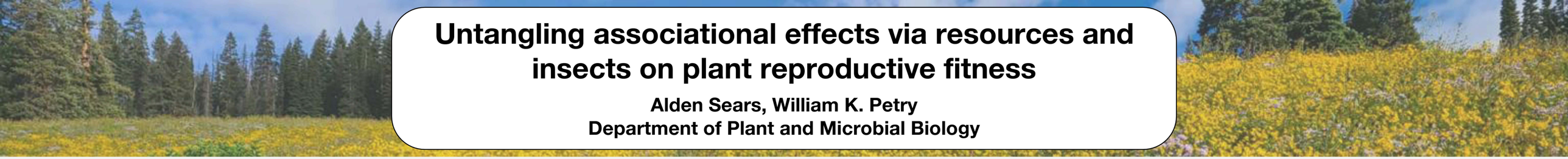

Untangling associational effects via resources and insects on plant reproductive fitness

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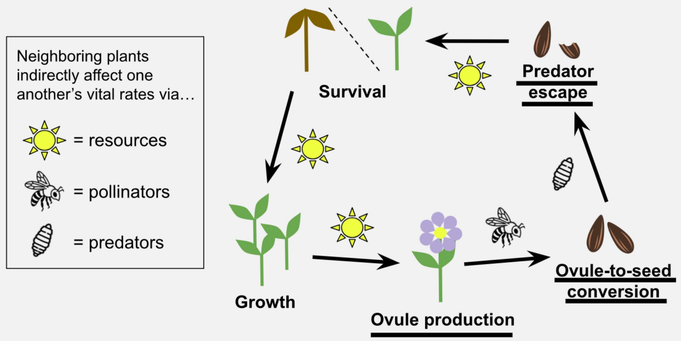
Background

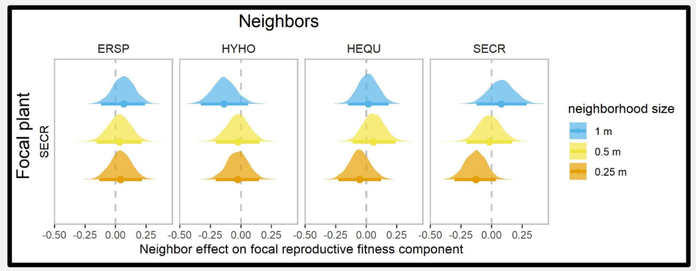
PROBLEM: The relative effects of three ubiquitous interaction mechanisms (resources,[1] pollinators,[2] and predators[3]) on the fates of rare plants are poorly understood. Each mechanism's effect can fall on different fitness components (below),[4] and these effects are often difficult to cleanly partition

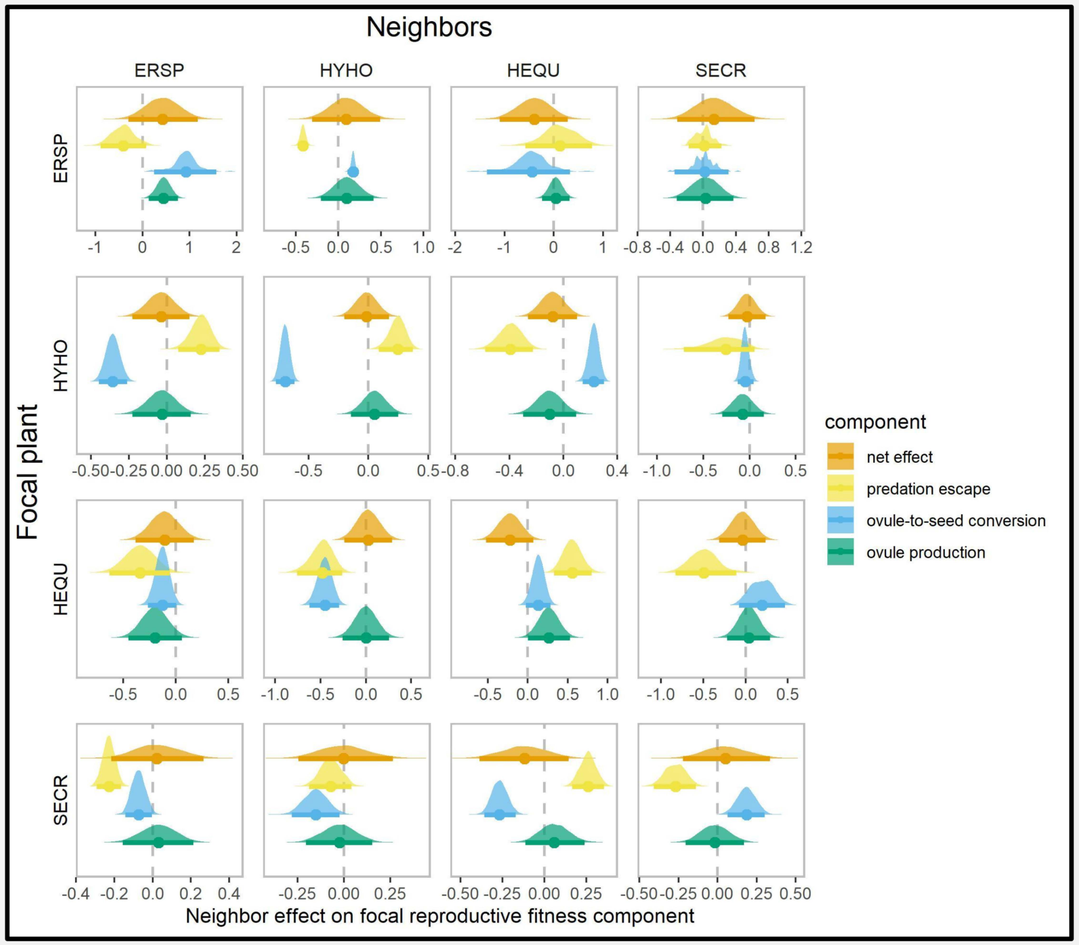
APPROACH: Perennial plant-pollinator-seed predator systems offer an opportunity to examine the relative role of each interaction mechanism in determining plant reproductive fitness



Results

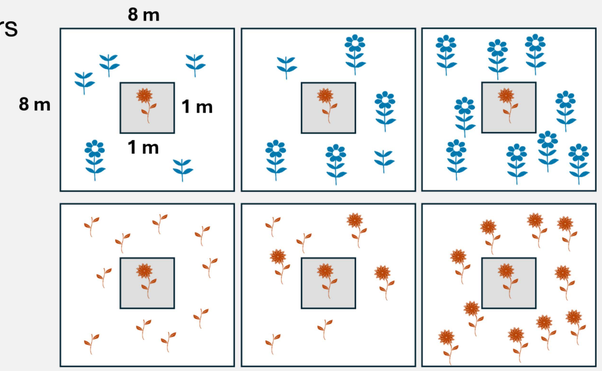
- **Resource competition**: little to no evidence of resource competition for most species pairs
  - ❖ No difference in model performance when neighborhood size is defined with 1 m, 0.5 m, or 0.25 m radii (below)
- **Insect-mediated interactions**: strong evidence for both facilitation (+) and competition (-)
- **Within vs. among species**: no clear patterns of facilitation within (right; diagonal plots) vs among (off-diagonal plots) species
- **Net effects on seed production**: none detected

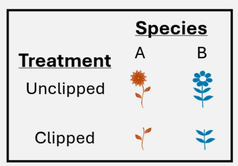




Methods

- **System**: 4 co-flowering asters with overlapping seed predator and pollinator communities
- **Observations**: ovule production of plants amidst varying density of con- and heterospecifics
- **Experiment**: clip 36 plots to cross floral density and species identity around "focal" individuals at plot centers (right)
- **Data**: # of ovules aborted, consumed, and mature/intact





Increasing neighbor density
Top: heterospecific
Bottom: conspecific

***Erigeron speciosus*, aspen fleabane**

***Senecio crassulus*, thickleaf ragwort**

***Helianthella quinquenervis*, fivenerve sunflower**

***Hymenoxys hoopesii*, Owl's claws**

References & photography

Conclusions

- **Core result**: contributions of insect-mediated interactions to overall effects on reproduction are negligible
- **Consequences for plant coexistence**: resource competition likely the main factor in determining plant coexistence, as its effects also fall on non-reproductive vital rates
- **Limitations**: experimental manipulation of plant density may have improved estimates of resource competition

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