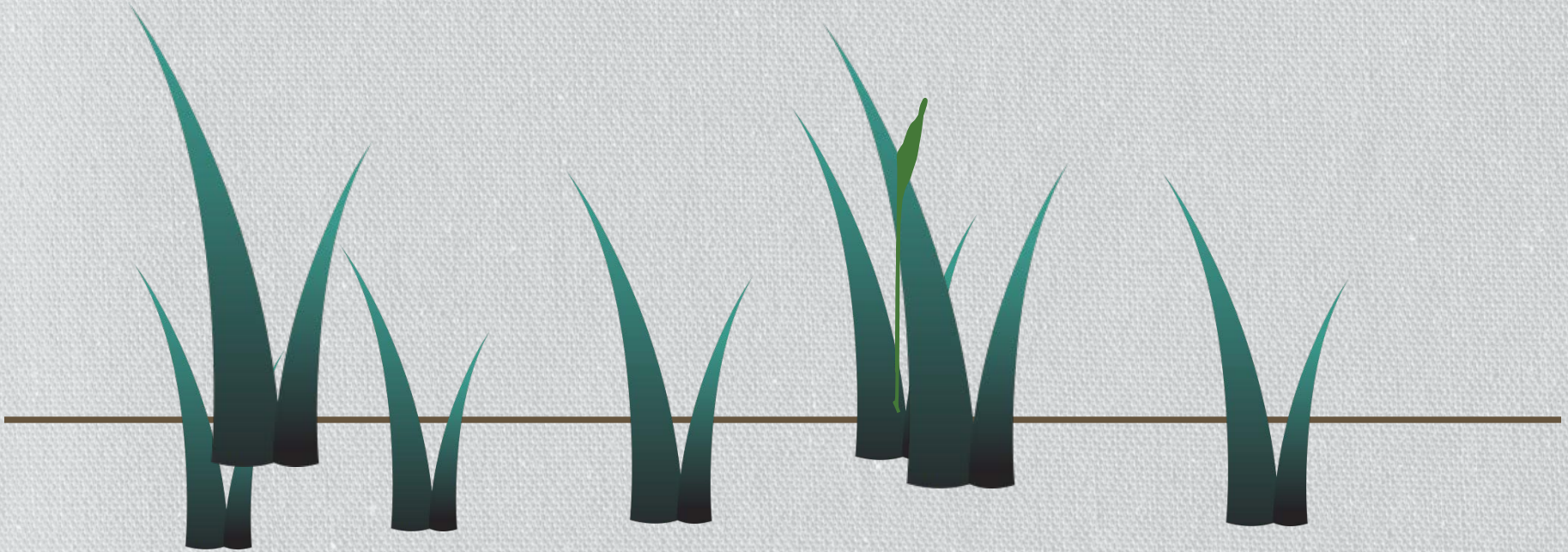
April

Potential mechanism



April

Potential mechanism



May

Potential mechanism



Compensation from younger cohorts limits long-term success of single effort control

More info on Medusahead

Medusahead

THE STATE OF THE WEED

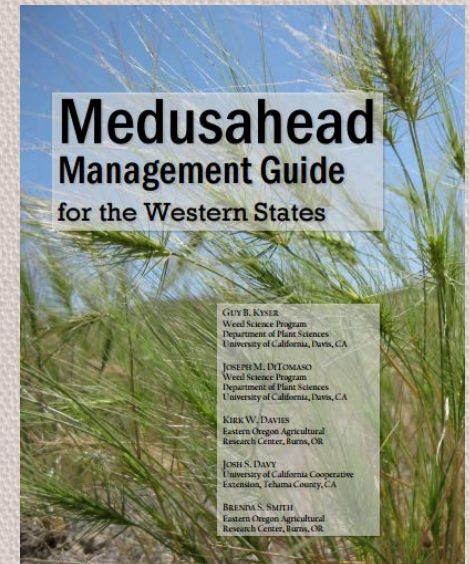
An overview by
Theresa Becchetti
Josh Davy
Elise Gornish



University of California
Agriculture and Natural Resources ■ *A Celebration of Science and Service*

Presentation + handouts
available from:

E Gornish website
UC Weed RIC website



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Use of seeding for weed management

Trait-based approaches to weed management



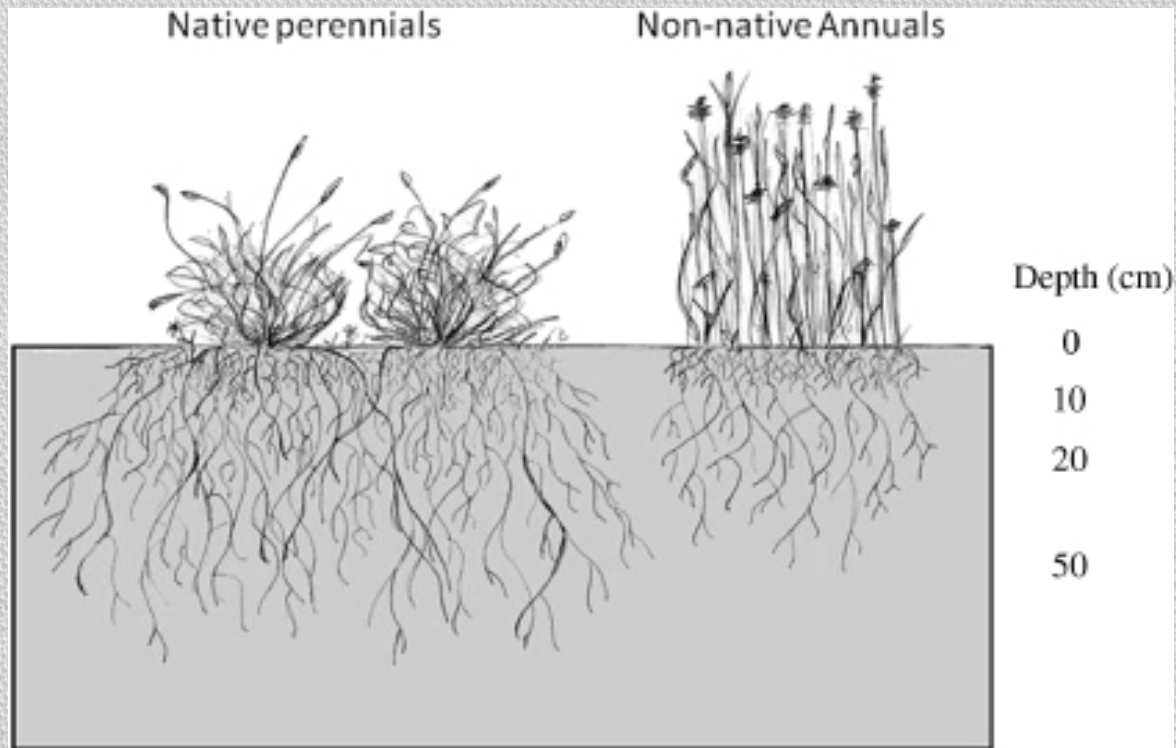
Use of seeding for invasive species management



How does seeding control invasive species?

How does seeding control invasive species?

Resource uptake



How does seeding control invasive species?

Resource uptake

Shading / physical restriction



How does seeding control invasive species?

Resource uptake

Shading / physical restriction

Encourage proliferation of antagonistic fauna



In addition to invasive species management, seeding is beneficial for lots of reasons

Increasing forage

Increase wildlife cover

Provide erosion control

Enhance water filtration

Reduce fire danger

Carbon sequestration



Experiment in Yolo Co.

Seeding treatments

None

Annuals

Native Perennials

Exotic Perennials

Mixed Perennials
(Native + Exotic)



Legend



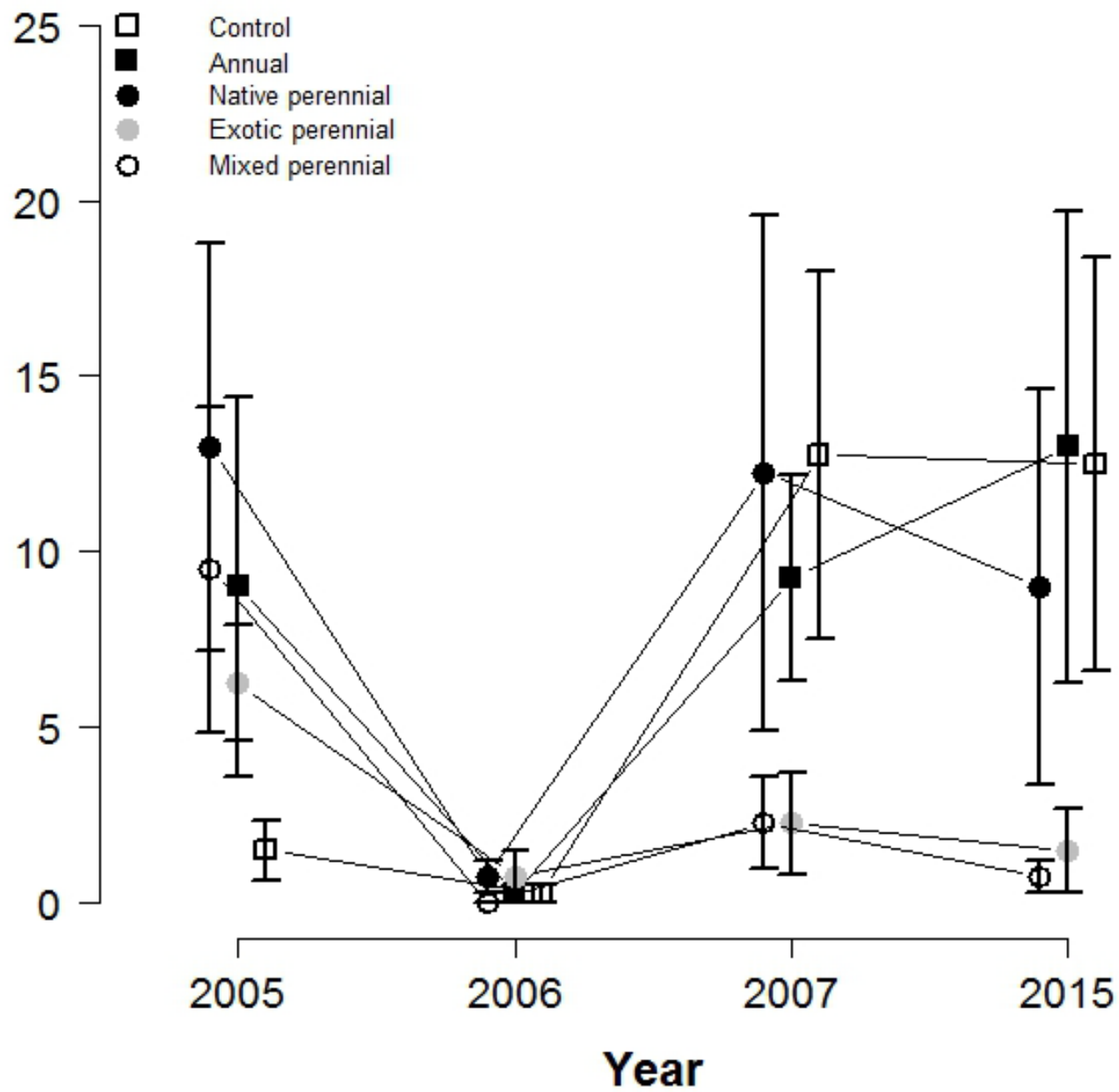
Seeding Plots

Image: Ortho Image 7/2005

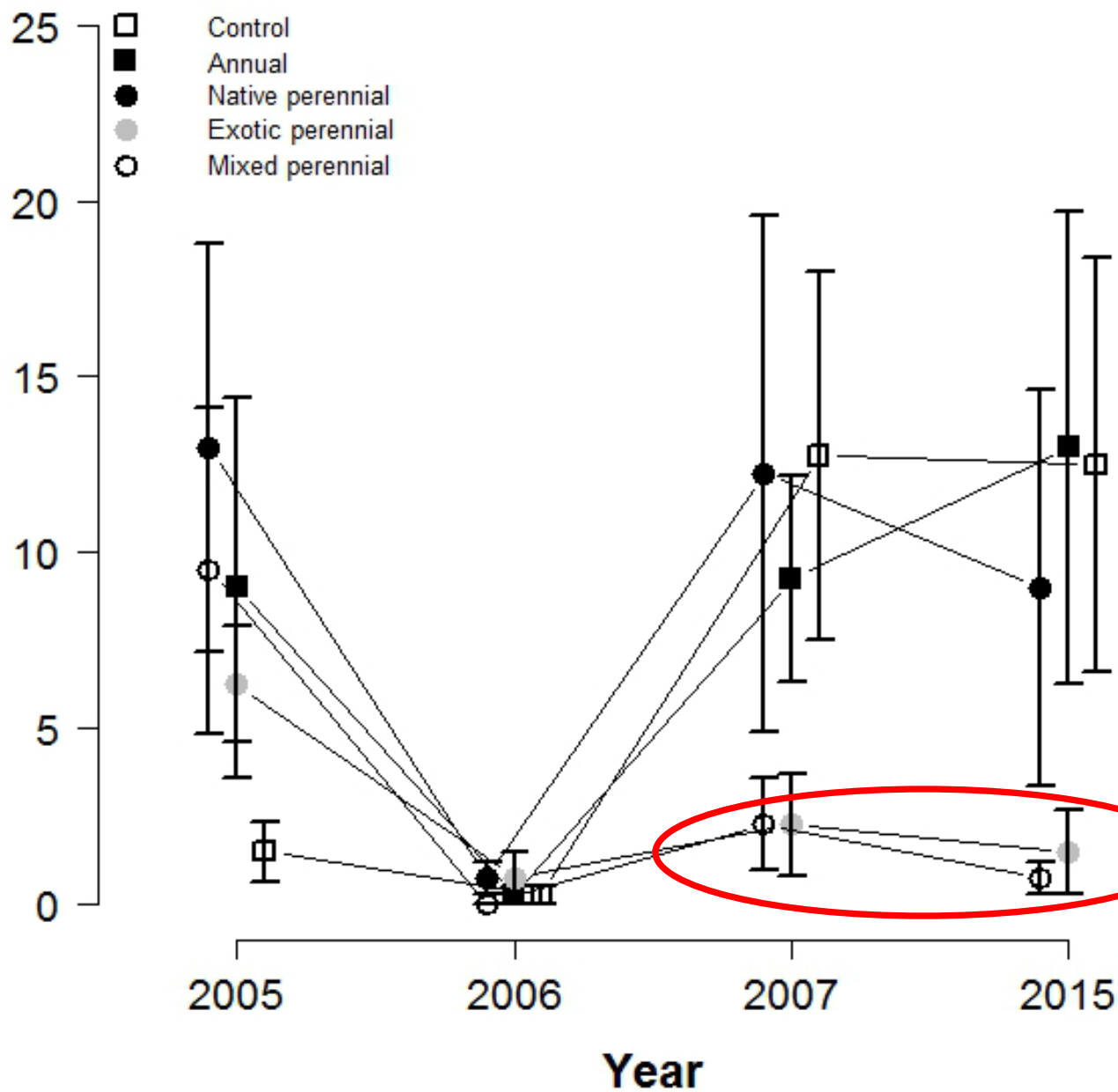
300 0 300 600 Feet



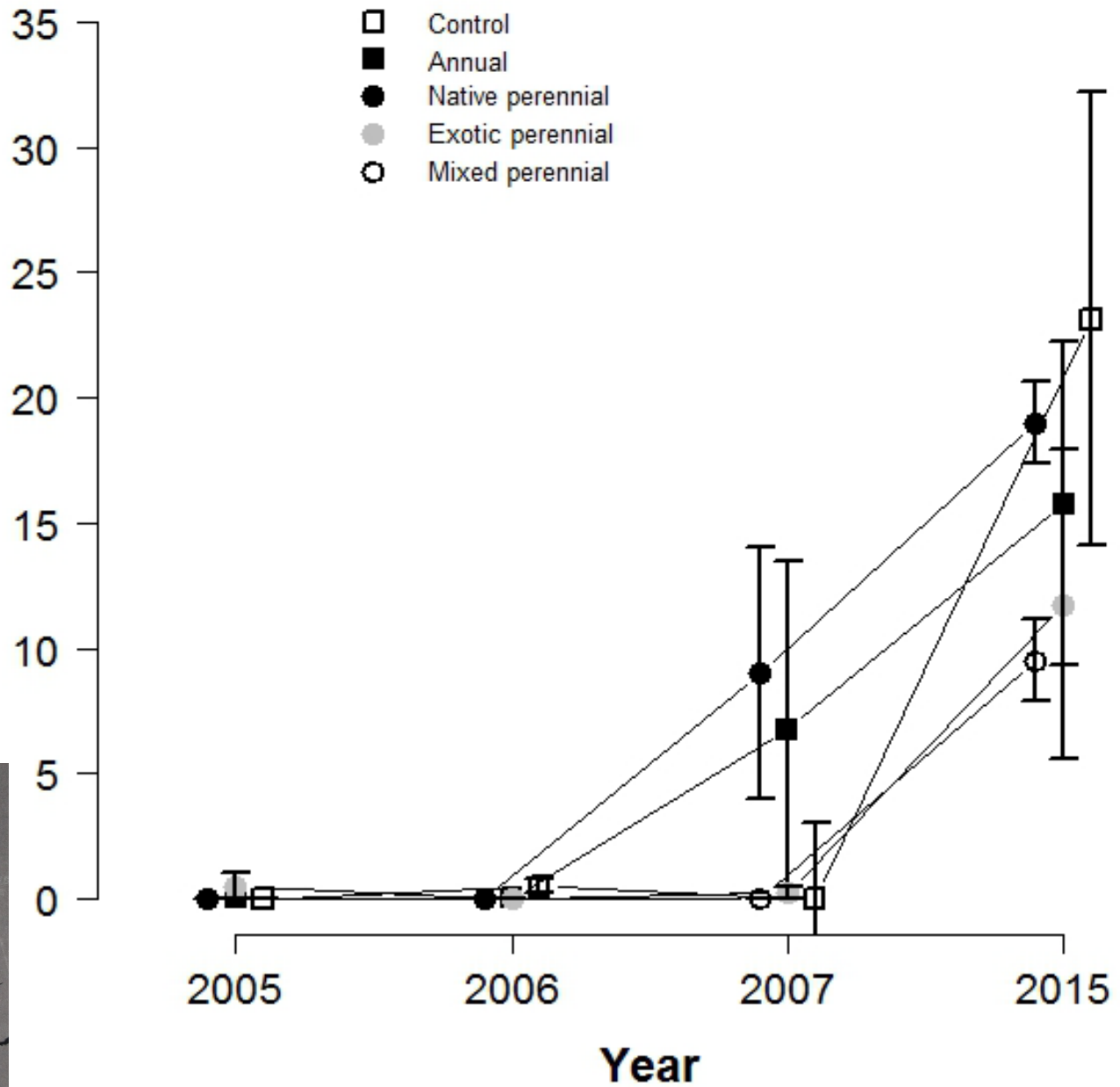
Yellow starthistle frequency



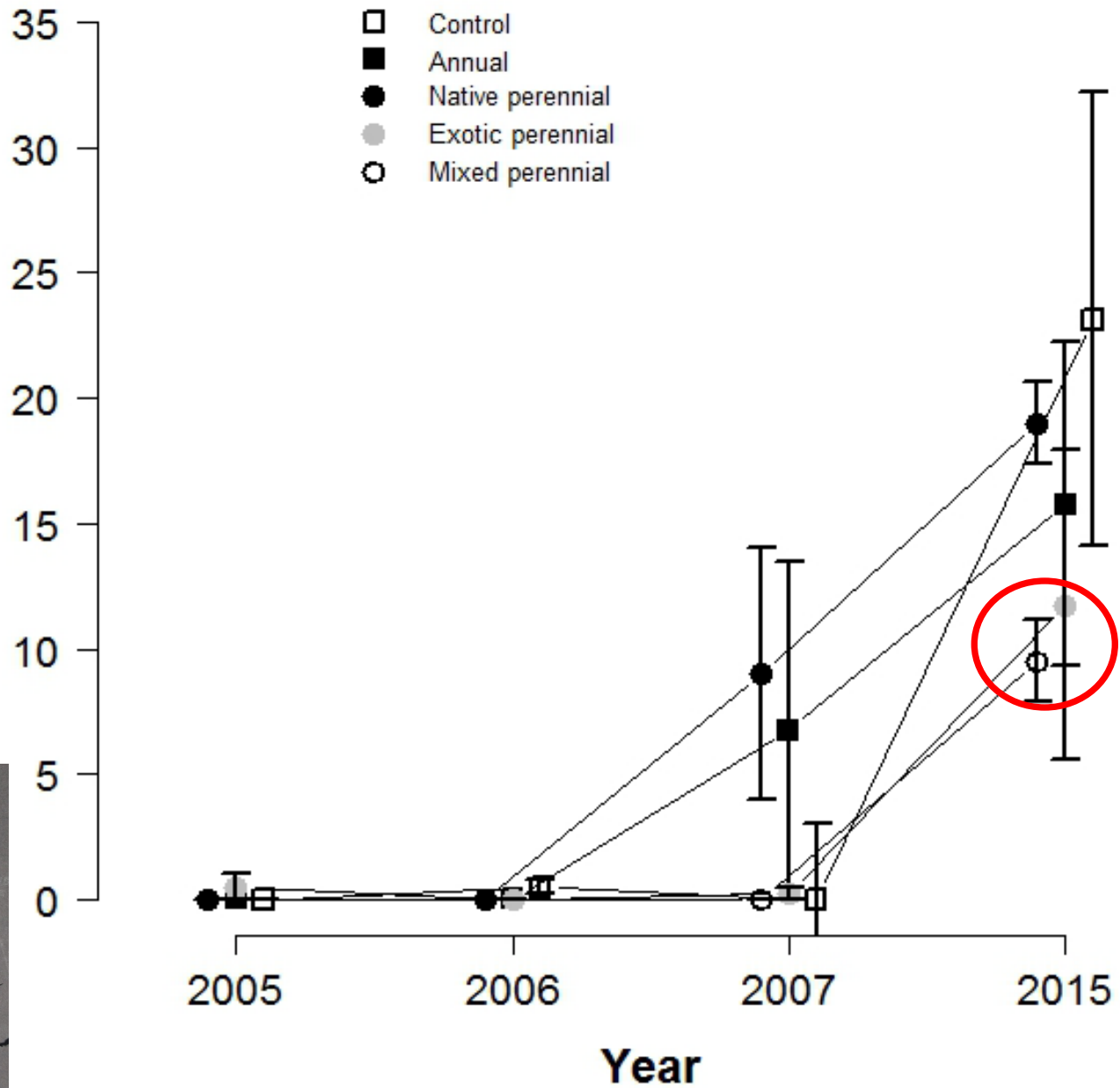
Yellow starthistle frequency



Goatgrass frequency



Goatgrass frequency





Burned

No seeding

Low diversity seeding

High diversity seeding

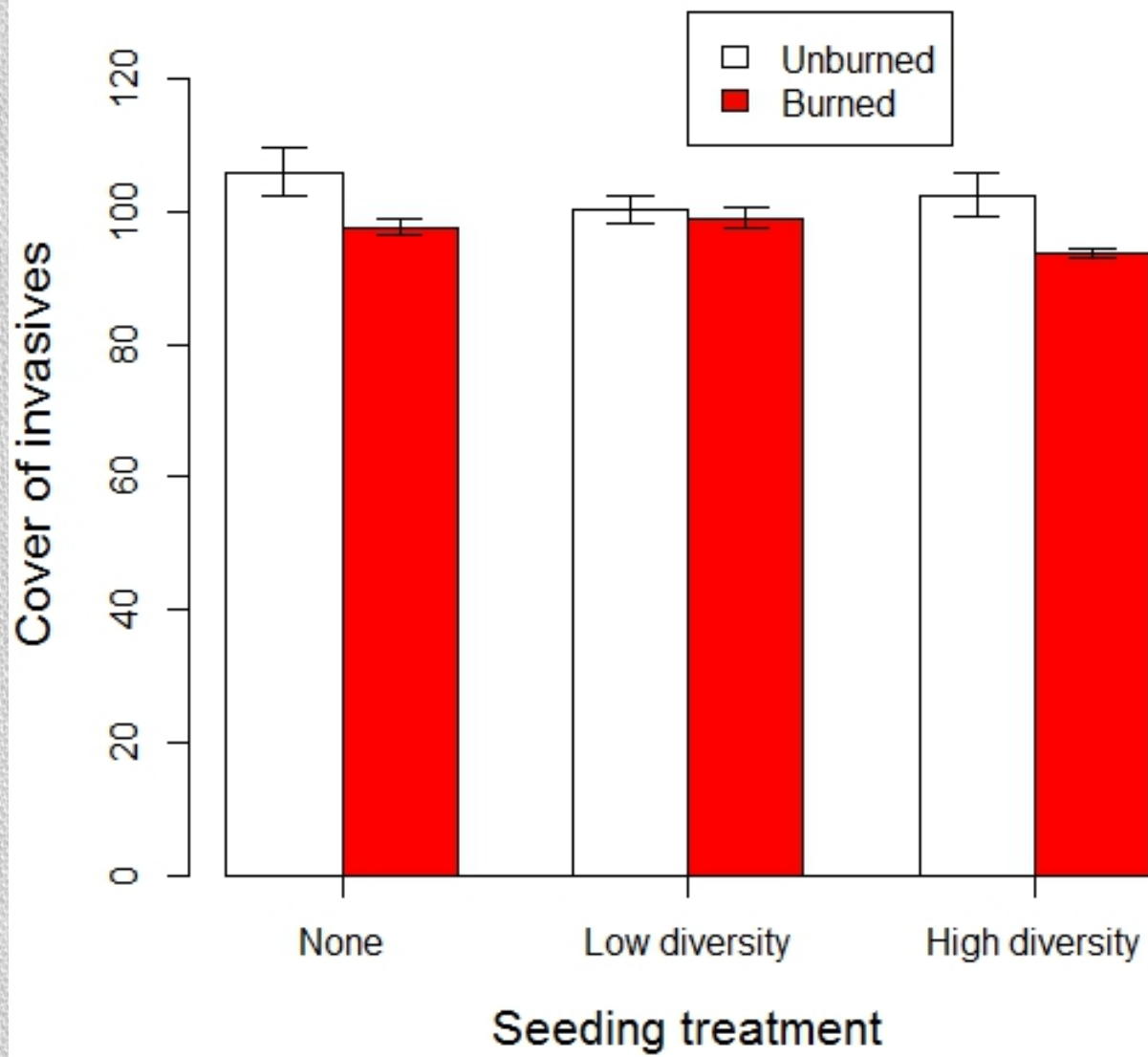
Unburned

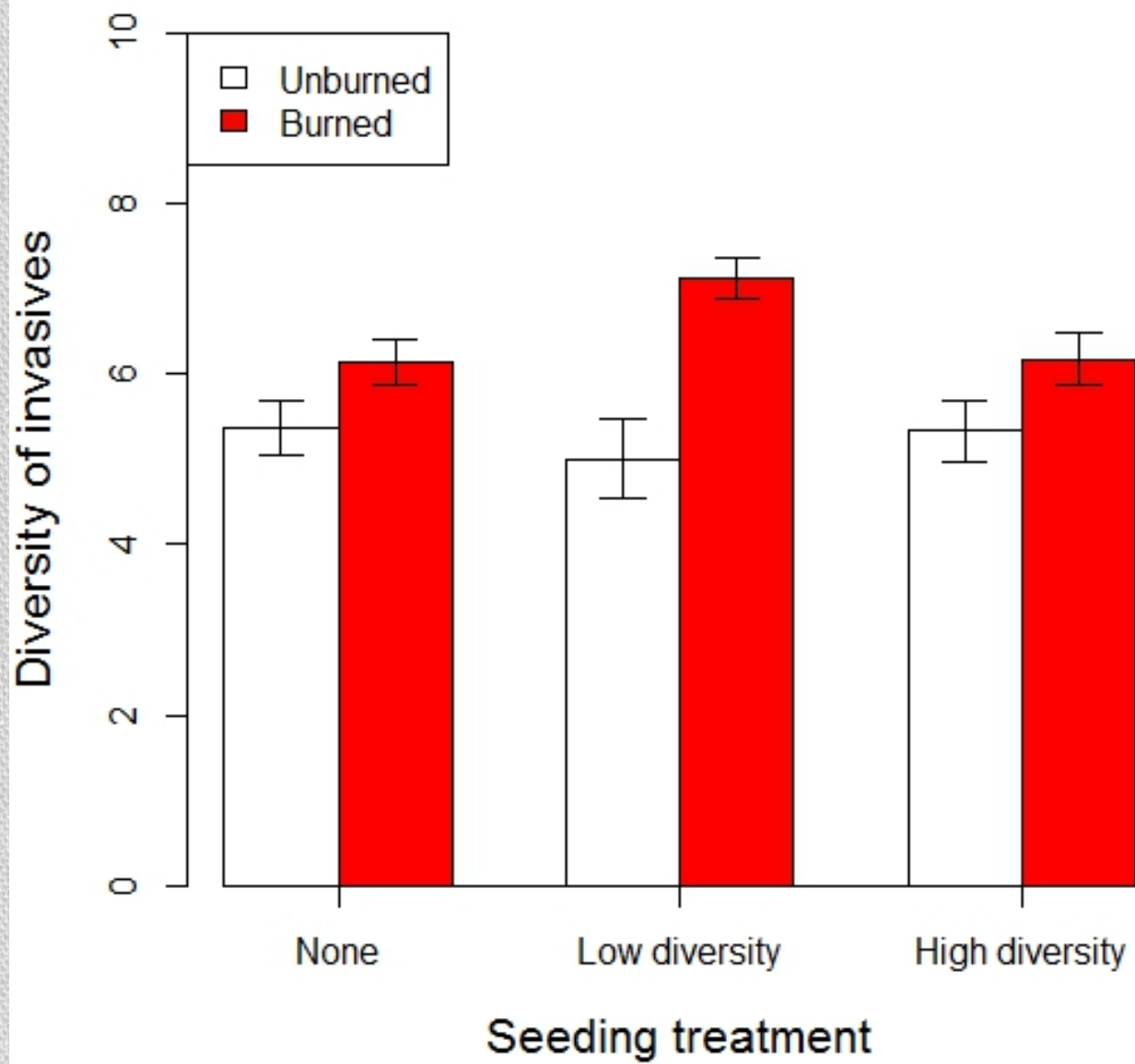
No seeding

Low diversity seeding

High diversity seeding







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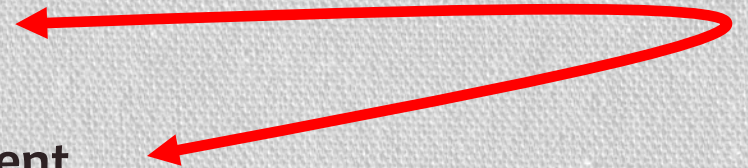


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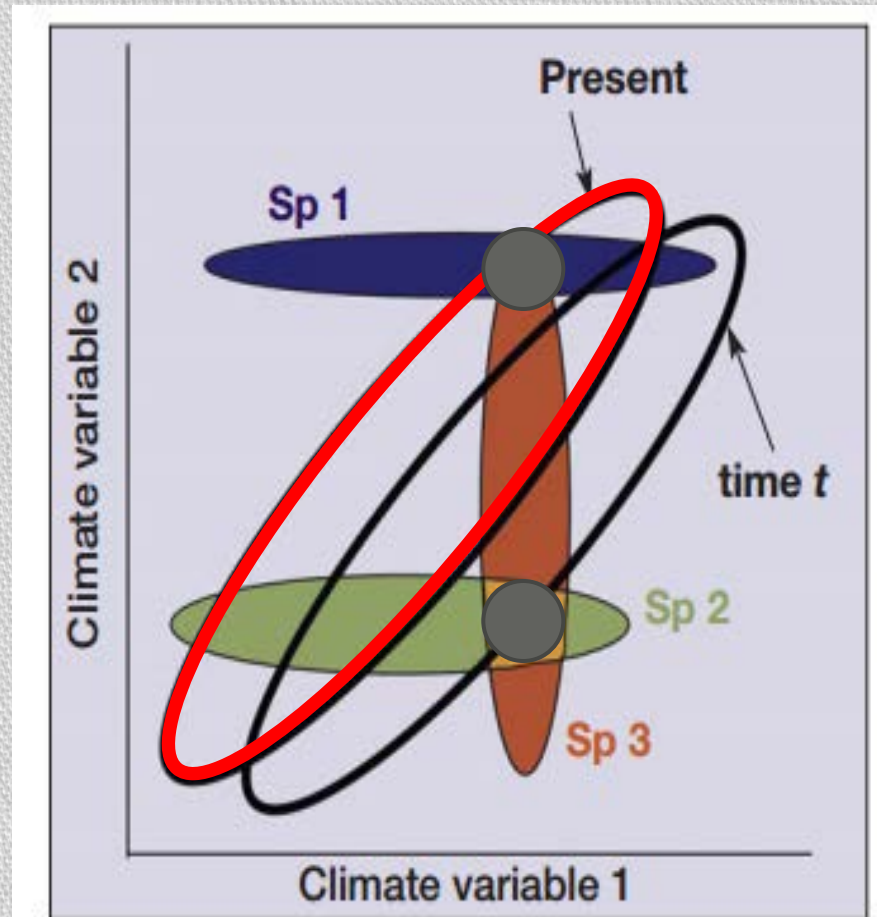
Use of seeding for weed management

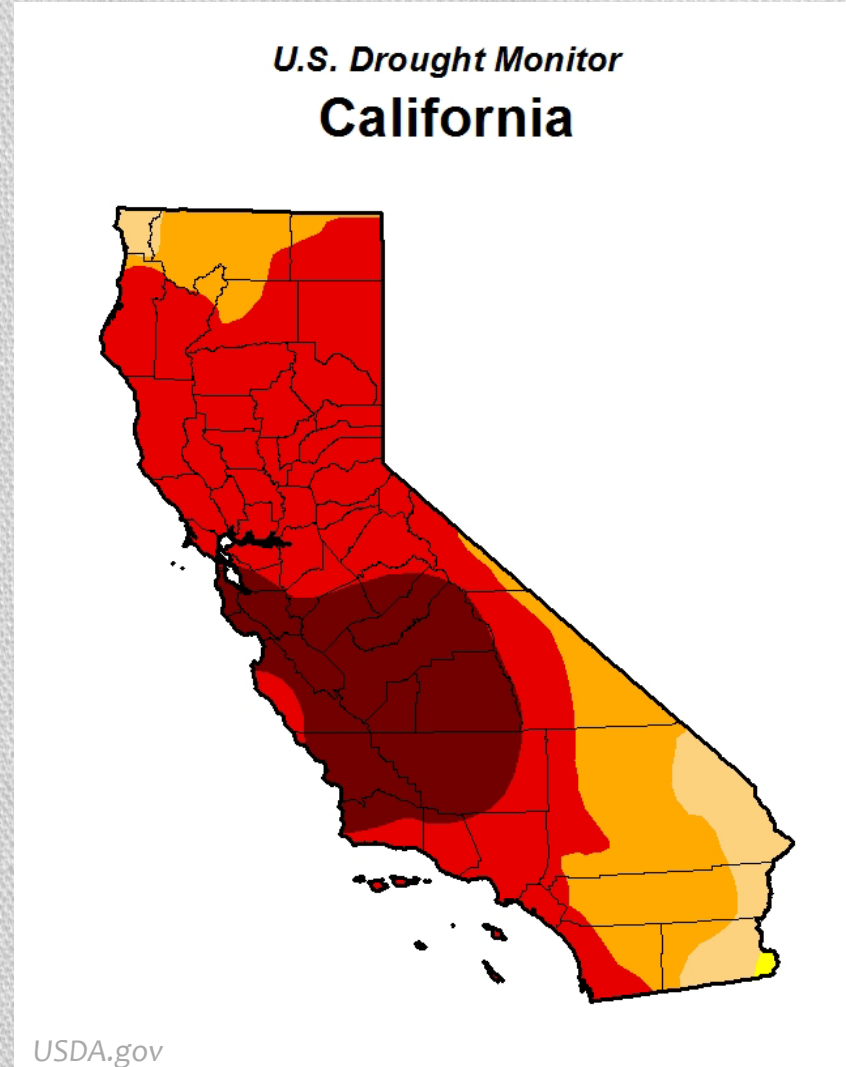
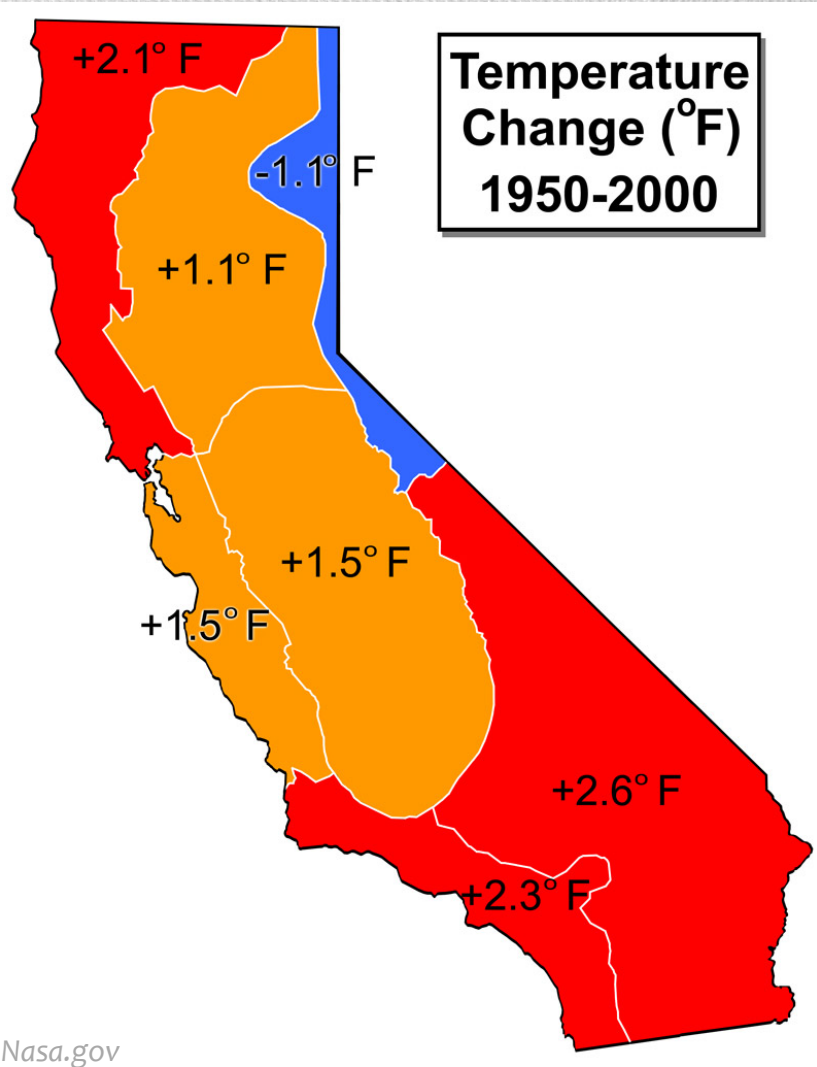
Trait-based approaches to weed management



Trait based choices of species to use in vegetation management

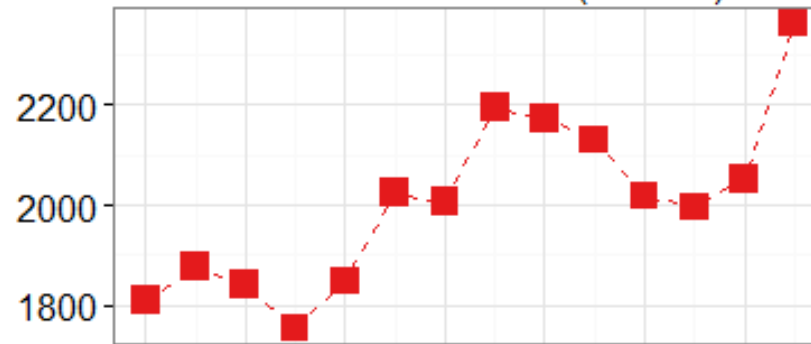
Choosing plant species based on traits that confer resilience to drought



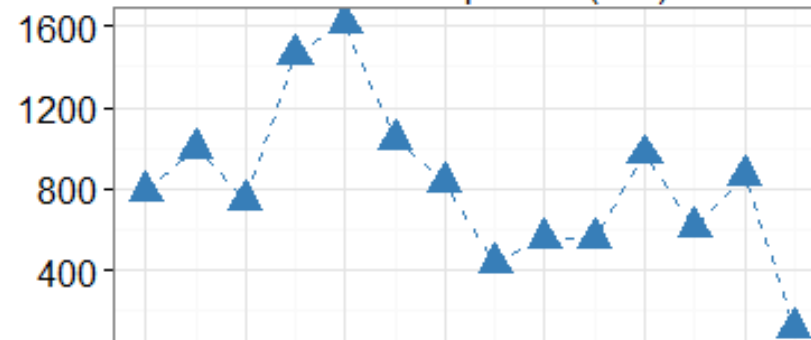




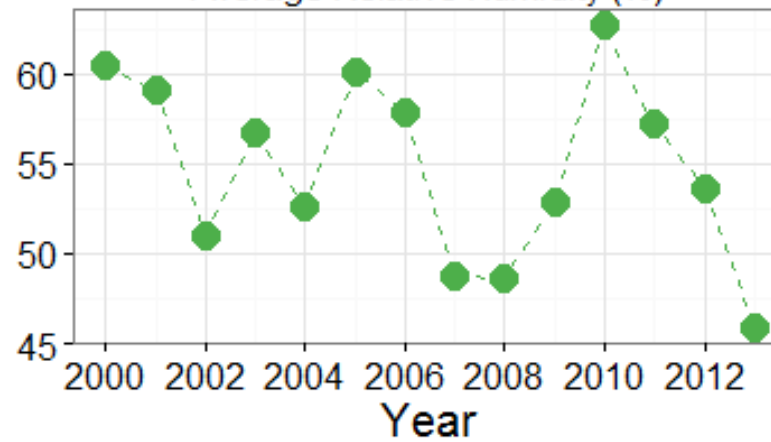
Annual Solar Radiation (kW/m²)

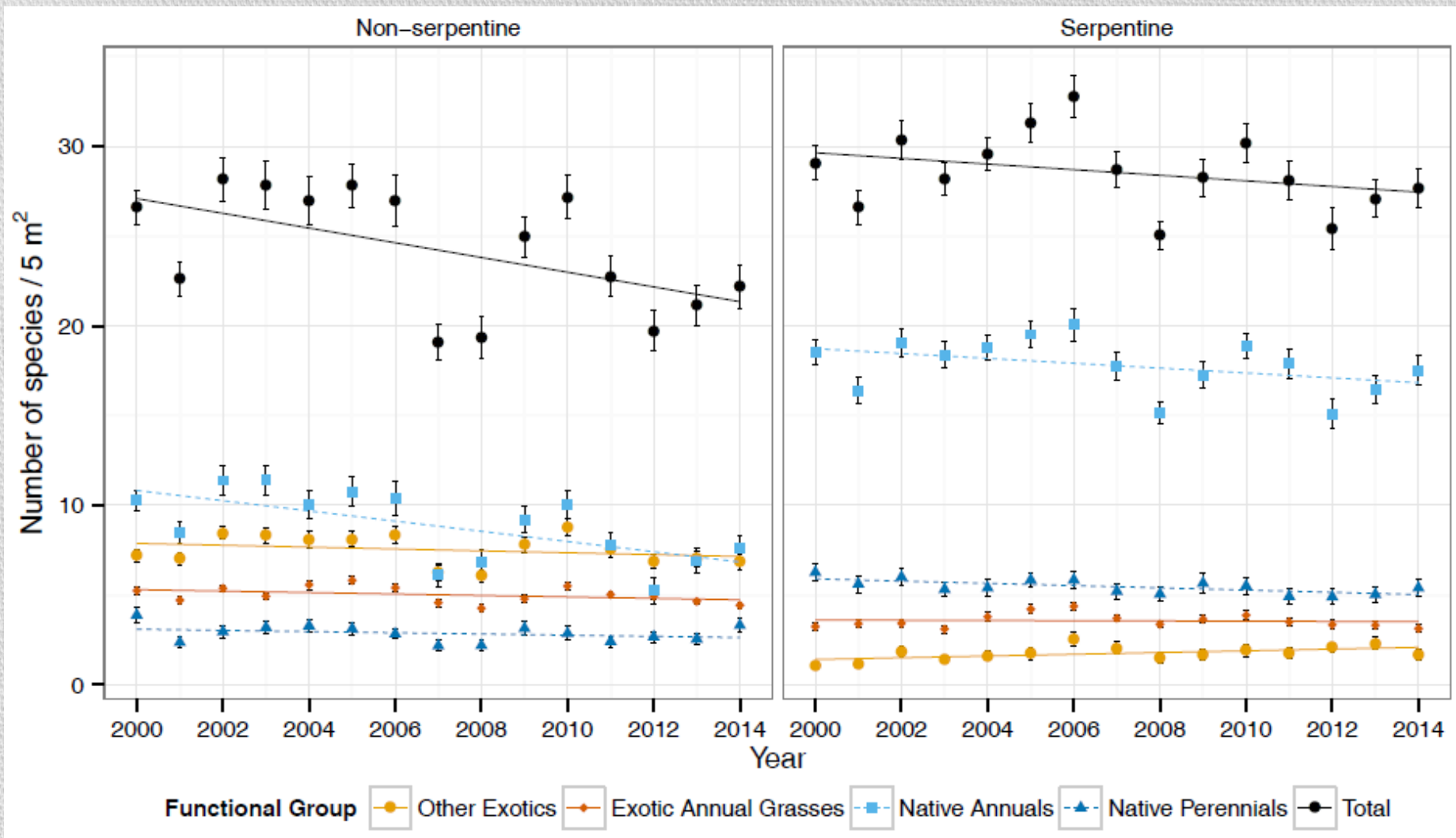


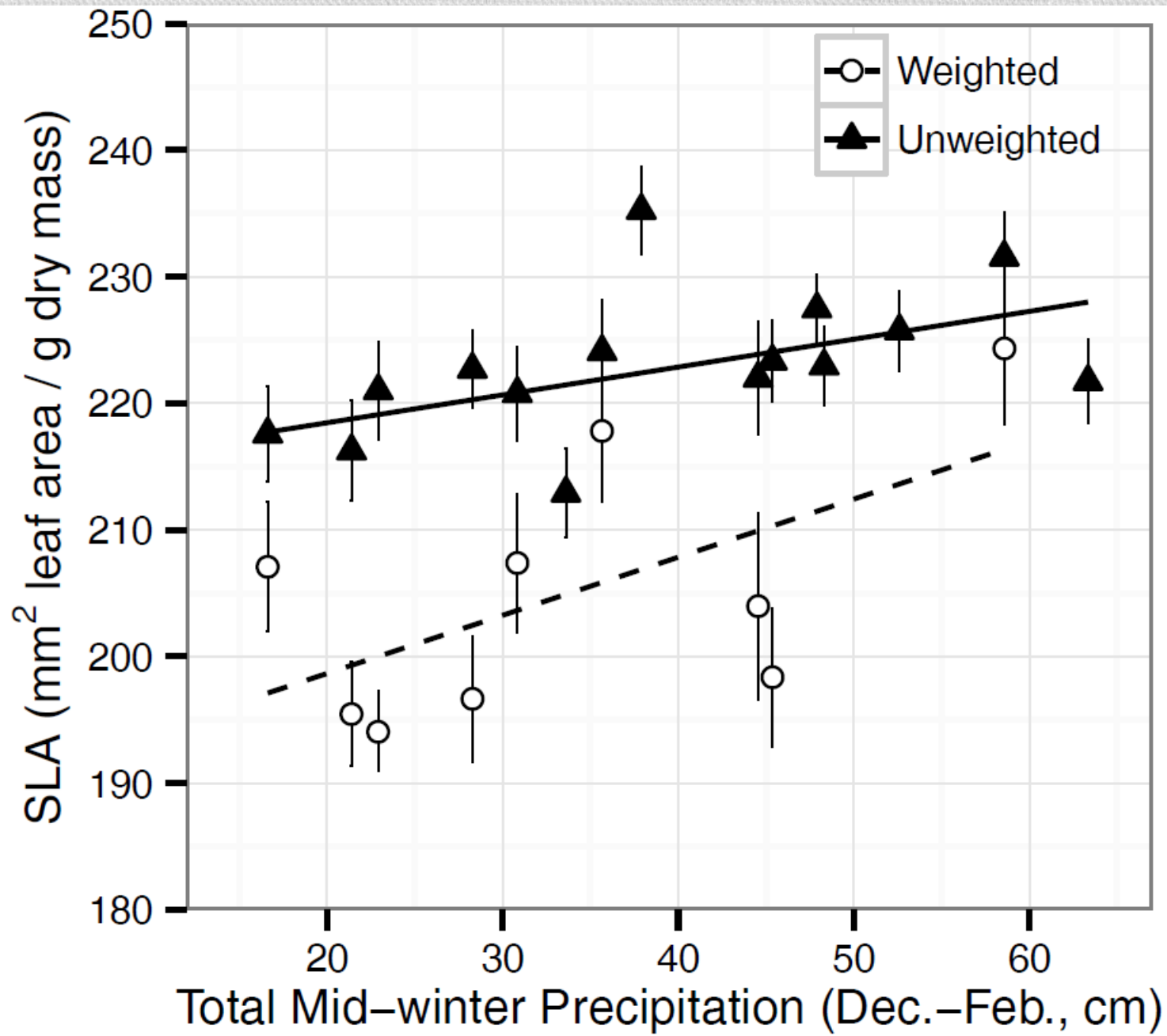
Annual Precipitation (mm)



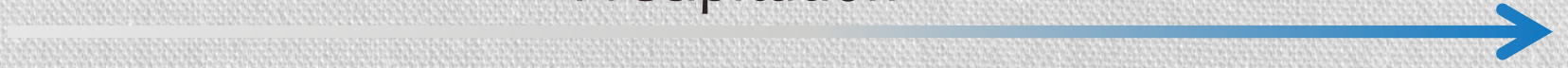
Average Relative Humidity (%)







Precipitation



low

high

Precipitation



low

Specific leaf area (SLA)

high



Precipitation



low

Specific leaf area (SLA)

high



Perennials

Annuals

Woody

Smaller stature

Tough leaves

'wimpy'

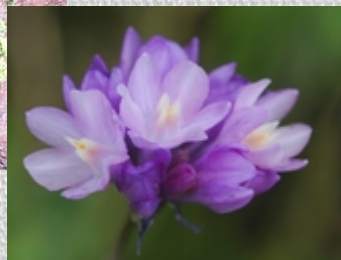
Precipitation



low

Specific leaf area (SLA)

high



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Questions?



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