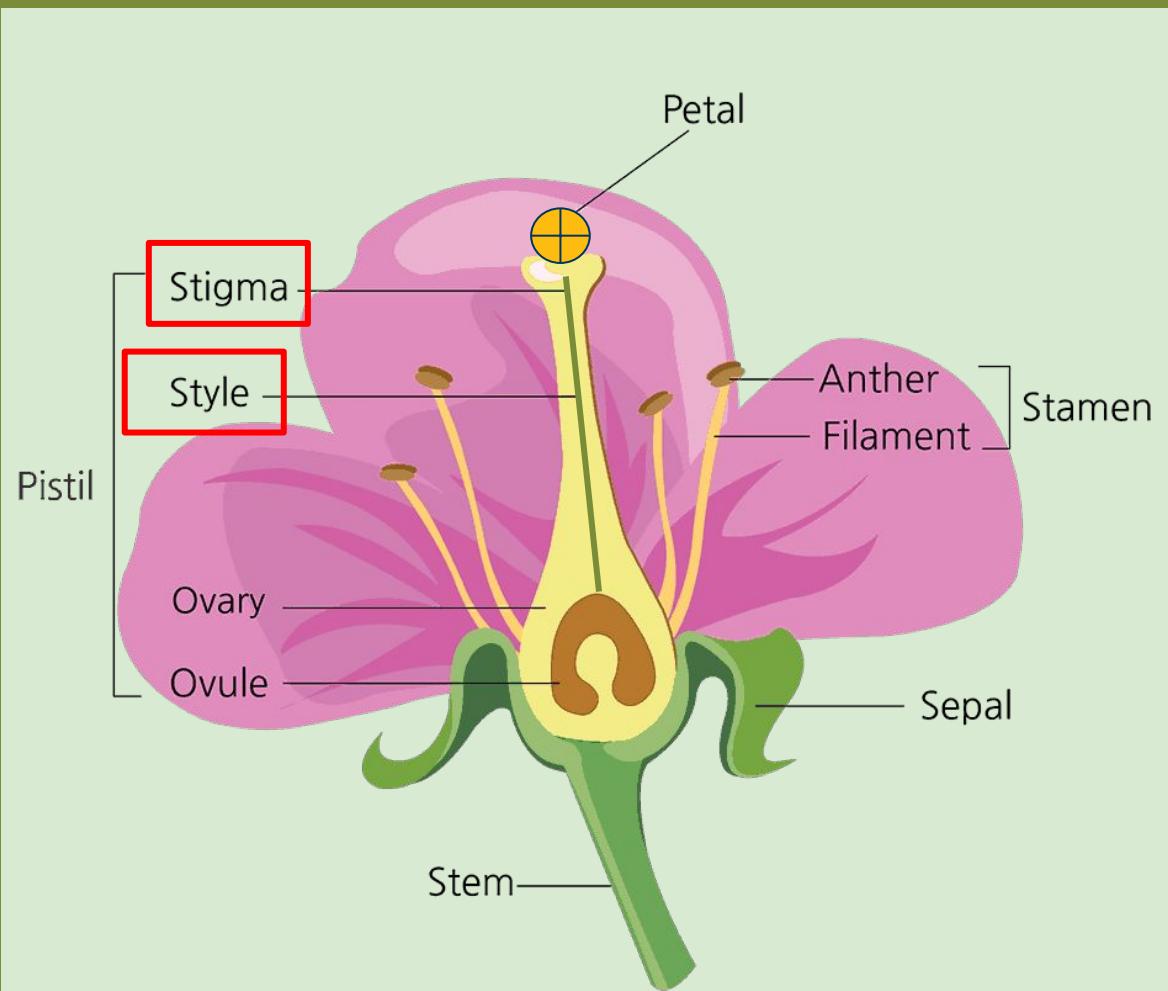


Style length, pollen deposition, and reproductive fitness for a native California wildflower, *Nemophila menziesii*



Silvana Sun, Helen Payne, Susan Mazer
Mazer lab, EEMB

Flower Anatomy

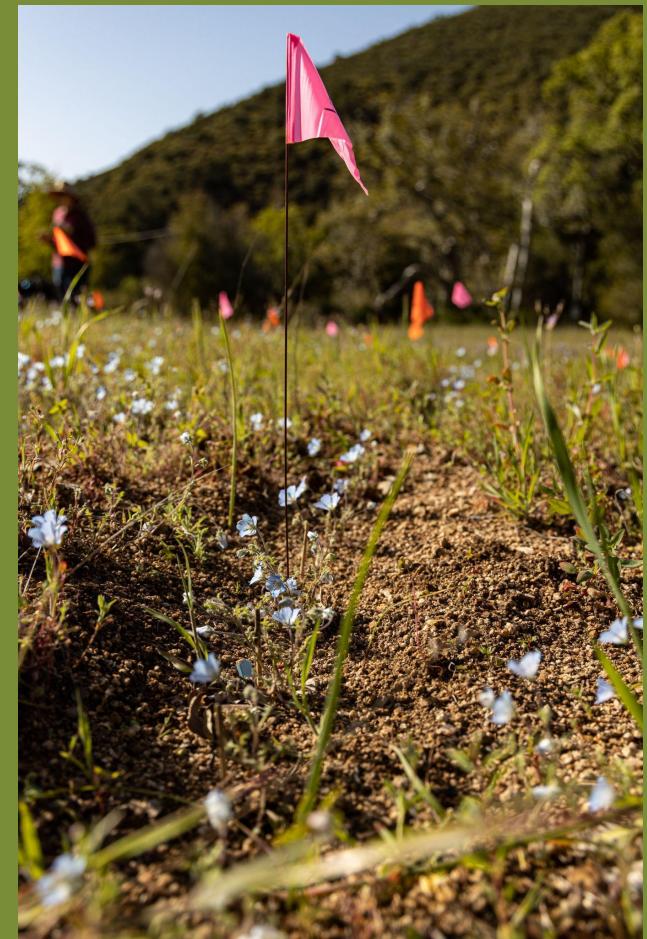


**Many flowering plants
rely on insects for
pollination**

Nemophila menziesii



Nemophila menziesii is an outcrossing annual California wildflower that depends on insects for reproductive success.

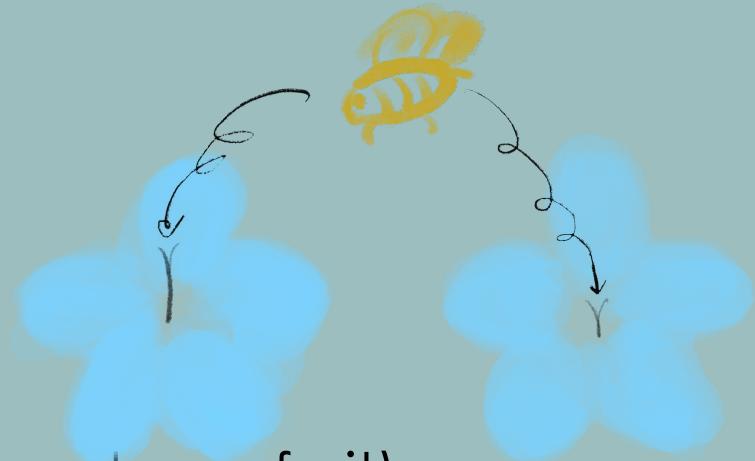


Questions:

Is style length influencing:

- a) pollen deposition
- b) Lifetime fecundity

(total fruit production * mean seeds per fruit)



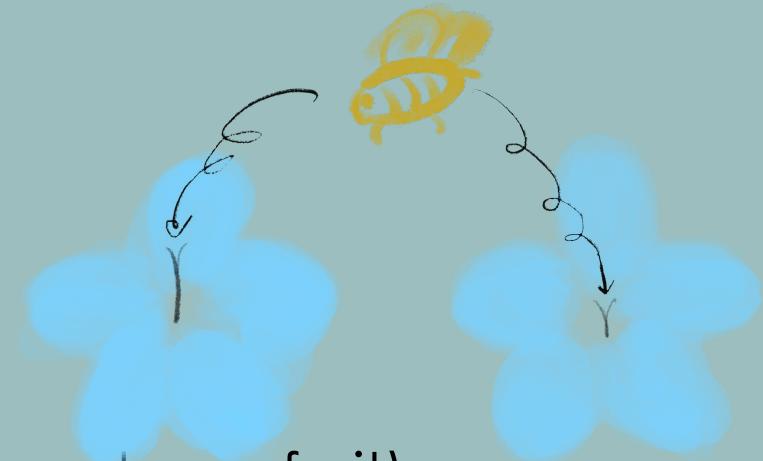
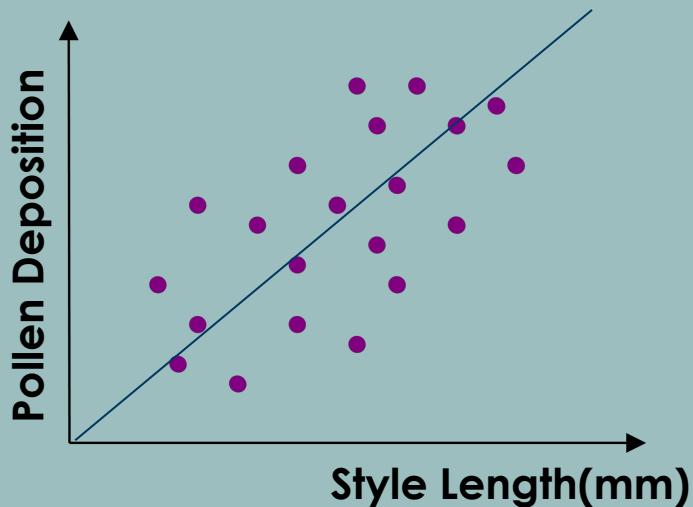
Questions:

Is style length influencing:

- a) pollen deposition
- b) Lifetime fecundity

(total fruit production * mean seeds per fruit)

Hypothesis:



- Longer styles are protruding from flowers and more likely to improve pollination efficacy
- **If higher pollen deposition is correlated with increases in plant fitness, longer styles will be under positive directional selection.**

**Style Length ↑ ⇒ Pollen Deposition ↑
Lifetime Fecundity ↑**

Style collection

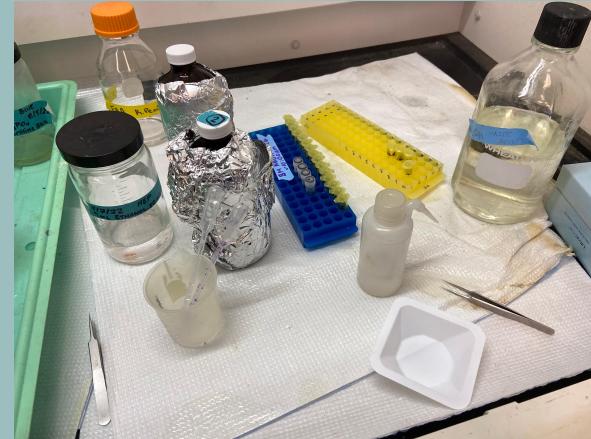
- 683 styles from 118 plants
- at Hastings Natural History Reservation
- by Helen Payne and SBCC students during Spring 2022



Method

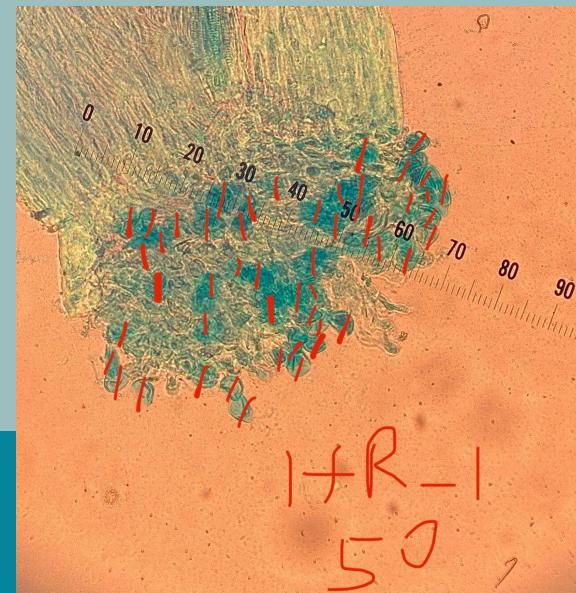
- **Pollen-staining:**

- Alexander's staining is one of the most common methods allowing differential staining of the pollen walls.
- Tried several concentrations of Alexander Dye



- **Pollen-counting:**

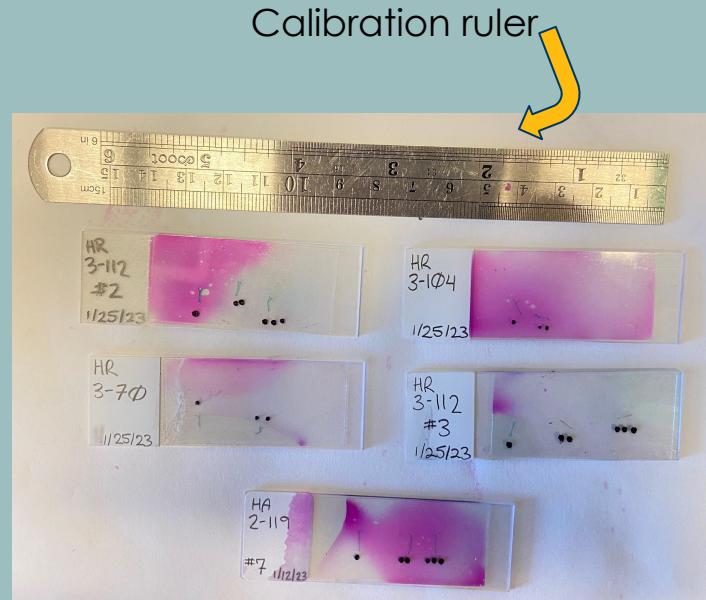
- Optical microscopy
- 60,929 pollen grains were counted in total



Method

- **Style Length-measuring:**
 - Developed a protocol using ImageJ to digitally measure style length

- Label
- Photograph
- Import into imageJ
- Determine length



Analysis & Results

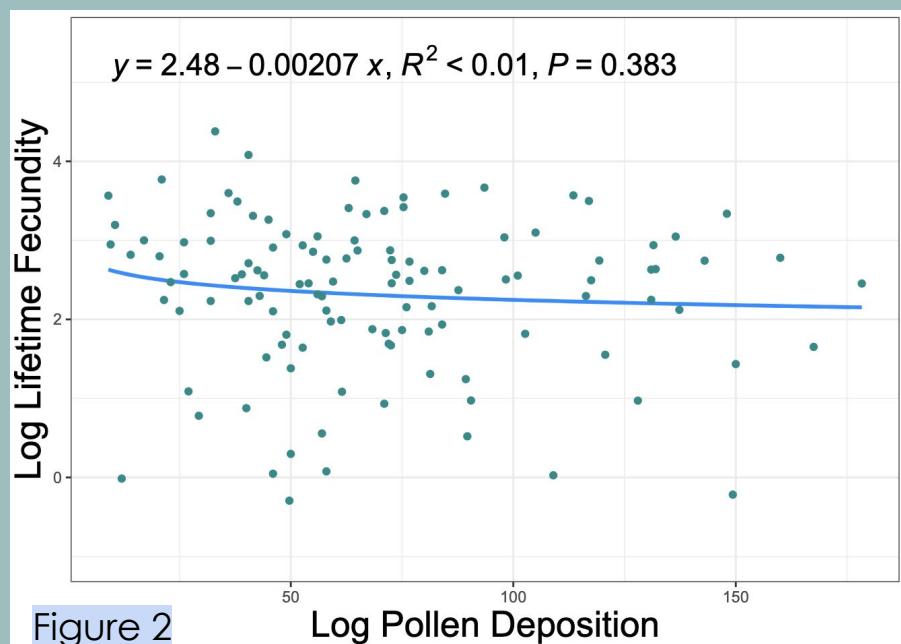
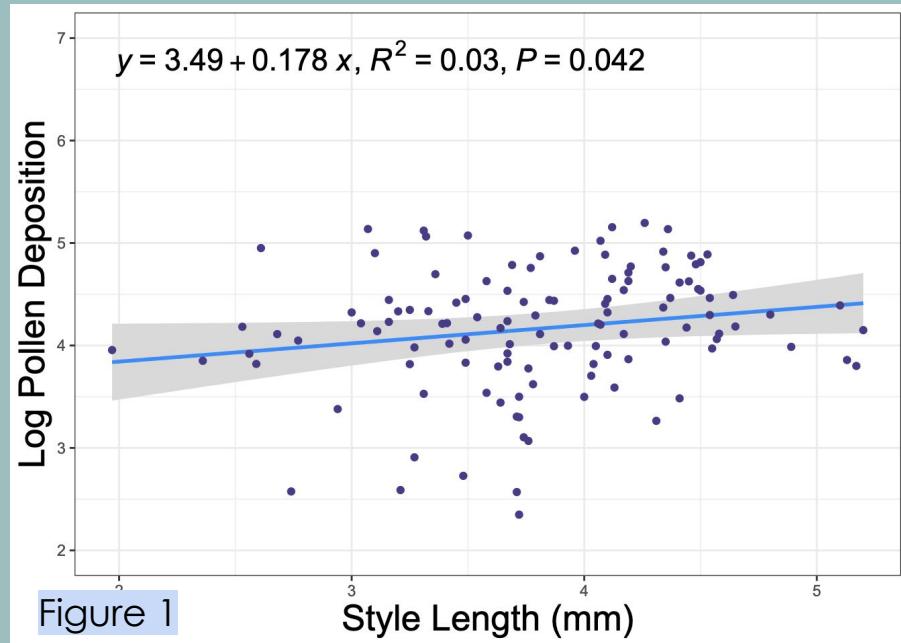
N=118

Multiple regression analysis

Pollen Deposition ~ block + stem biomass
+ corolla area + style length

Lifetime Fecundity ~ block + stem
biomass + corolla area + pollen
deposition

Figure credit: Helen Payne



Conclusion

- At the Hasting Reserve during 2022, style length was positively correlated with pollen deposition
- However, the pollen deposition was not significantly correlated with lifetime fecundity
- As a result, we found longer styles were not under direct selection at this time

**Style Length ↑ ⇒ Pollen Deposition ↑
but No Effect on Lifetime Fecundity**

Significance of this study

At this site during Spring 2022 , *N. menziesii* flowers were receiving the pollen quality and quantity required for reproductive success

- Lifetime fecundity is likely resource-limited rather than pollen-limited
- Drought Year 2022, results can be different in other years
- Pollination is an important process for flower species to thrive in the wild, and this study provides fundamental knowledge that can help promote *N. menziesii* population persistence and healthy pollinator communities

Acknowledgment

Thank you, Mazer lab

