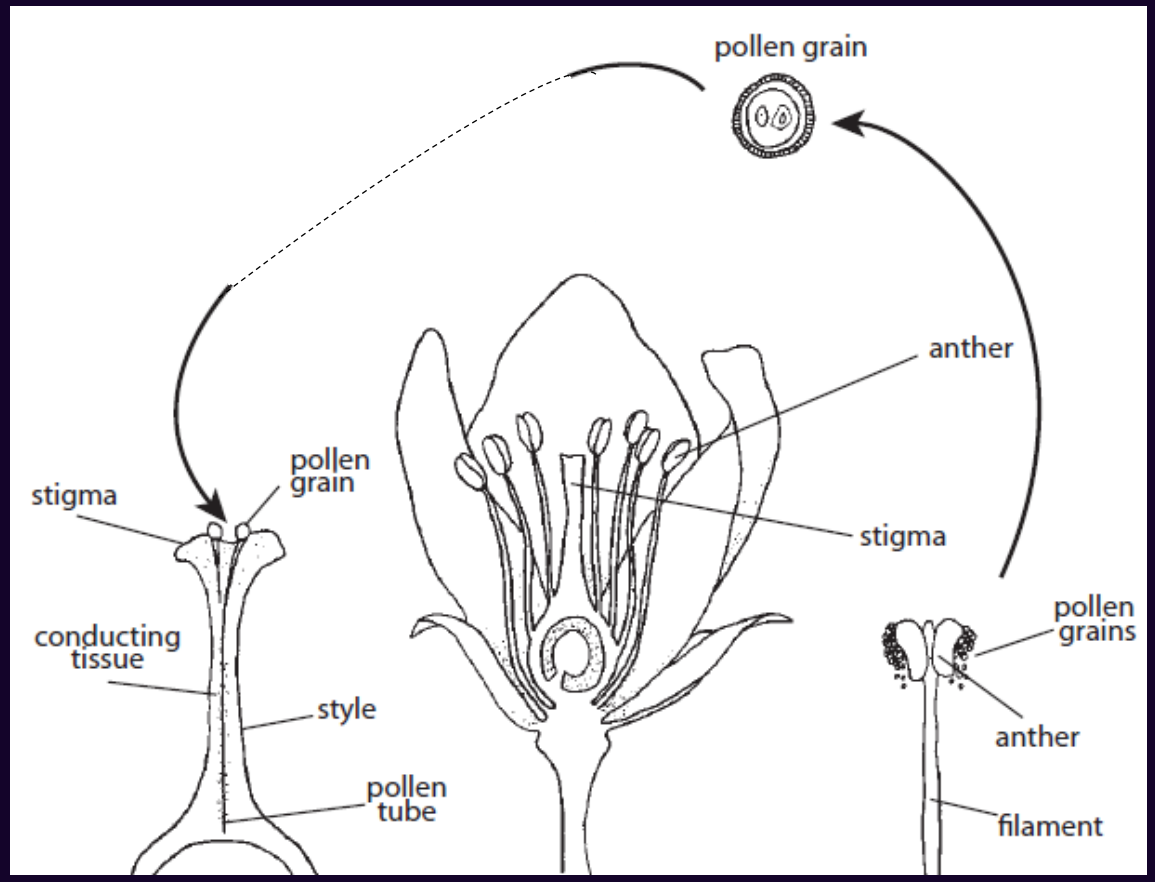
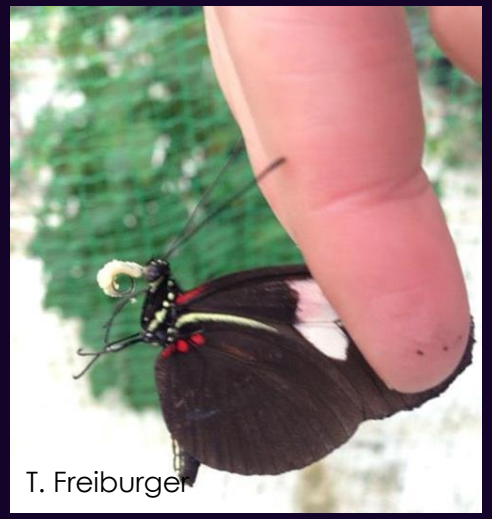
What is pollination?



From: *Pollination and Floral Ecology,* Willmer

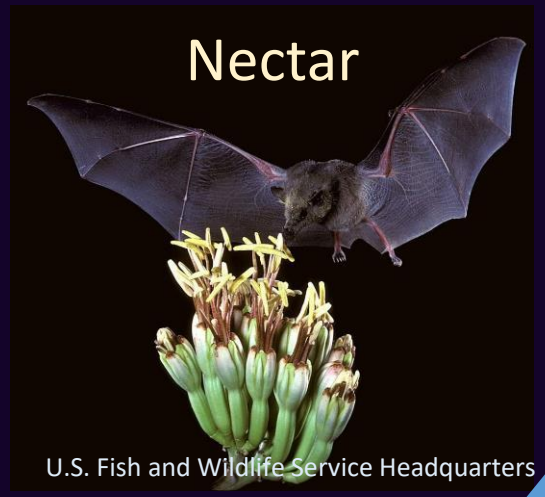
Why animal pollination?

Pollen



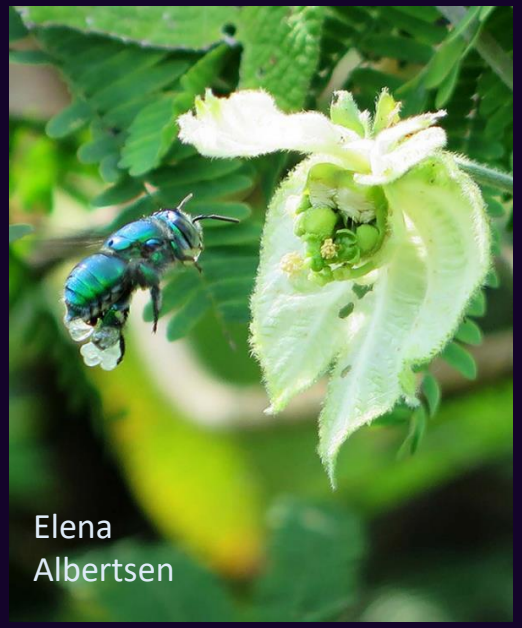
Prey

Nectar

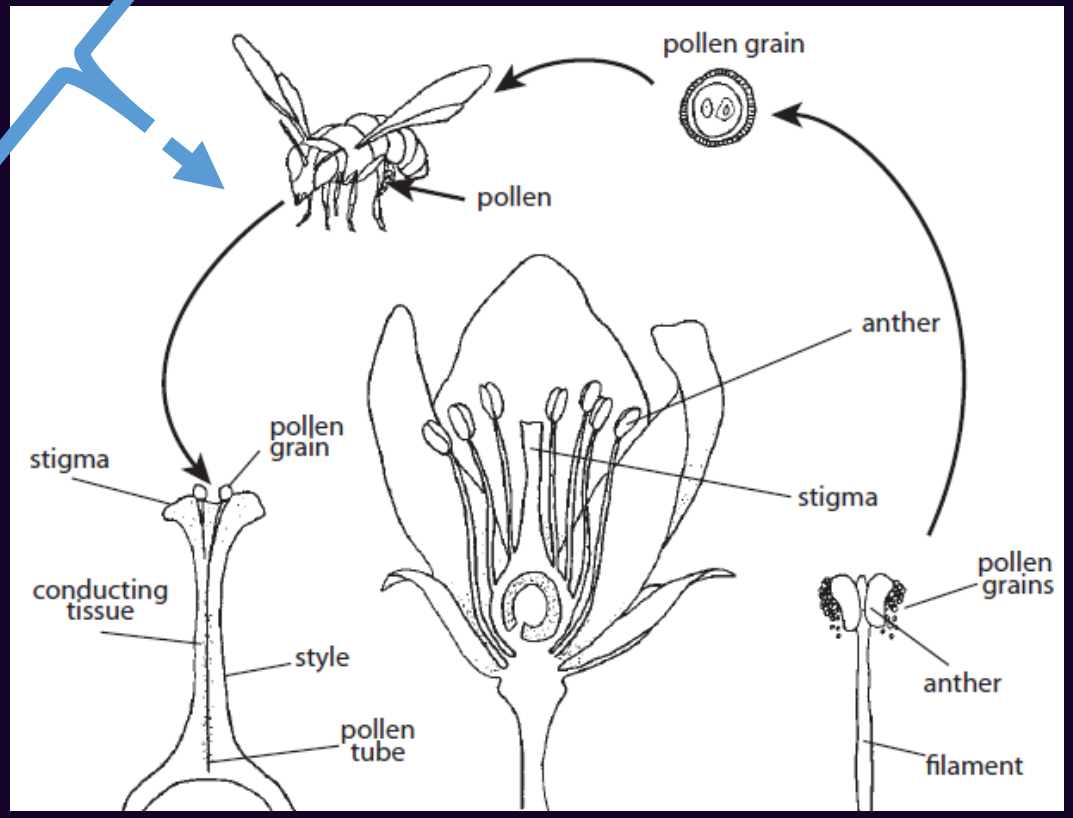


Scent

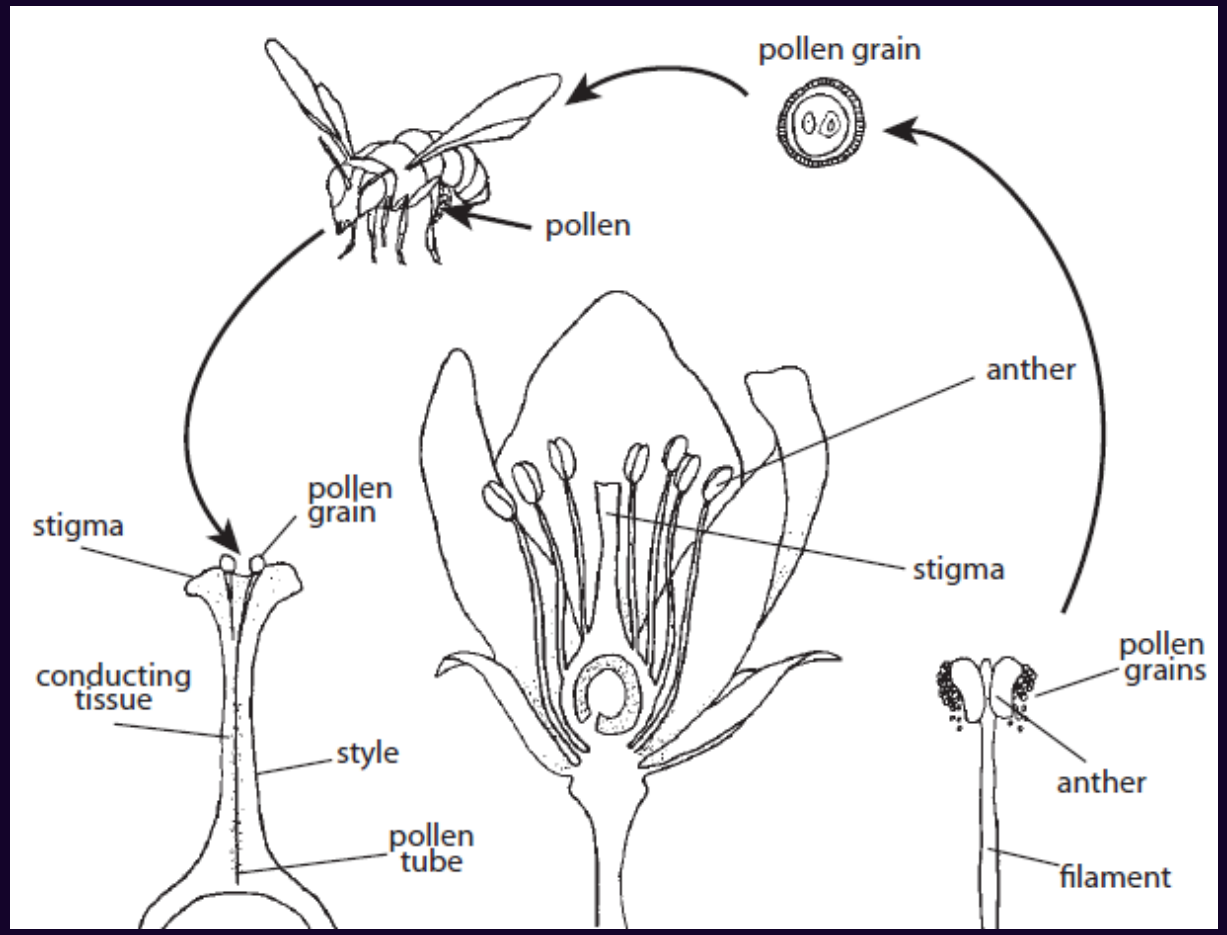
Resin



What is animal mediated pollination?



What *isn't* animal mediated pollination?



Pollination by animals IS NOT an altruistic behavior.

All mutualisms can (and should!) be thought of as "reciprocal parasitism's"

(Judith Bronstein)

Pollinators differ & plants differ

Pollinators

- Morphology
- Behavior
- Resources sought
- Effectiveness and efficiency as pollinators
- Etc, etc

Plants

- Architecture / morphology
- Mating system
- Phenology
- Rewards offered
- Etc, etc

What is the upshot of this variation?

Coevolution between plants and floral visitors

Coevolution between plants and flower visiting animals is well documented

Robert Clark, for Evolution

Animals → Plant traits

Darwin, C. (1888). The various contrivances by which orchids are fertilised by insects. J. Murray.

Galen, C. (1996). Rates of floral evolution: adaptation to bumblebee pollination in an alpine wildflower, Polemonium viscosum. *Evolution.*

Schemske & Bradshaw (1999). Pollinator preference and the evolution of floral traits in monkeyflowers (Mimulus). *Proceedings of the National Academy of Sciences*

Strauss, S. Y., & Whittall, J. B. (2006). Non-pollinator agents of selection on floral traits. Ecology and evolution of flowersWhittall, J. B., & Hodges, S. A. (2007). Pollinator shifts drive increasingly long nectar spurs in columbine flowers. Nature

Schiestl, F. P., & Johnson, S. D. (2013). Pollinator-mediated evolution of floral signals. Trends in Ecology & Evolution

Plants → Animal traits

Darwin, C. (1888). The various contrivances by which orchids are fertilised by insects. J. Murray.

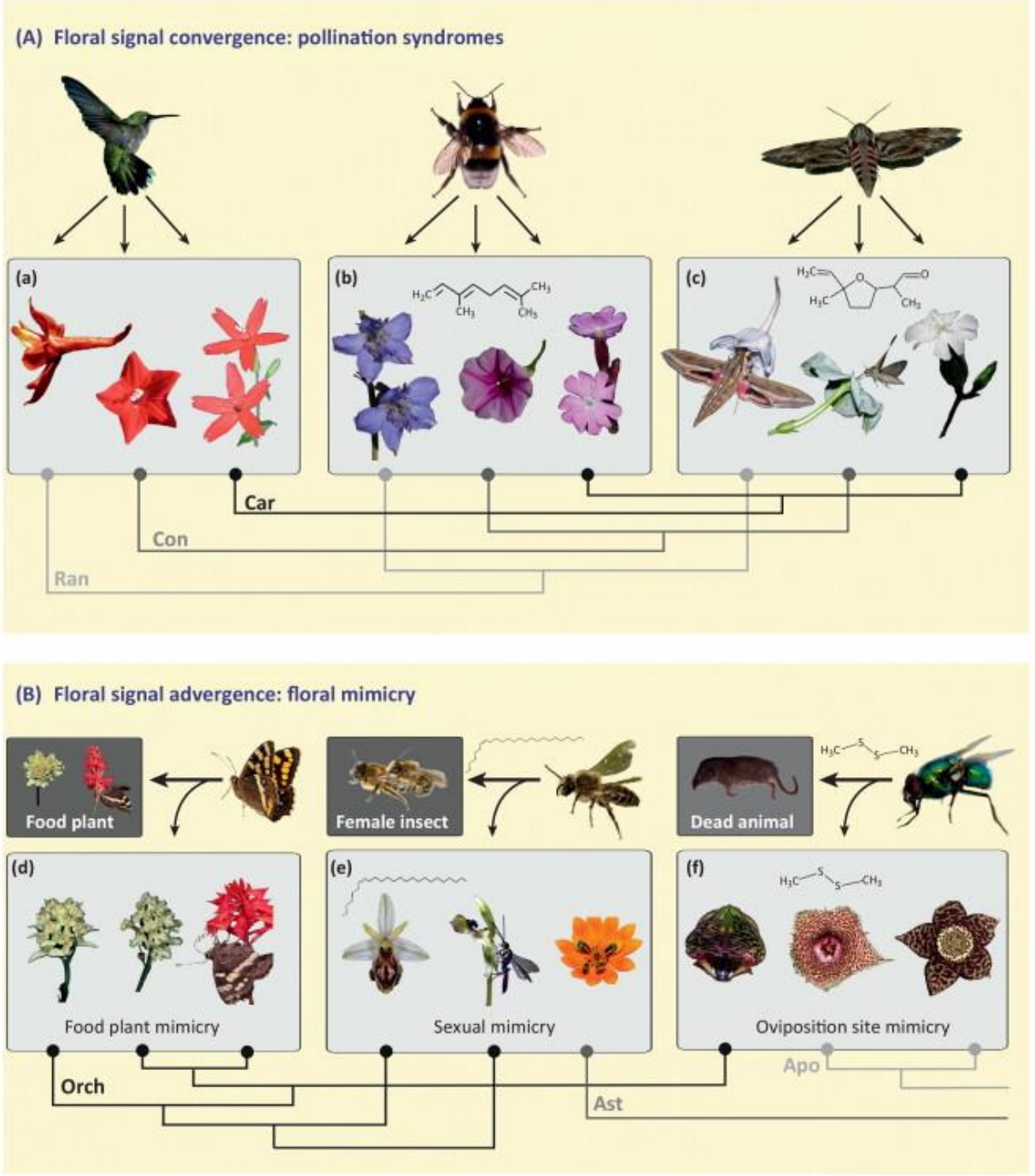
Borrell, B. J. (2005). Long tongues and loose niches: evolution of euglossine bees and their nectar flowers. Biotropica

Miller-Struttmann, et al. (2015). Functional mismatch in a bumble bee pollination mutualism under climate change. Science

Pollination syndromes

Floral characteristics predict the kinds of pollinators that utilize the species

“Syndromes” are emergent properties of plant—pollinator co-evolution



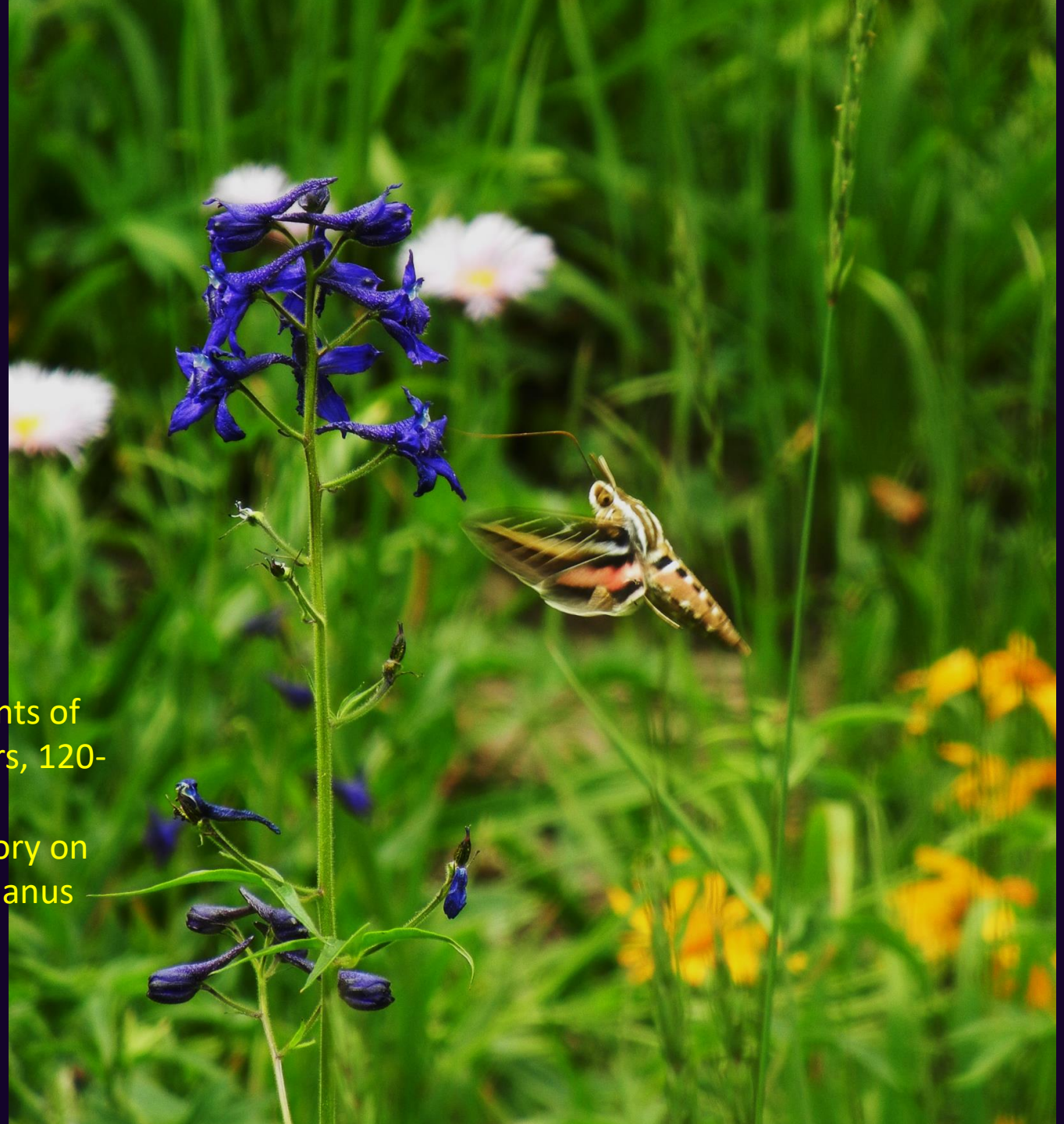
Florian P. Schiestl , Steven D. Johnson,
https://doi.org/10.1016/j.tree.2013.01.019

This concept can be useful

This concept can be useful

But it is not perfect

- “Matches” aren’t really perfect
- “Everything visits everything”
- Many relationships too diffuse
- Many other factors also drive floral trait evolution

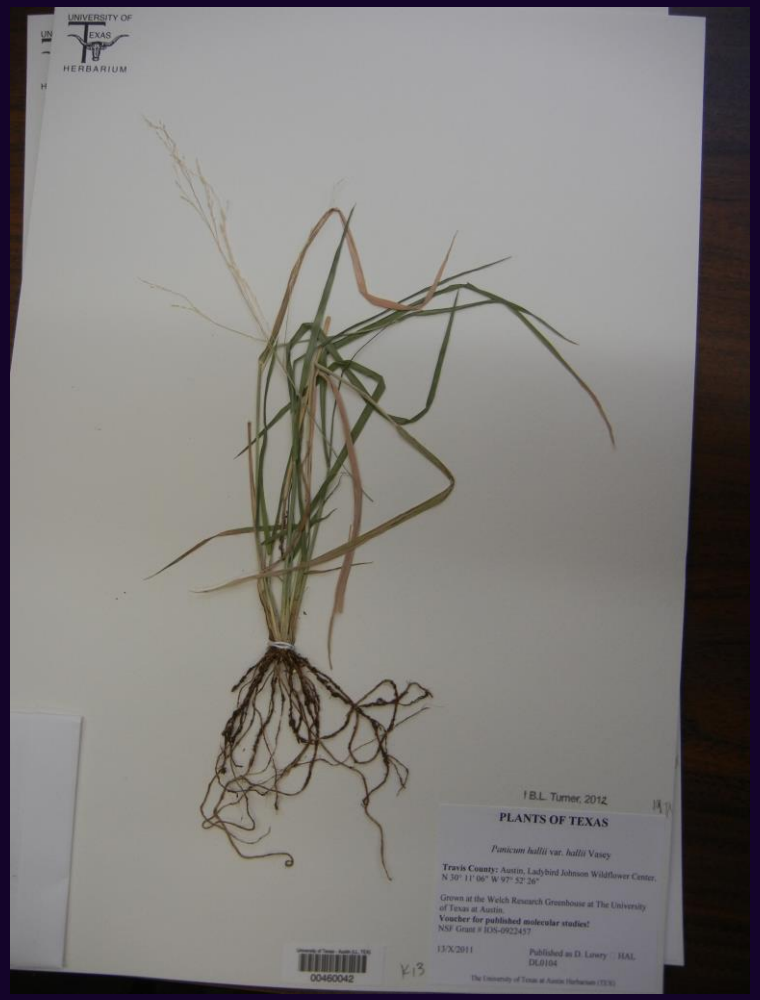


Strauss, S. Y., & Whittall, J. B. (2006). Non-pollinator agents of selection on floral traits. Ecology and evolution of flowers, 120-138.
Lehtilä, K., & Strauss, S. Y. (1999). Effects of foliar herbivory on male and female reproductive traits of wild radish, Raphanus raphanistrum. Ecology, 80(1), 116-124.

Today's lab

- Visit herbarium
- Examine / take notes on specimens
- Finish readings, answer assignment questions

What is an herbarium?



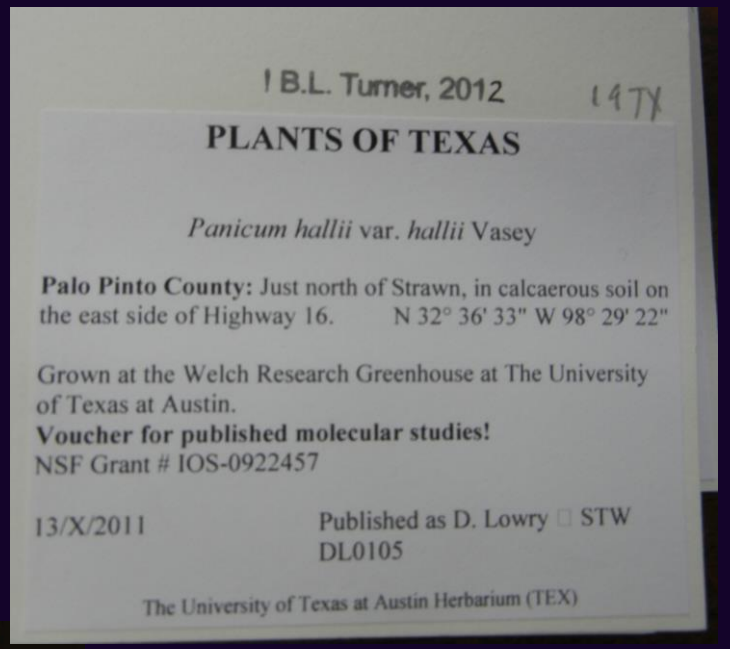


Figure captions

1 - What are we looking at? → Describe the data, not the results
2 - What does it mean? → **Very** brief statement of the take-home point
3 - How do you know? → Stats

This is not the results nor is it the discussion section

Be concise