



The Effect of Burning on *Echinacea angustifolia* Reproduction

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Prairie Fires

Why are they important?



- 🔥 Greater access to sunlight
- 🔥 More space
- 🔥 Increased nutrients (released from ground)
- 🔥 For *Echinacea*¹: synchronized flowering + self-incompatibility

¹Wagenius, S., J. Beck, and G. Kiefer. Fire synchronizes flowering and boosts reproduction in a widespread but declining prairie species. *Proceedings of the National Academy of Sciences* 117.6:3000–05. 2020.

Does burning affect reproductive effort and/or outcome?

Effort:

Resources that the plant puts toward aiding reproduction

- Achenes
- Heads

Outcome:

The result of the effort, or amount of achenes which are pollinated

- Seed set



Credit: Alex

Hypotheses!

And predictions

Achene Count

Head Count

Seed Set



No Change



Could change or stay the same



Will change



Null Hypothesis- (Achene count)/(Head count)/(Seed set) **will not** differ in a plant between burned and unburned years.

Alternate Hypothesis- (Achene count)/(Head count)/(Seed set) **will** differ in a plant between burned and unburned years.

Workflow

(1)
Cleaning
the heads

(2)
Separating
chaff and
achenes

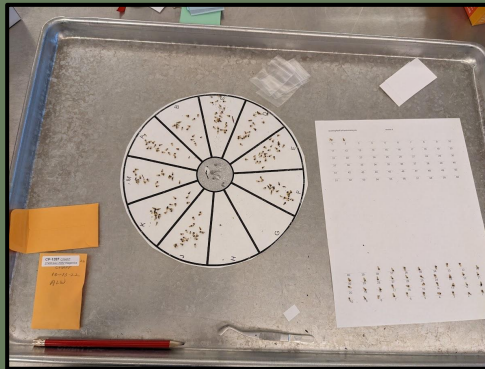
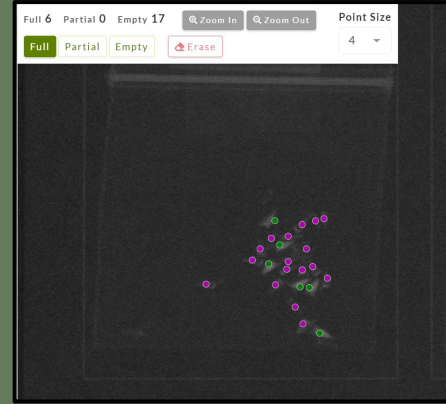
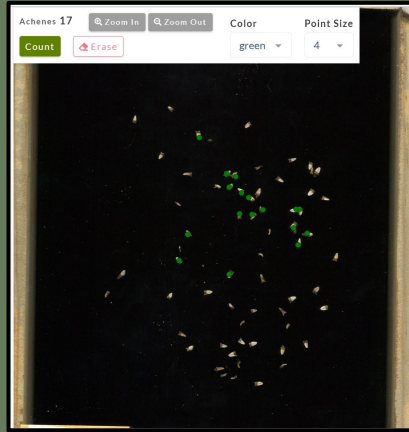
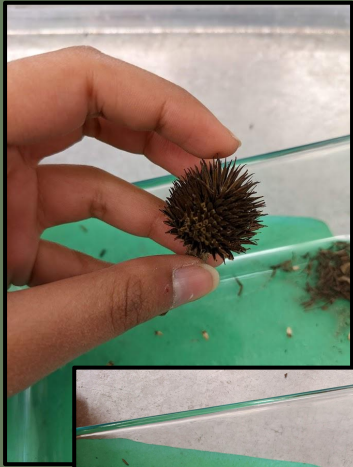
(3)
Rechecking
chaff for
achenes

(4)
Counting
achenes

(5)
Randomizing
to get a
sample

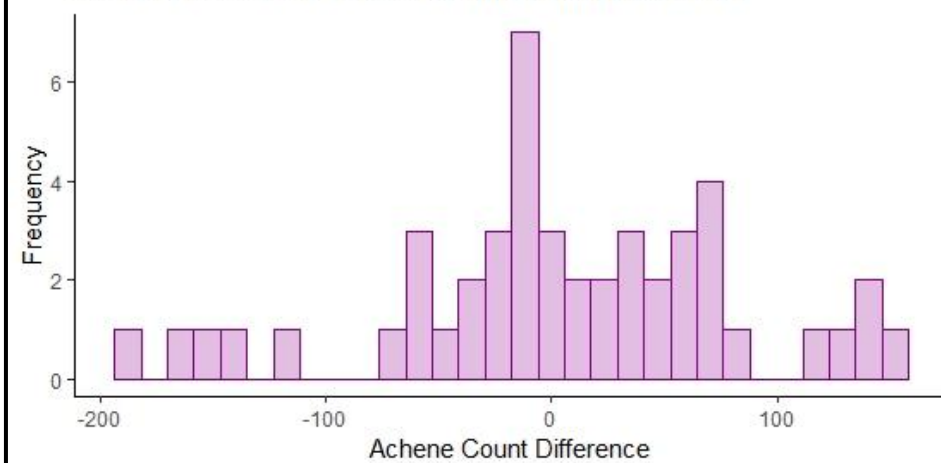
(6) Make
x-ray
sheets and
x-ray
samples

(7)
Classifying
achenes as
having a
seed or not

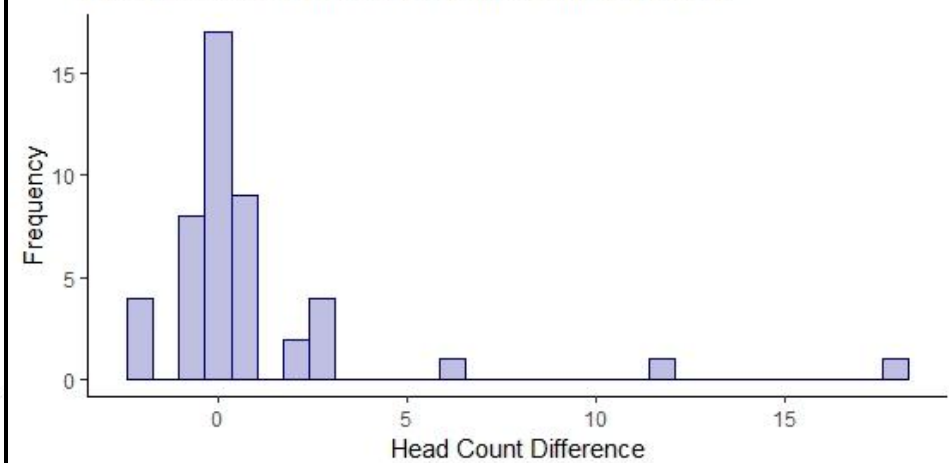


Reproductive Effort

Achene Count Dif in Burned and Unburned Years



Head Count Dif in Burned and Unburned Years



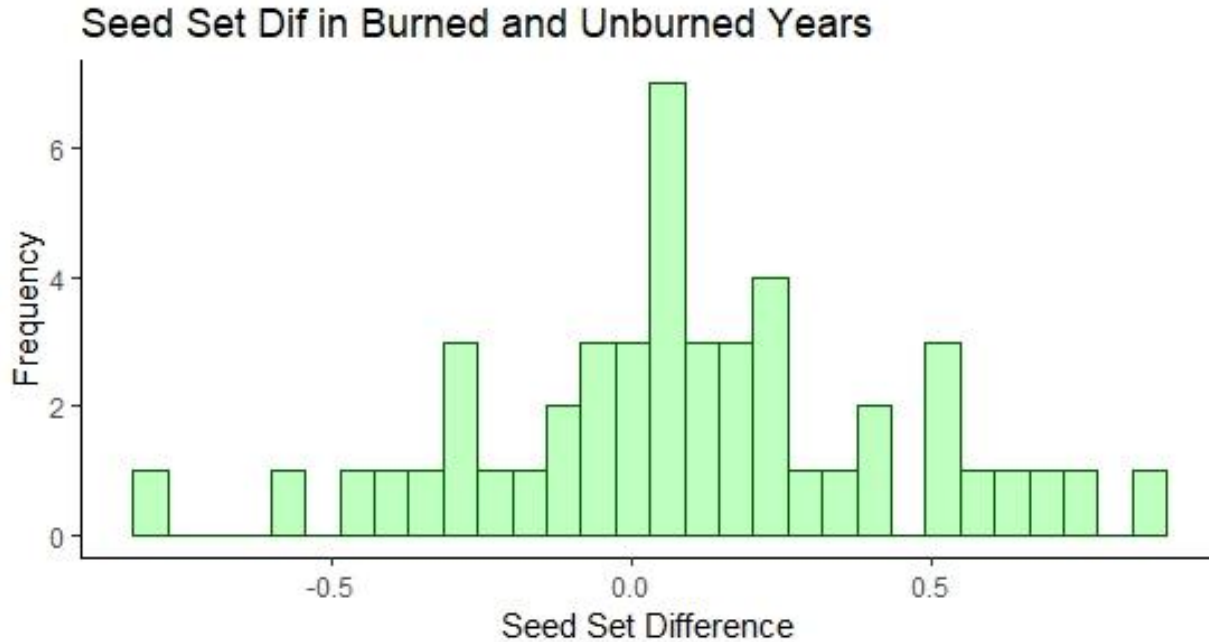
P-value = 0.7057
Mean = 4.351064

70% (7/10)

P-value = 0.06114
Mean = 0.9574468

6% (6/100)

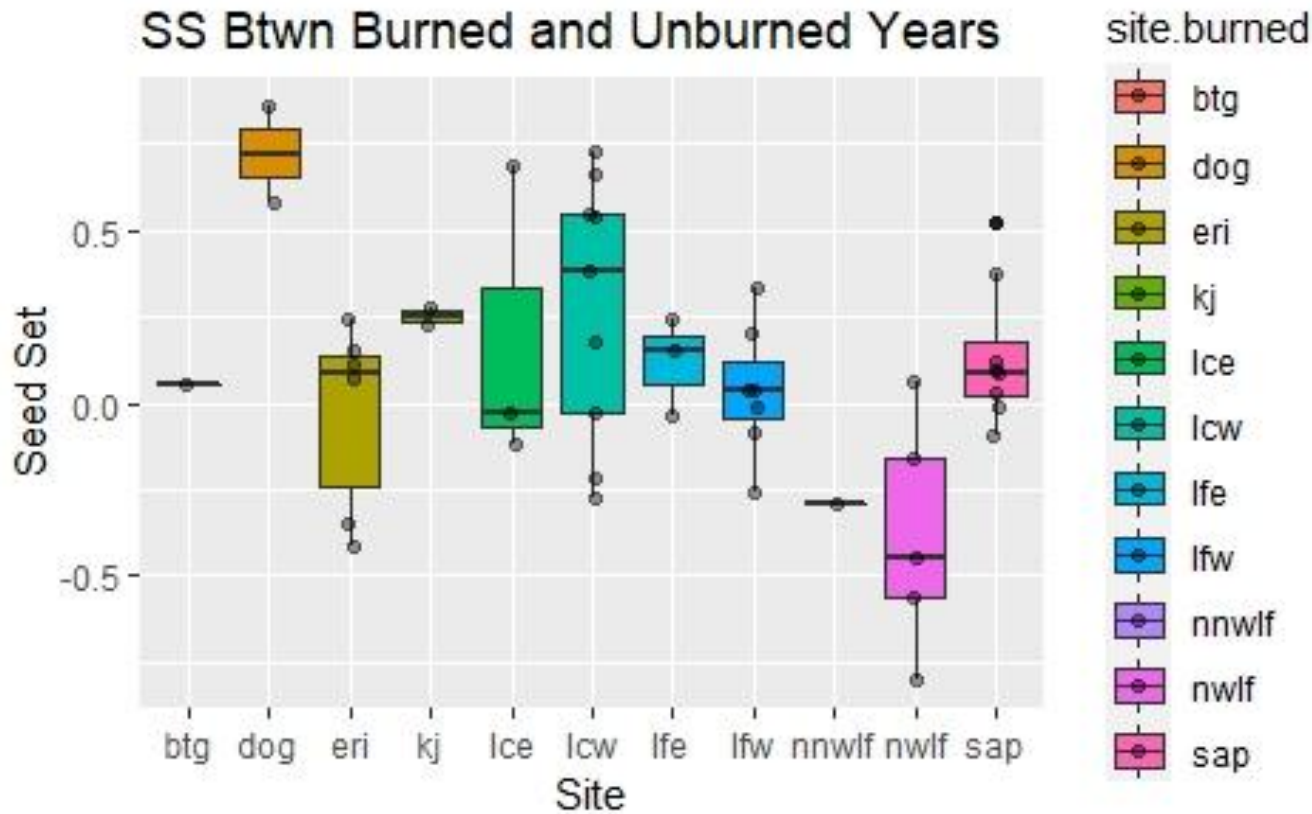
Reproductive Outcome



P-value = 0.0743
Mean = 0.09287469

7% (7/100)

Seed Set Difference in Different Sites



Implications

Burning may influence reproduction!



- * Pairing accounts for individual differences
- * Reproductive effort does not change (achene) and does change (heads)
- * Seed set -> outcome changes
- * Fire can help conservation
- * Future studies

Acknowledgements

Thank you to...

Alex

Lindsey

Jared

Stuart

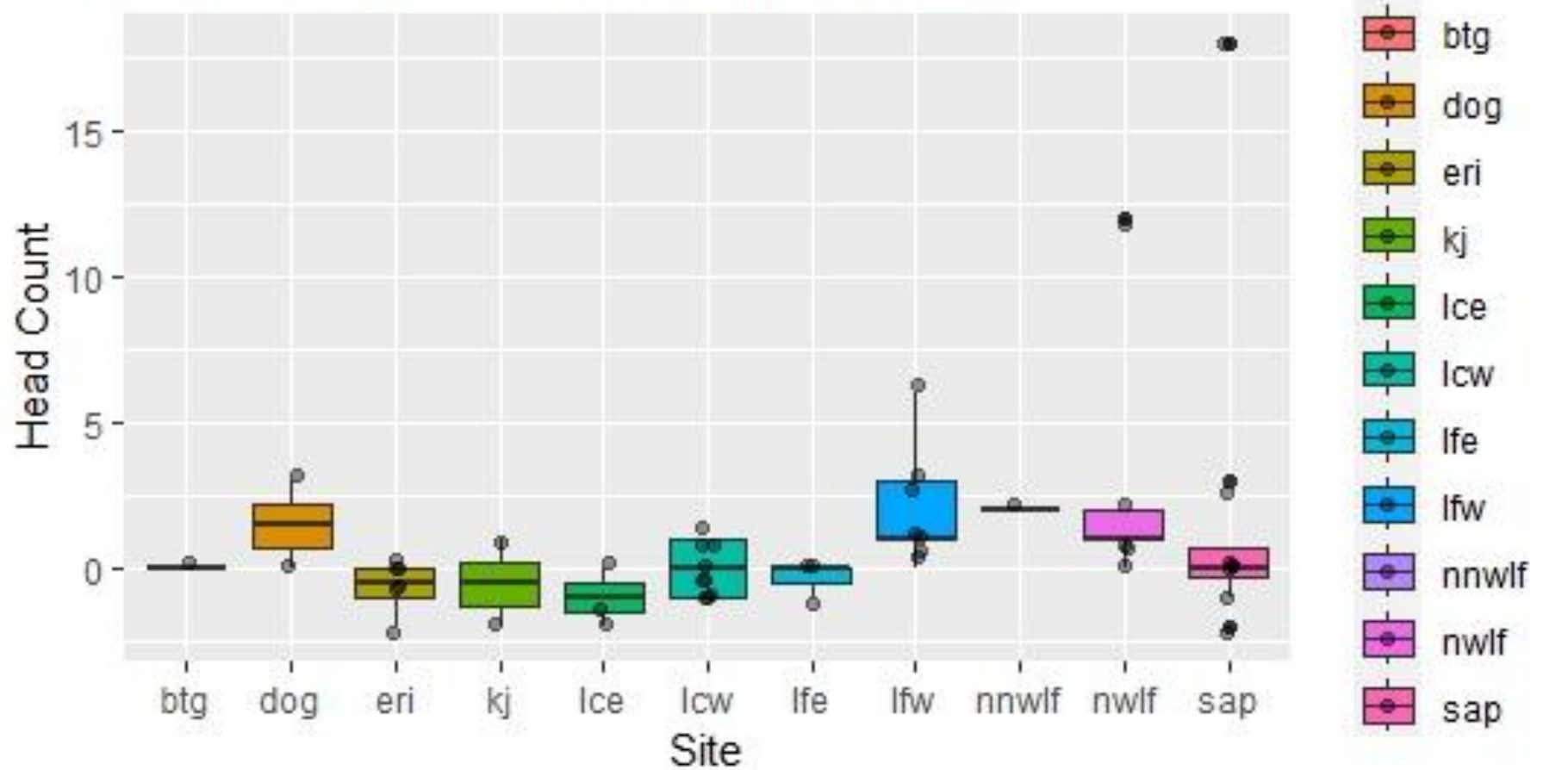
All of the volunteers!

My friends and family

A field of purple coneflowers with brown centers, growing in a garden. The background is a blurred landscape with green foliage and a body of water. A semi-transparent green rectangular box is centered over the flowers, containing white text.

Thank you!
Questions?

HdCt Btwn Burned and Unburned Years



AchCt Btwn Burned and Unburned Years

