



# Research Update: Vegetation & Reproductive Patterns in *E. angustifolia*

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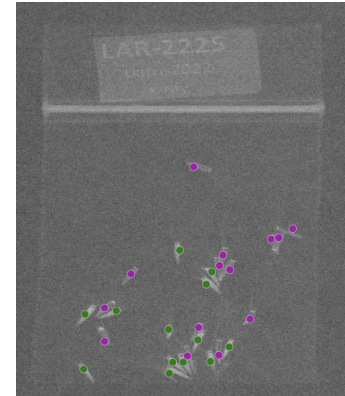
# Introduction

- ❖ Plants use energy they derive from photosynthesis for all functions, including producing reproductive structures
- ❖ Previous studies on long-lived perennial taproots like echinacea have shown a positive correlation between vegetation and reproductive effort within one year
- ❖ It is unknown if a similar relationship exists in echinacea
- ❖ I used data from the echinacea samples that I have been processing to examine the relationship between vegetative effort from 2018 to 2022 and reproductive effort and success in 2023
- ❖ Hypothesis: there will be positive relationships between these variables



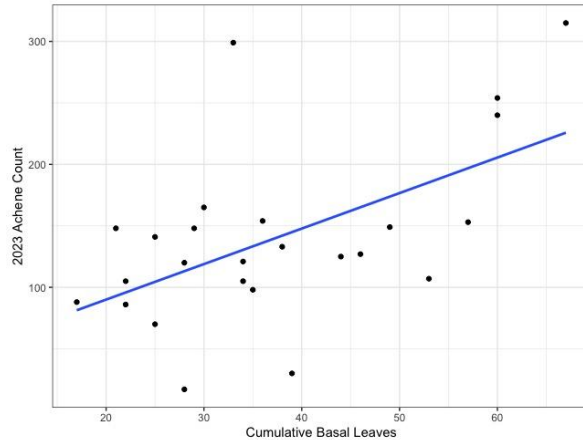
# Methods

- ❖ The sample used consists of 199 seed heads harvested from 142 individual plants in research plots in western MN
- ❖ Heads were cleaned and rechecked for achenes (fruit).
- ❖ Then, achenes were scanned into an image and counted
- ❖ A random  $\frac{1}{8}$  sample was taken from each head
- ❖ The x rayed achenes were classified by whether they contained a full seed, partial seed, or were empty

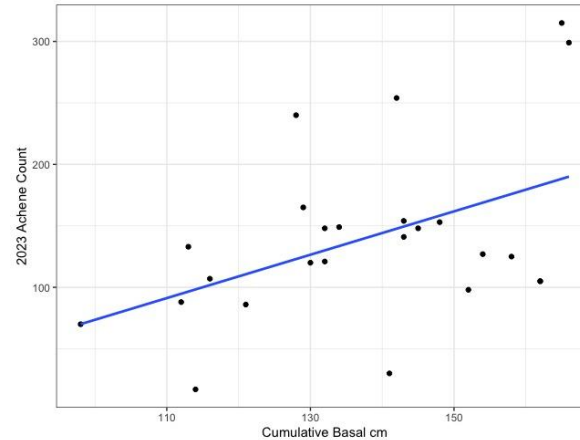


# Results - veg effort vs. rep effort

- ❖ Vegetative Effort = cumulative basal leaf count 2018-22 & cumulative length of longest basal leaf 2018 - 22
- ❖ Reproductive Effort = 2023 Achene Count (per plant)
- ❖ Reproductive Success = pollination % and seed set
- ❖ The following data only includes plants that were basal from 2018-22 (31 plants)

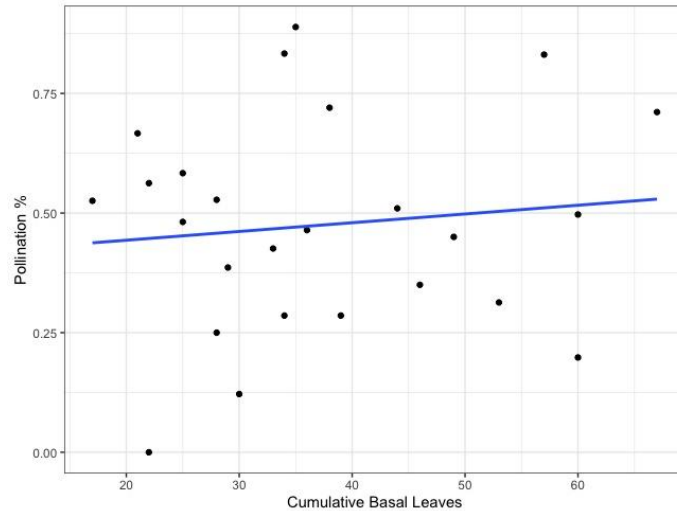


r2: .309    p value: .0039

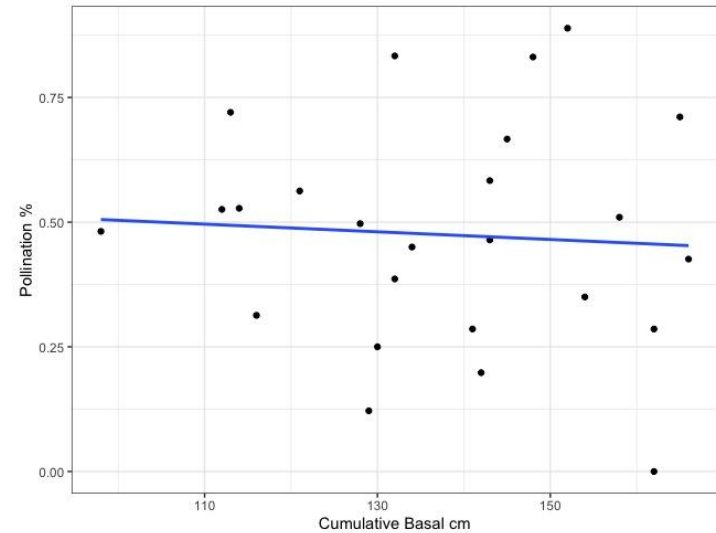


r2: .208    p value: .022

## Results - veg effort vs pollination

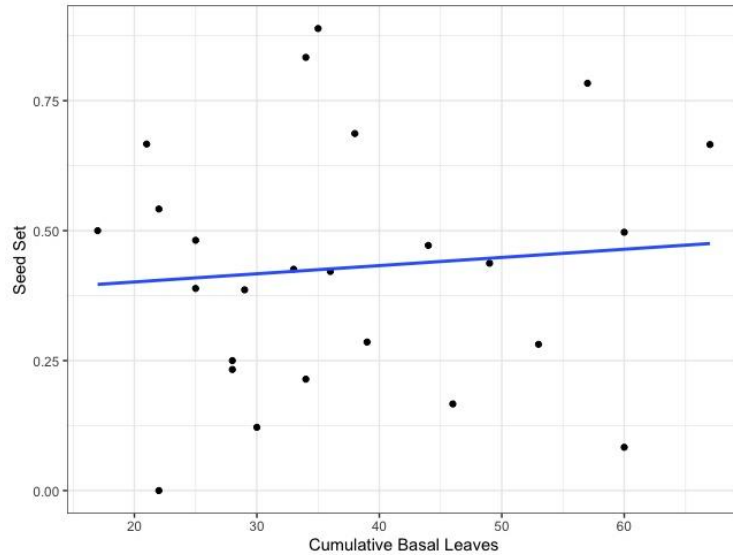


$r^2: .012$   $p$  value: .59

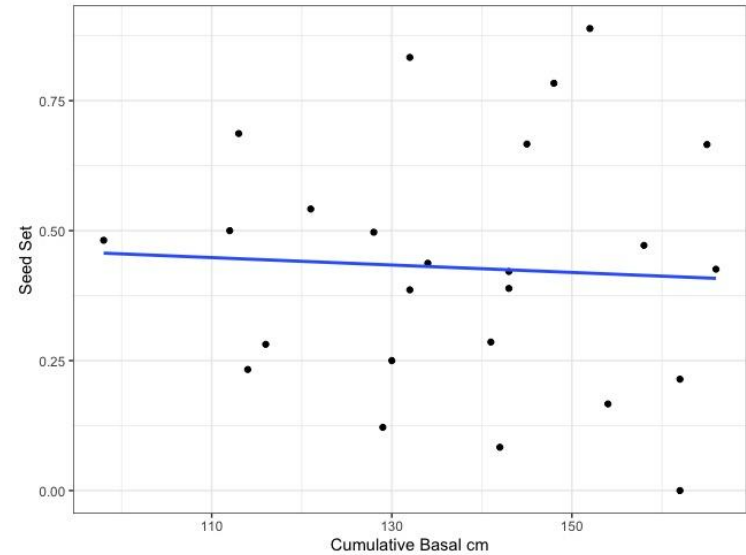


$r^2: .004$   $p$  value: .76

## Results - veg effort vs. seed set



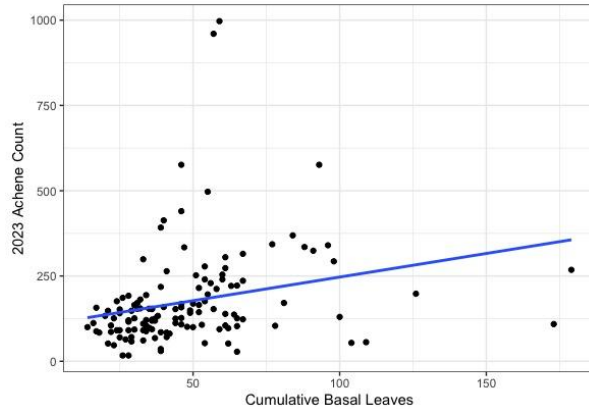
$r^2: .009$   $p \text{ value}: .66$



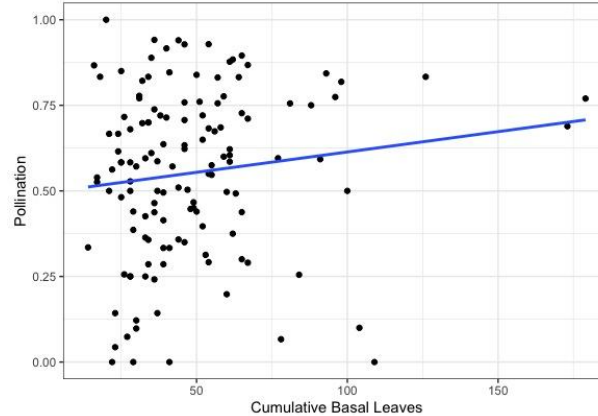
$r^2: .003$   $p \text{ value}: .79$



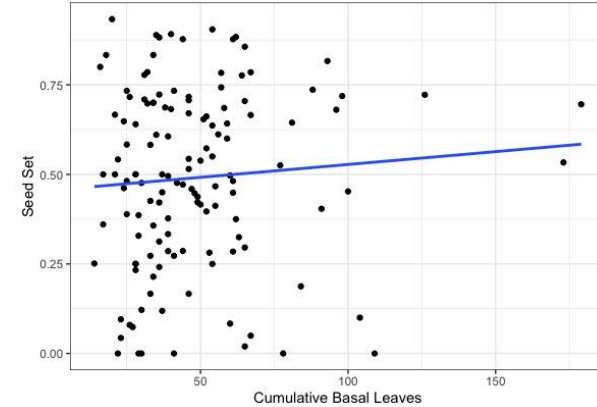
## Results - basal leaves vs. all (unfiltered data)



$r^2: .065$   $p\text{ value}: .0033$



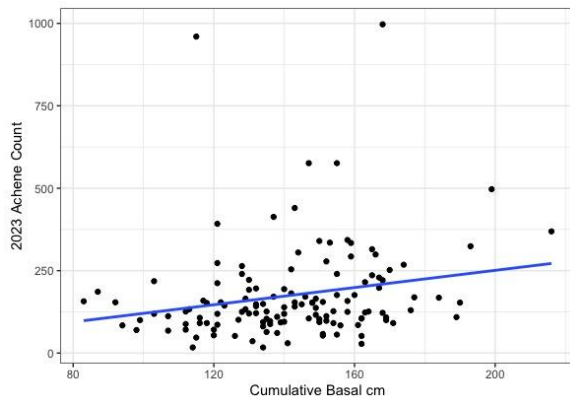
$r^2: .017$   $p\text{ value}: .141$



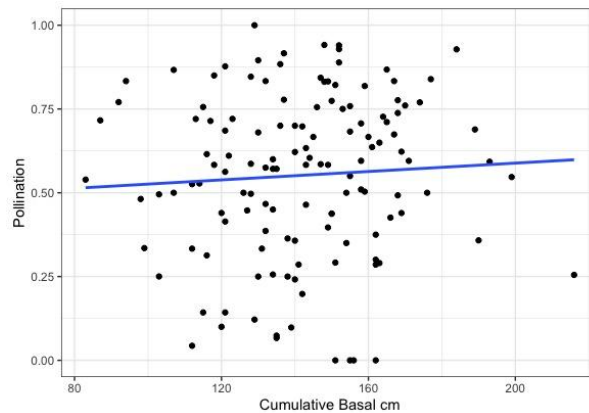
$r^2: .006$   $p\text{ value}: .382$



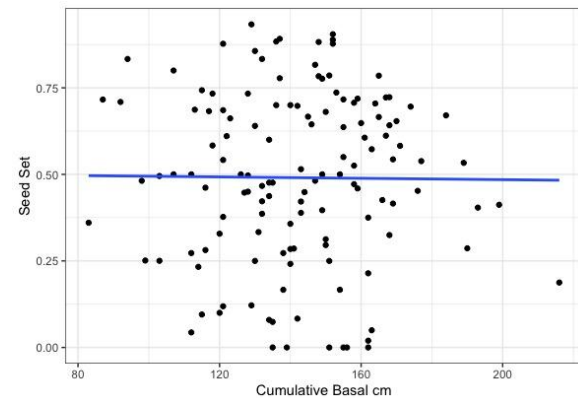
## Results - cm vs. all (unfiltered data)



$r^2: .045$   $p\text{ value}: .0143$



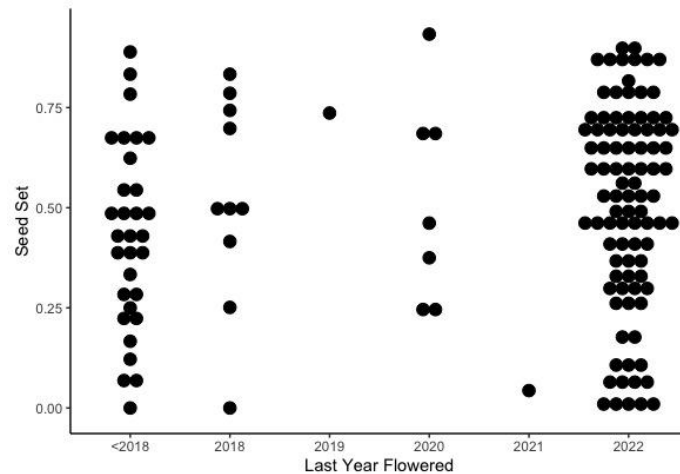
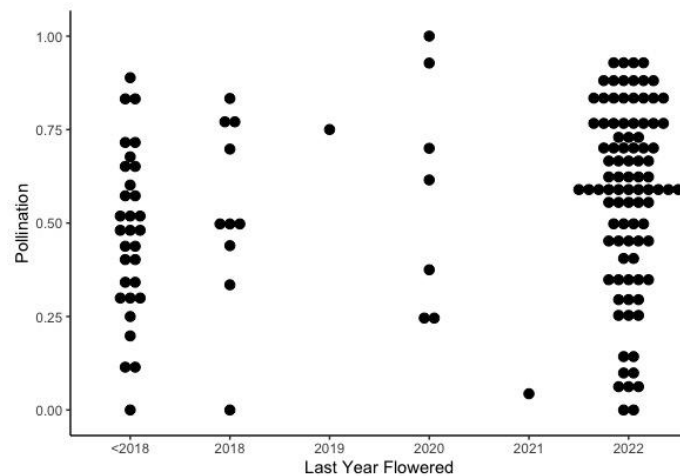
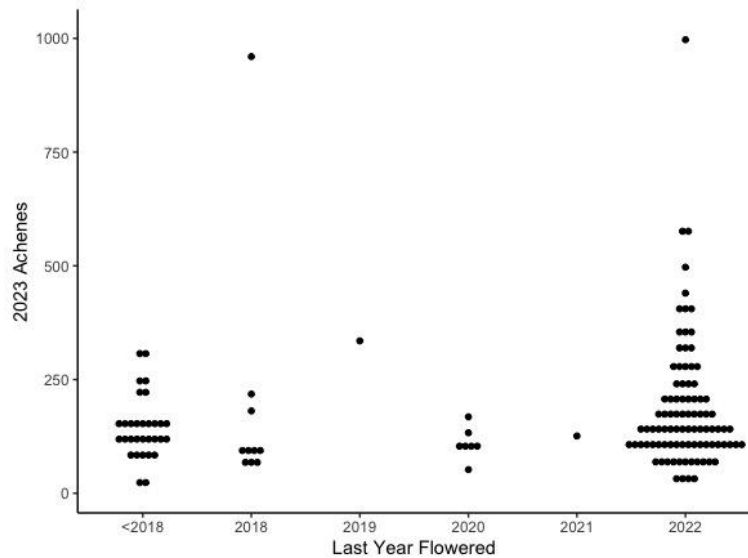
$r^2: .004$   $p\text{ value}: .49$



$r^2: 8.8e-5$   $p\text{ value}: .92$

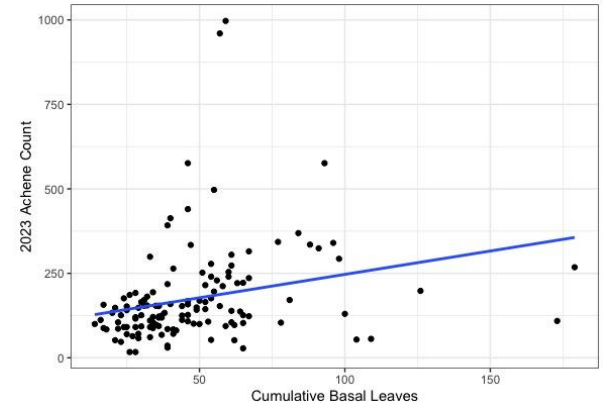


# Results - year vs. reproduction



# Conclusion

- ❖ Hypothesis:
  - ◇ It appears that there is a positive relationship between vegetative and reproductive effort in echinacea
  - ◇ However, the same cannot be said regarding vegetation vs. reproductive success
- ❖ Further Research:
  - ◇ One could examine these relationships further with a larger sample to see if it is replicable and search for confounding variables
  - ◇ Previous flowering status does not seem to be an important factor



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# Acknowledgements

