

Resources or Pollen? Which is Limiting: Examining Seed Set in a Common Prairie Perennial.

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Background:

- Only 0.1% of the tallgrass prairie is remaining¹.
- In fragmented habitats native plants often experience reproductive failure².
- Seed production in plants can be pollen or resource limited.³
- *Echinacea angustifolia*, a common prairie perennial, has been shown to be pollen limited³.

Research question:

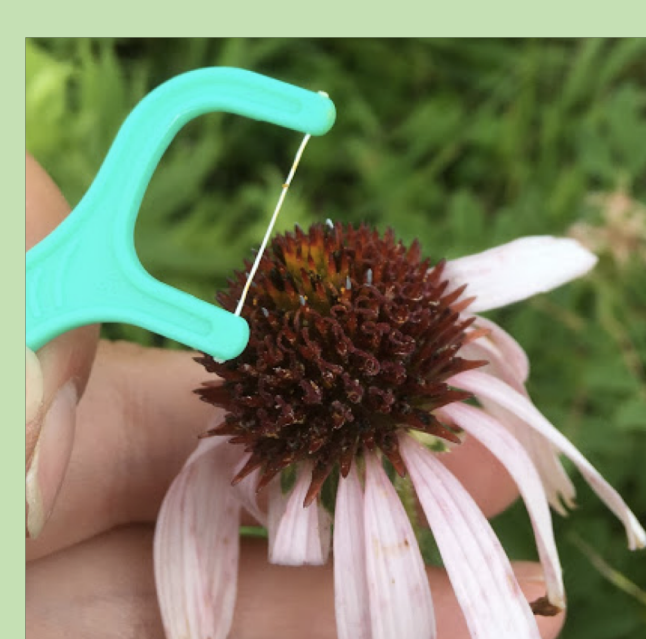
Does the number of pollen grains deposited predict seed set in *Echinacea angustifolia*?

Methods:

60 sets hand crosses, 9 crosses per set with varying amounts of pollen.



3 styles not crossed



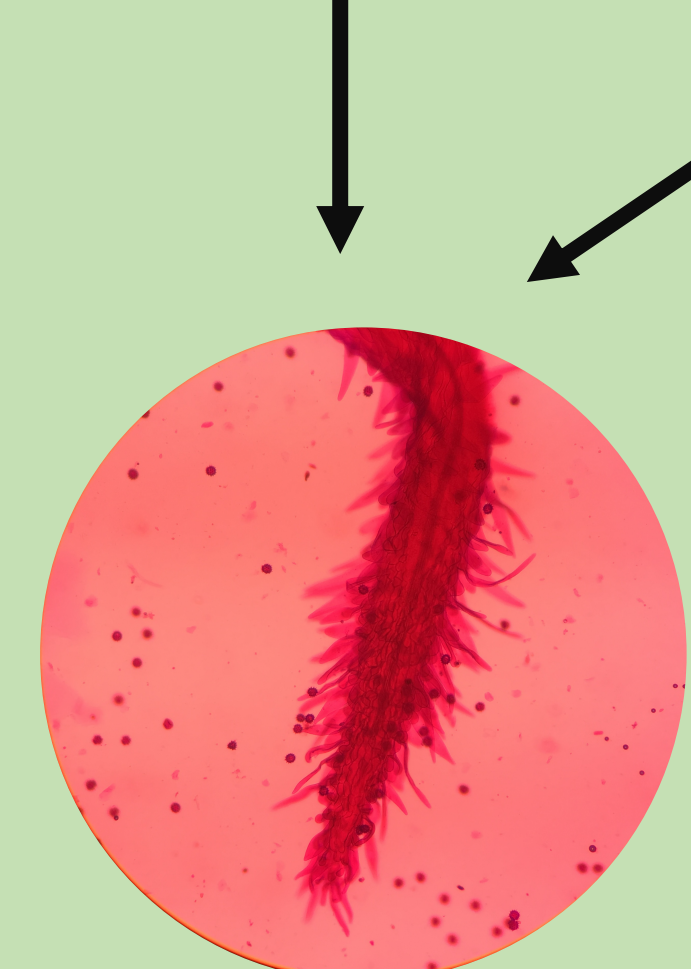
6 styles crossed

24 hours later:

3 styles removed

3 styles removed

3 styles left



Pollen counted on style using microscope



Corresponding fruits X-rayed to determine if seed present

Multi-logistic regression performed comparing row on inflorescence to the success fail ratio of making a seed.

Results:



Figure 1: Pollen on styles after a hand cross was performed compared to seed set. A random slight effect was added to the points to aid in data visualization (n=60).

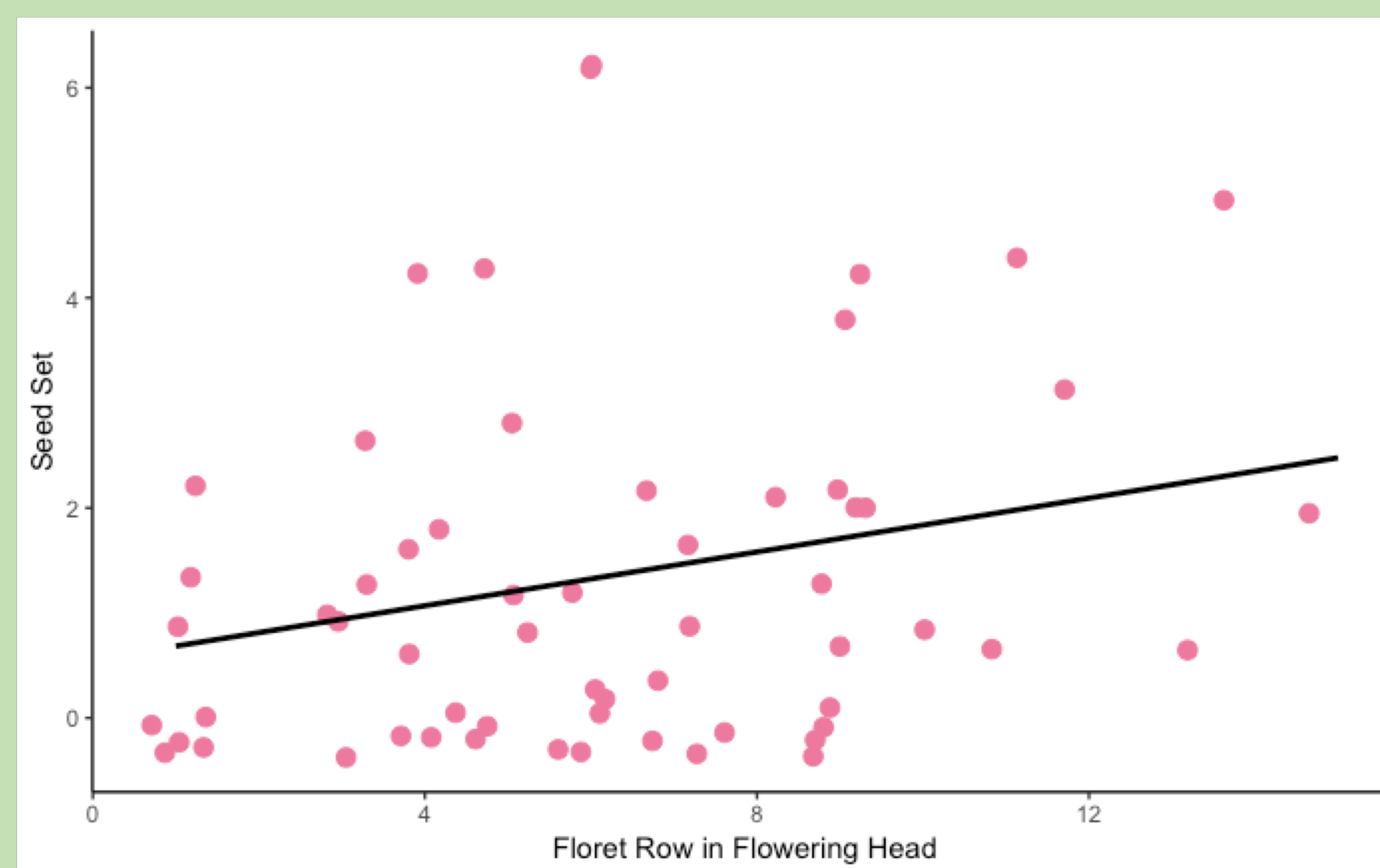


Figure 2: The position in floral architecture that a cross was performed on a head compared to seed set. A random slight effect was added to the points to aid in data visualization. The flower head below is presenting anthers in the third row. (n = 60, z-value = 3.525, p = 0.000423)



Florets with anthers presenting pollen in row 3

Echinacea angustifolia, a common perennial prairie plant (photo credit to Gretel Kiefer)

Discussion:

- The number of pollen grains on a style does not significantly predict seed set but placement within the inflorescence does (Figure 1).
- Floret row within flowering head does not significantly predict seed set (Figure 2).
- Other studies have found that flower position within inflorescences is related to resource allocation.⁴
- Therefore, our results are more consistent with seed set being limited by resource availability rather than pollen availability.
- Future studies could more directly test if resource availability is affecting seed set in *Echinacea angustifolia*.
- Interestingly even though this system can be pollen limited we could not find a relationship between amount of pollen deposited and seed set.
- This indicates that these fragmented *Echinacea angustifolia* populations may not be pollen limited if any conspecific pollen was moving between compatible plants.



Acknowledgements and References:

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