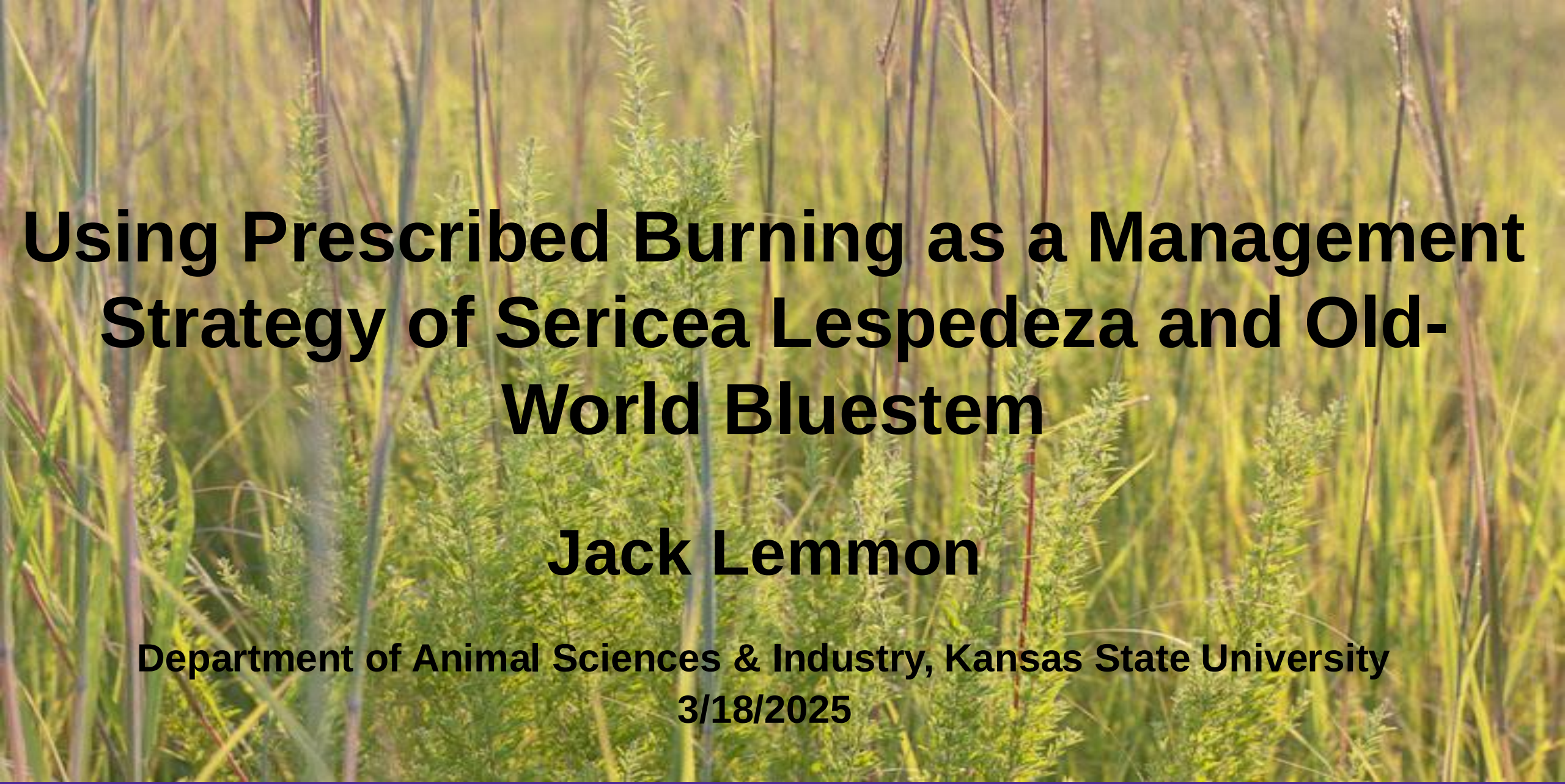

Using Prescribed Burning as a Management Strategy of Sericea Lespedeza and Old-World Bluestem

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3/18/2025

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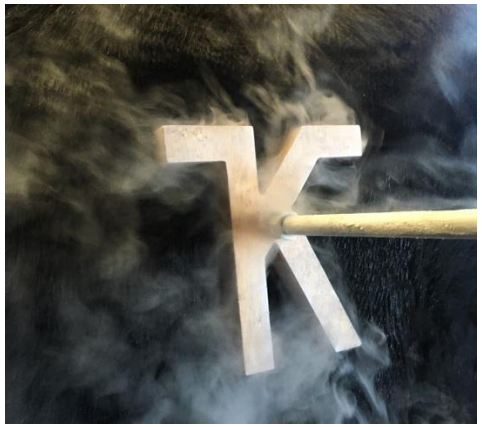
PEARSON
RAWHIDE
RAWHIDE

KSU Cow-Calf Unit

- 325 commercial cows,130 heifers,16 breeding bulls
- 5,000 acres native tallgrass prairie
- 1,100 acres crop residue with rye/turnip/radish mix
- Team of 5-7 people
- Research Areas
  - Beef cow nutrition
  - Beef cow reproduction
  - Invasive weed management
  - Prescribed burning



Which is better?

https://www.freep.com/picture-gallery/money/2016/01/07/chryslers-minivans-through-the-years/78442150/

https://www.ferrari.com/en-EN/magazine/articles/a-new-icona-is-born


April Prescribed Burn

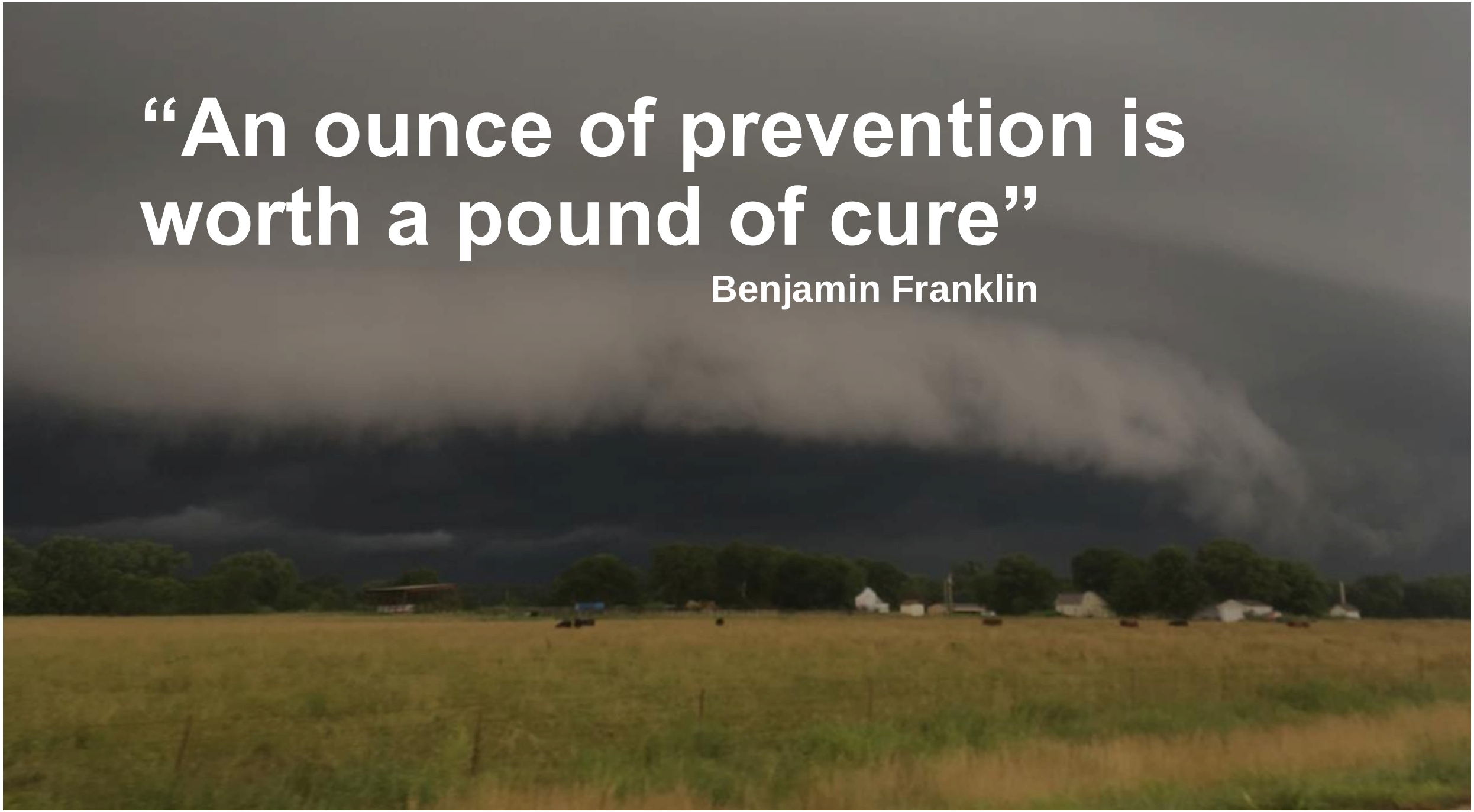

August Prescribed Burn

5 P's

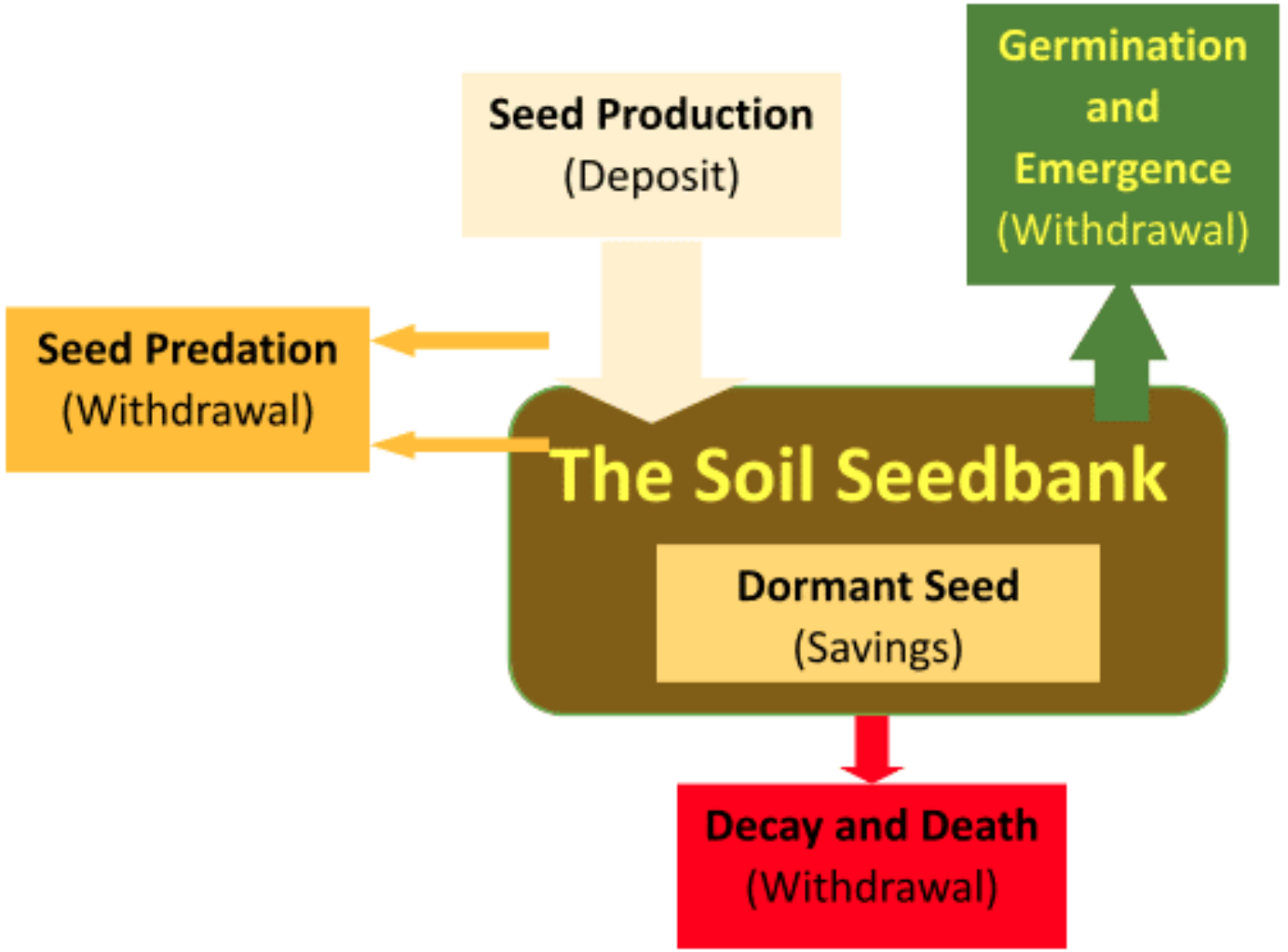
- **Propper Preparation Prevents Poor Performance**
  - **Do you have a plan?**
  - **Burn site**
    - **Fire breaks**
    - **Fuel load**
    - **Water source**
  - **Equipment**
    - **Trucks?**
    - **4 wheelers?**
    - **Sprayers**
  - **People**
    - **Trained?**

Considerations for Growing Season Burns

- Dry thatch layer to carry fire
  - Every other year
- Crew safety
  - Heat
  - Humidity
  - Hydration
- Revisit treatment site each year to monitor


“An ounce of prevention is worth a pound of cure”
Benjamin Franklin

Prescribed Burning Used to Control Invasives



https://brewerint.com/news-insights/agriculture/staying-a-step-ahead-of-the-soil-seedbank/

Sericea Lespedeza (SL)

- **High-tannin, invasive, perennial legume**
- **Introduced in United States,1896 from Southeast Asia**
  - Potential forage crop for livestock
- **Introduced into Kansas for erosion control**
  - Spread is expedited when seeds were unintentionally harvested and combined with seed mixes planted on Conservation Reserve Program lands

SL Continued

- **In Kansas, sericea lespedeza (SL) infests approximately 980 square miles of pasture, reducing native grass production by up to 92%**
- **Drought tolerant & adaptable to poor soils; allelopathic to native plants**
  - Quickly degrades habitat for wildlife and livestock
- **Prolific seed producer**
- **Contains high levels of condensed tannins**

What are the costs of sericea lespedeza infestation?

- **Biodiversity Loss (Ogden et al., 2019; Alexander et al., 2021)**
  - **19% decrease in species richness over 4 years**
    - Number of different species in a community
  - **7% decrease in species evenness over 4 years**
    - How evenly the species are distributed in a community
  - **Eventual loss of insects and upland birds**

Why does it spread?

- **Predominant Flint Hills grazing management practice**
  - Annual spring burning followed by intensive grazing with yearling beef cattle from April to August (Owensby et al., 2008)
  - Pastures remain idle for the remainder of the year
- **SL flowers and produces seed in late summer from late August to September (Cope and Burns, 1974; Koger et al., 2002)**
  - Absence of grazing and pyric pressure during this interval may promote seed production
  - Coincident with this management practice, invasion by SL into the tallgrass prairie biome has steadily increased since the late 20th century (Eddy et al., 2003)

SL Seeds

- **Produces large amounts of very small, thin, oval shaped seeds**
- **Established stands of SL can produce**
  - 300 to 800 lb of seeds/acre
  - Over 1,697,559.42 seeds/lb
- **Seeds in soil may be viable for years**

Growing-Season Burns for Sericea Lespedeza Control

- **Based on over a decade of prescribed fire research at KSU, we can beat sericea lespedeza by taking away competitive advantages like:**
  - **Abundant seed production**
  - **Canopy dominance**
- **Summer and early fall fires (annual or biannual) will make sericea:**
  - **Reduce seed production**
  - **Less abundant**
  - **Shorter**

Initial Prescribed Burn Project

- Study site: 123.5 acres native tallgrass pasture south of Manhattan, KS
- The site was divided into nine units (12.4 ± 6.5 acres)
  - Assigned randomly to 1 of 3 prescribed fire treatments:
    - Early spring (traditional, dormant-season burning)
    - Mid summer (August)
    - Late summer (September)

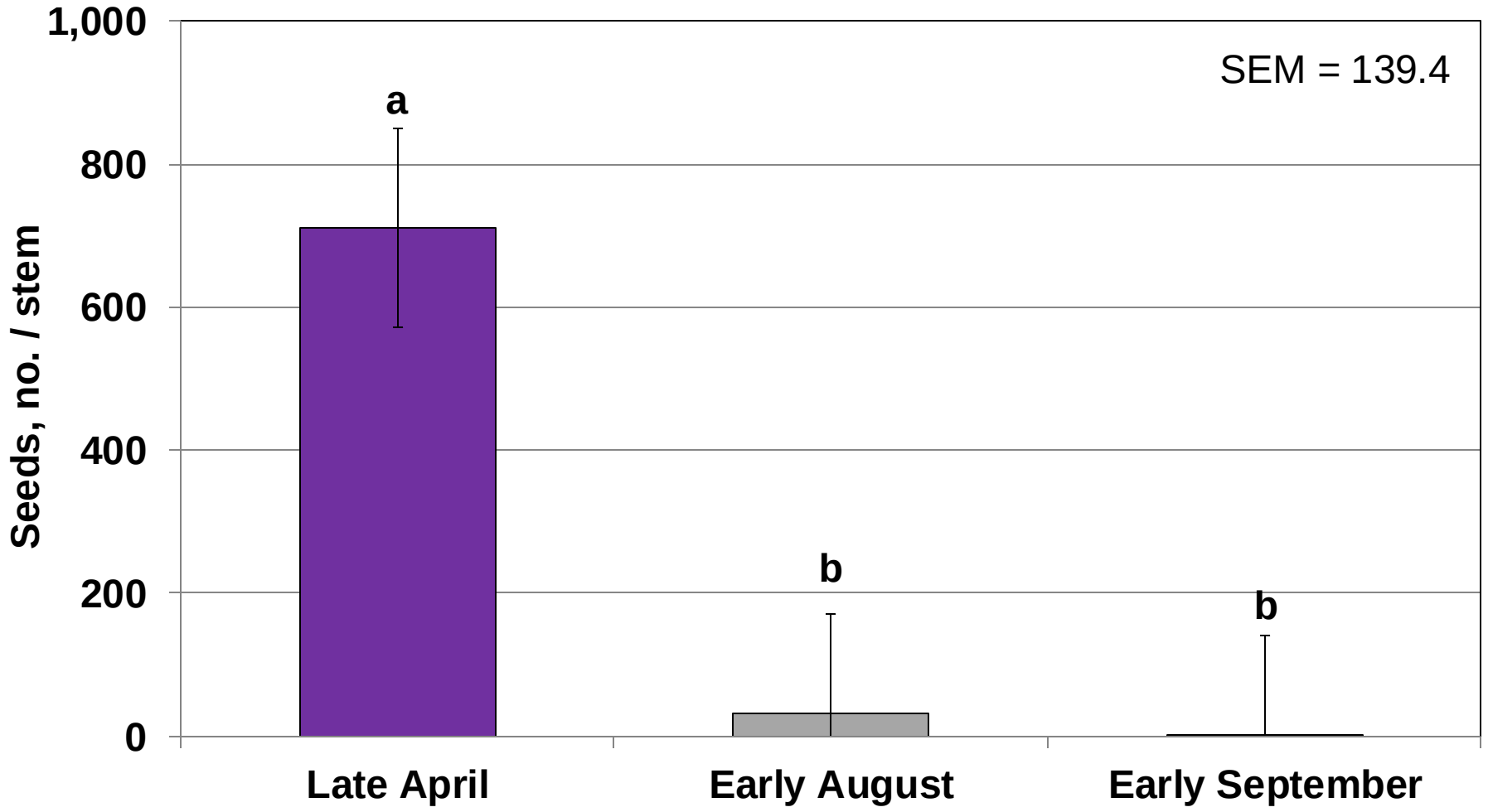

Total Acres = 123.5
1
7.2 AC
AUG 1
2
6.0 AC
SEPT 1
3
9.7 AC
SEPT 1
4
11.5 AC
AUG 1
5
8.5 AC
UB
6
19.0 AC
UB
7
23.8 AC
AUG 1
8
11.0 AC
SEPT 1
9
4.3 AC
UB
S1-T12S-R6E

August Burn


August Burn
September Burn


September Burn

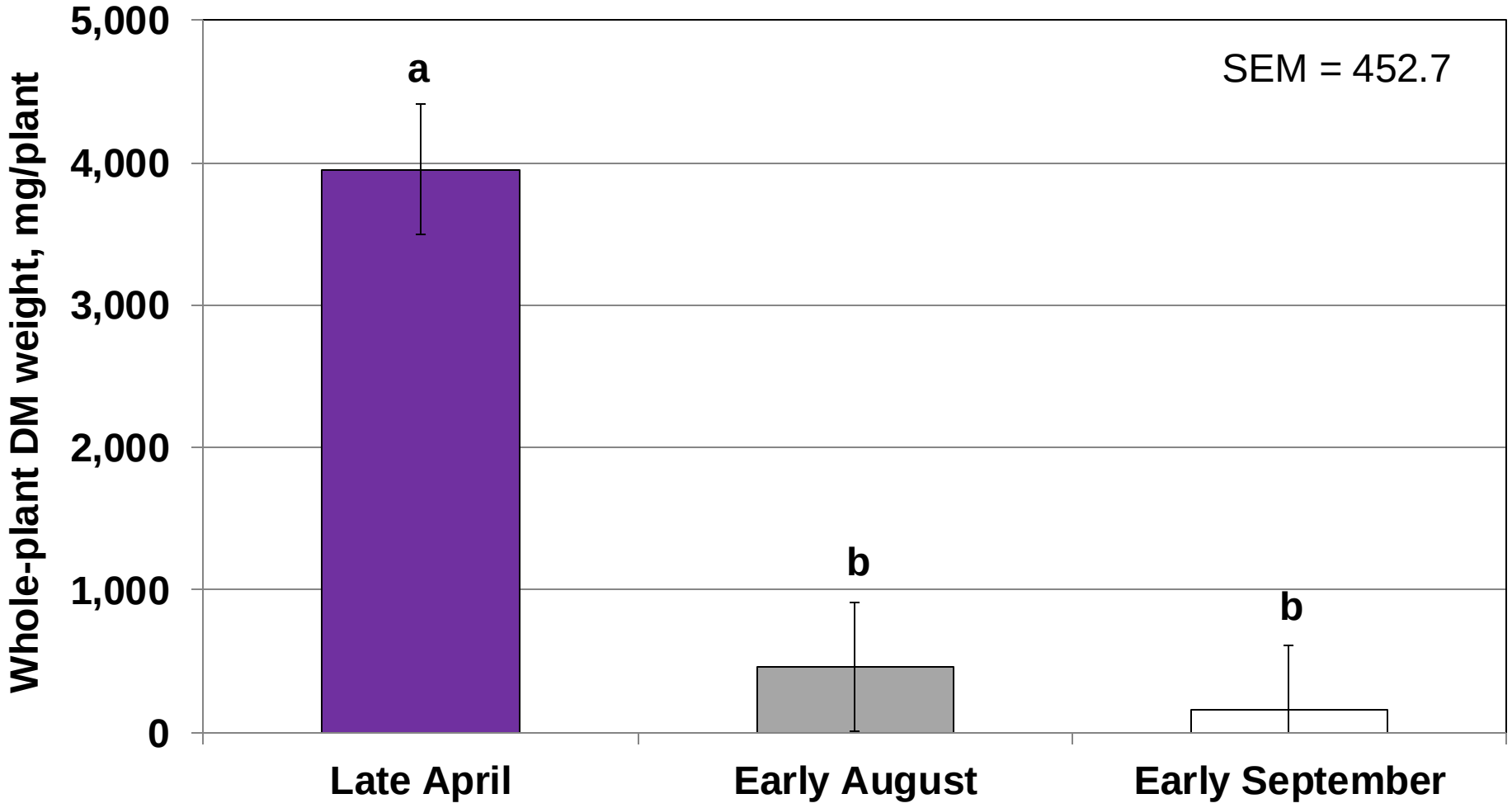
Fire timing and sericea lespedeza seed production



Alexander et al., 2021

[a, b] Means w/ unlike superscripts differ ($P \leq 0.01$)

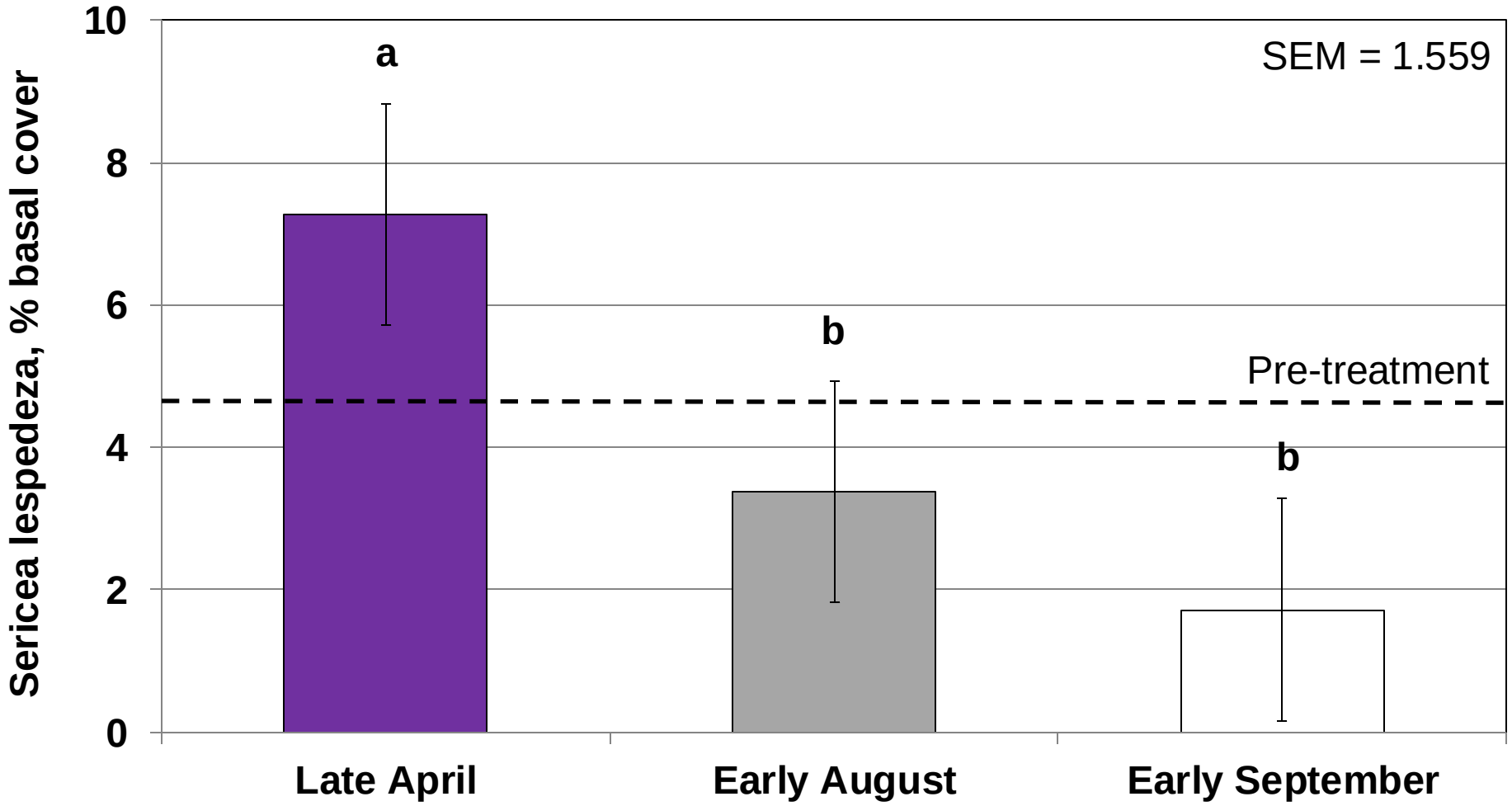
Fire timing and sericea lespedeza whole-plant mass



Alexander et al., 2021

[a, b] Means w/ unlike superscripts differ ($P \leq 0.01$)

Fire timing and sericea lespedeza basal cover



Alexander et al., 2021

[a, b] Means w/ unlike superscripts differ ($P \leq 0.01$)

What About Other Invasive Species?

Old World Bluestems (OWB)

- **Introduced in United States,1920s from Asia and Europe**
  - Used as potential improved forage crop for livestock
  - Yellow Bluestem and Caucasian Bluestem
- **Warm-season, Perennial Grass**
- **Drought tolerant & adaptable to many soils; allelopathic to native plants**
  - Quickly degrades habitat for wildlife and livestock
- **Prolific seed producer**

OWB Continued…

- Bunch grass, almost sod forming
- Not closely related to our native bluestems
- Not very palatable to livestock
  - More grazing pressure on native plants
- Grazing, mowing, and burning at the wrong times may facilitate its spread
- If left unmanaged, can overtake native grasslands

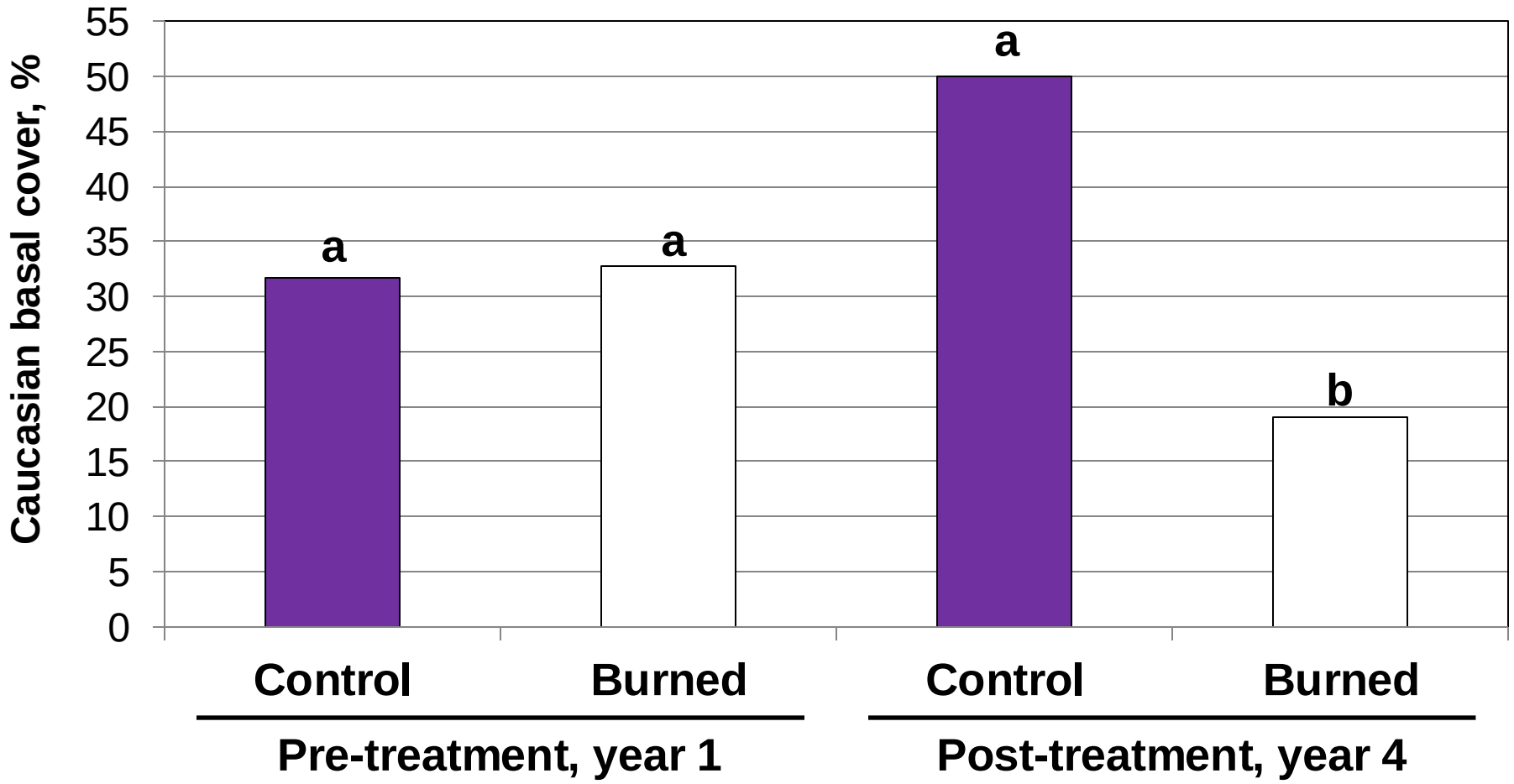
The Project

- Ellsworth County, KS
- Eighteen plots of one square acre each were established
  - Assigned randomly to one of two treatments:
    - No burn (n = 6 plots)
    - Burn (n = 12 plots)
    - The Burn treatment was applied Mid-August

August Burn

Caucasian Bluestem

Effects of August Prescribed Fire on Mixed-Grass Prairie



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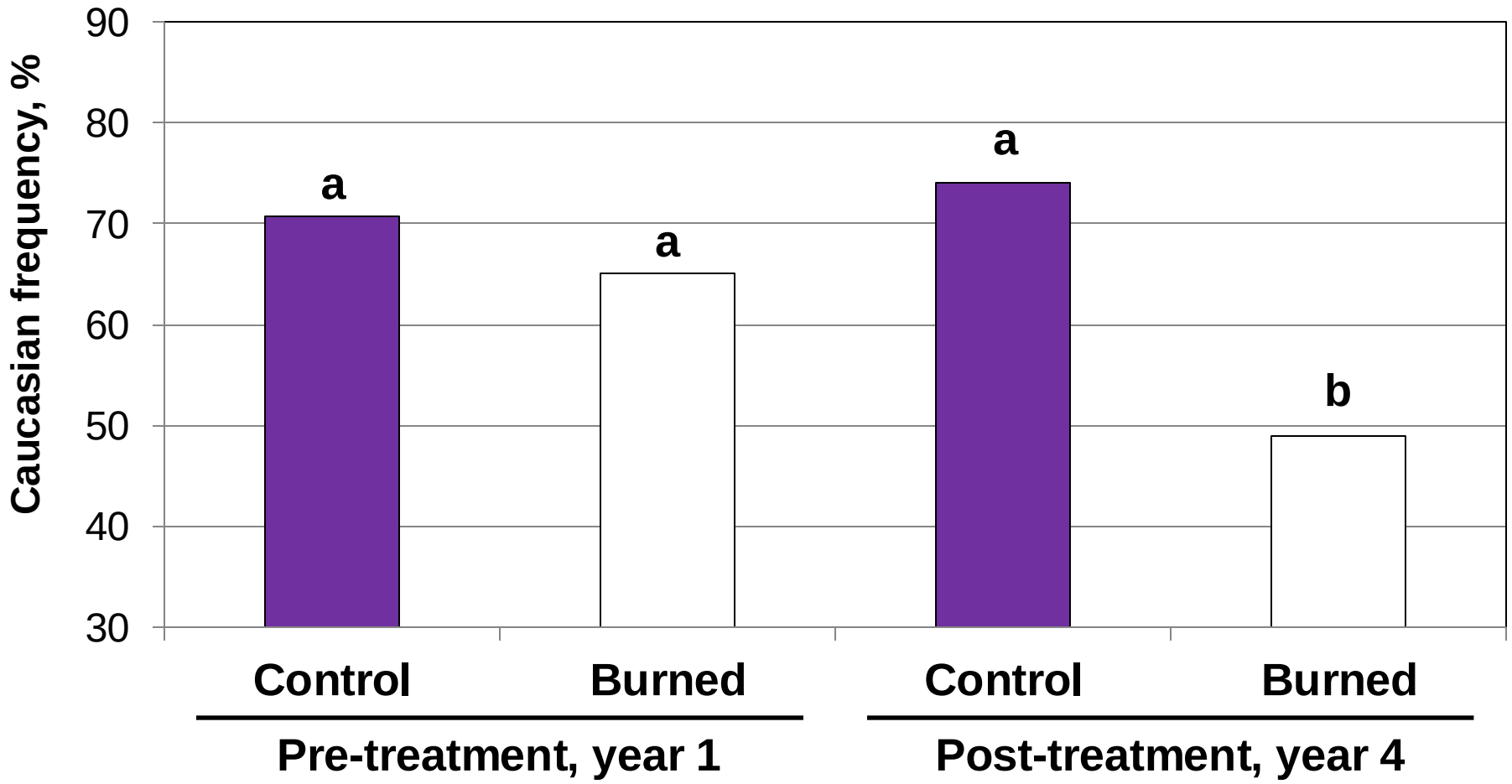
[a, b, c] Means with dissimilar superscripts differ ($P < 0.01$)
SEM = 8.24

Caucasian Bluestem

Effects of August Prescribed Fire on Mixed-Grass Prairie



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[a, b, c] Means with dissimilar superscripts differ ($P < 0.01$)
SEM = 9.83

Caucasian Bluestem

So What does this mean for both studies?

Improved Range Condition

- Burning in the August-to-September time frame improves plant species composition, soil organic matter, and diversity compared to spring burning (Gatson, 2018; Alexander et al., 2021; Duncan et al., 2021; Duncan et al., 2023; Giefer et al., 2025)
  - Burning increased native plant diversity by 15%
- Control of sericea lespedeza and old world bluestems with late-summer fire is comprehensive and inexpensive
- Summer burning every year is not necessary to achieve the desired result
- It takes about 3 fire treatments (each treatment could be 2 years apart) to achieve a visually-satisfying outcome


Peer pressure in the Flint Hills:
Watching your neighbor burn their pasture first