Effects of agriculture on evolution of native species

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The Idea

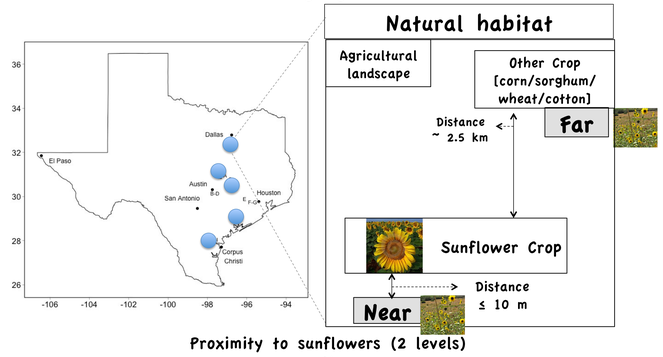
- Agriculture covers ~50% of vegetated land surface
- Evolution is altered in agricultural landscapes
  - Gene flow occurs from crops to wild relative plants
  - Evolution of resistance occurs in plants to GMOs
  - Evolution of plants and insect pests in response to herbicides and peseticides
- Yet, we know less of how natural selection is altered in agricultural landscapes through species interactions
- Much evidence for altered biotic communities
- How do changes in abundance and community structure of mutualists and antagonists near sunflower crops alter natural selection on flower traits in wild sunflowers

The Questions

Does proximity to crops alter:

1. Abundance of mutualists and antagonists?
2. Community structure of mutualists and antagonists?
3. Selection on native plant floral traits?
4. Contribution of mutualists and antagonists to selection on native plant floral traits?

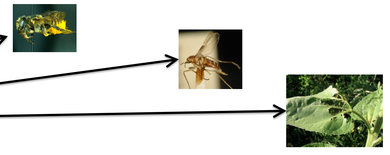
The Approach



Proximity to sunflowers (2 levels)
X
Seed source (2 levels)

@ 5 sites in '10, @ 2 sites in '11

Data Collected
- Pollinators: pollinator observations
- Seed predators: counted damaged seeds
- Folivores: leaf damage

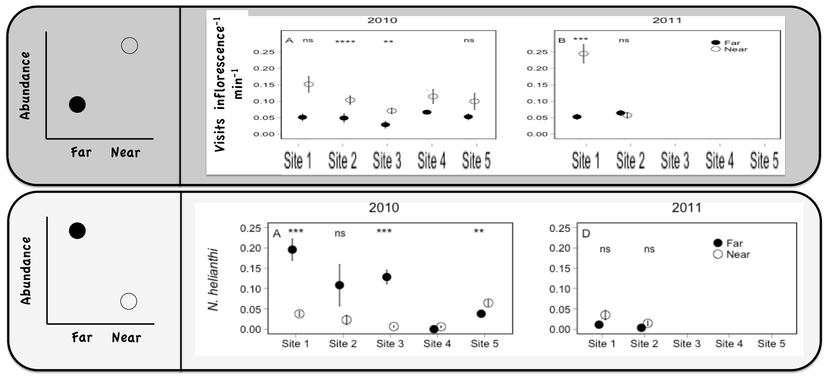


What did we find?

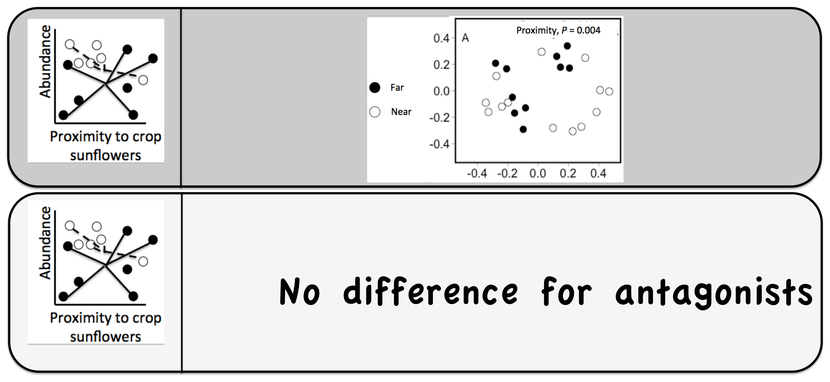
Predictions	Results

Does proximity to crops alter:

1. Abundance of mutualists and antagonists?

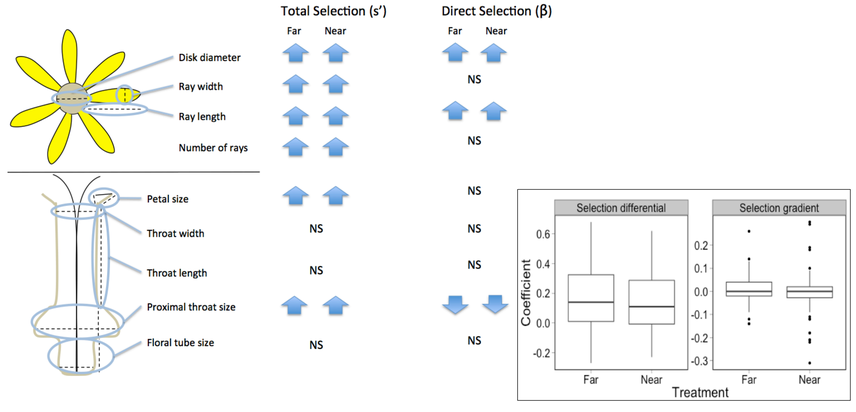


2. Community structure of mutualists and antagonists?



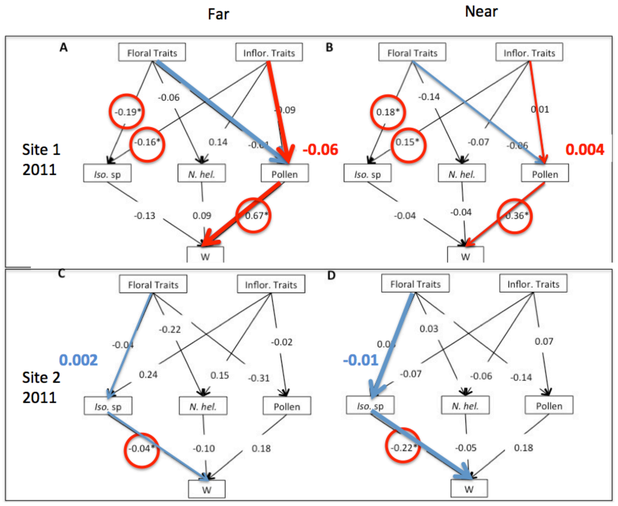
3. Selection on native plant floral traits?

Natural selection Differs Near vs. Far in some traits



What did we find?...

4. Contribution of mutualists and antagonists to selection on native plant floral traits?



What does it mean

Conclusions

- Sunflower mutualists more abundant near, antagonists more abundant far from crops
- Beta-diversity of mutualists greater near crops
- Natural selection altered by proximity to sunflower crops
- Changes in mutualist/antagonist communities drive differences in selection near vs. far from crops
- This is one of few studies to show agricultural effects on natural selection across a landscape in a native plant species

Implications

- Mutualist-antagonist framework may be useful in understanding agricultural effects on plant evolution
- Natural selection altered in agricultural landscapes, BUT contrary to expectation

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QR Code here

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