

# Special Delivery!: Quantifying the Distance that Solitary Bee Genera Move Pollen in a Fragmented Prairie Plant Population



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# Habitat Loss and Fragmentation



- Old growth forest
- Prairie



# Consequences of Small Populations

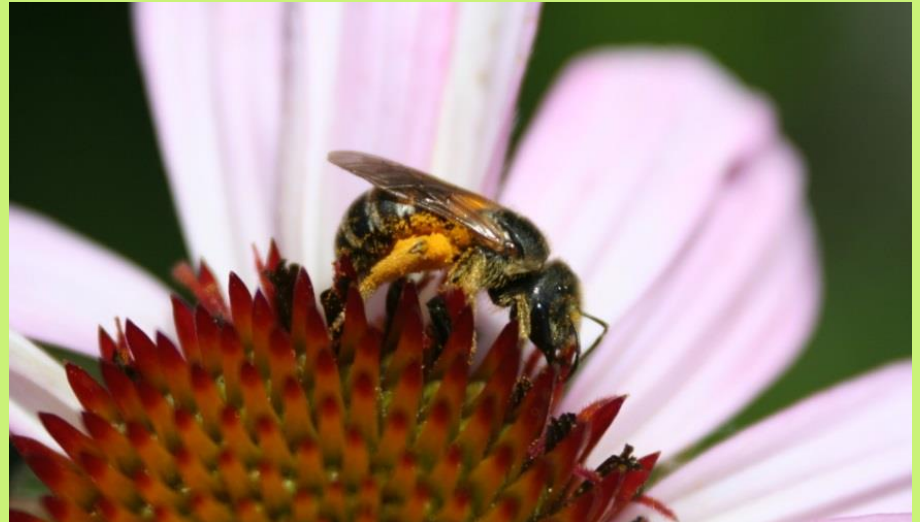


- More susceptible to genetic and demographic stochasticity
- Reduced genetic variation
- Increased inbreeding and inbreeding depression
- Allee effect
  - Mate limitation

# Pollination



- What makes a good pollinator?
  - Number of pollen grains transferred
    - ✦ Seed set
  - Number of pollen donors
  - Distance pollen grains move



# Research Questions



- Do different pollinator taxa move pollen grains different distances?
- Do different pollinator taxa carry pollen from a different number of pollen donors?



# *Echinacea angustifolia*

- Model plant
- Native prairie perennial
- Long-lived
- Self-incompatible
- Generalist insect pollinators



# Study Area: Western Minnesota



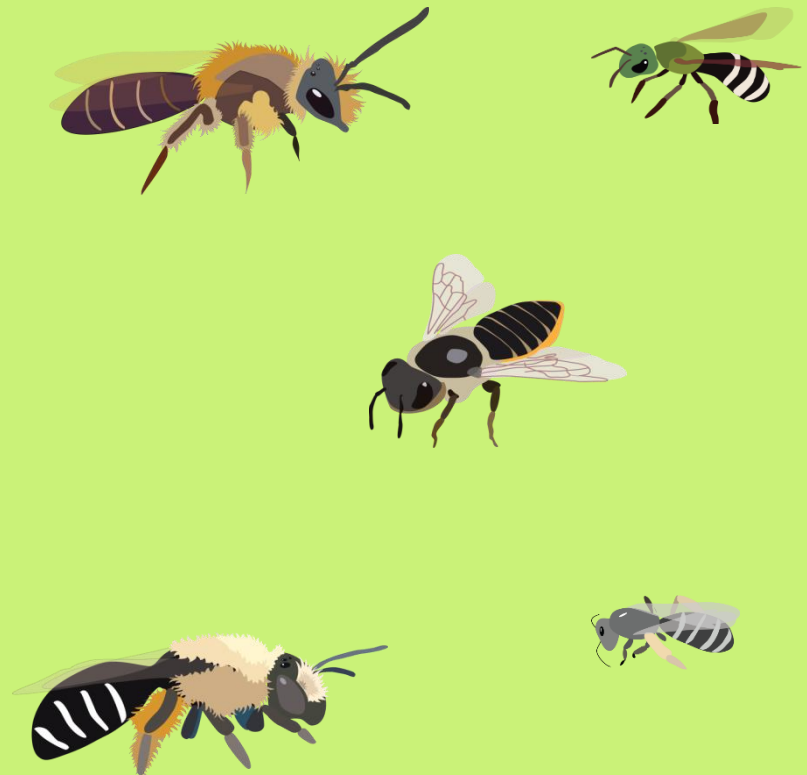
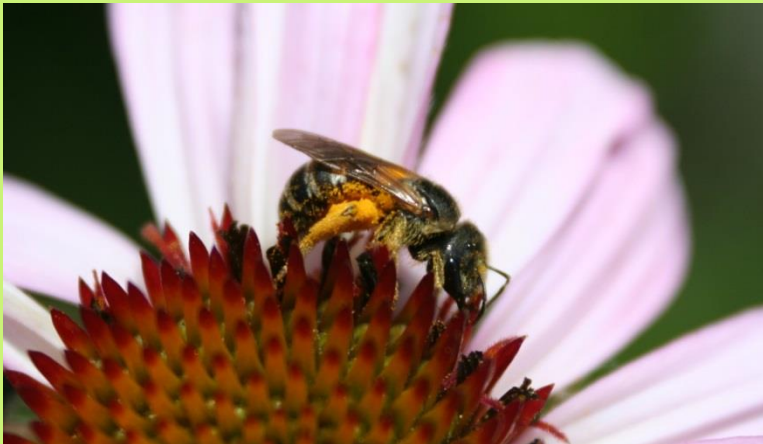
- Pre-settlement: tallgrass prairies and lakes
- Today: farmland, forested areas, and lakes
- Experimental plot





# Pollinator Community

- Solitary bees:
  - *Andrena* spp.
  - *Melissodes* spp.
  - *Agapostemon* spp.
  - *Augochlorella* spp.
  - Halictids





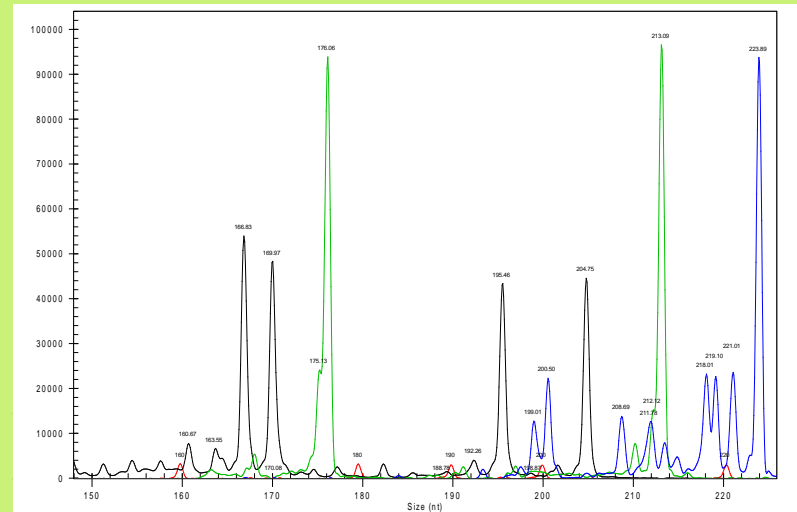
# Field Methods



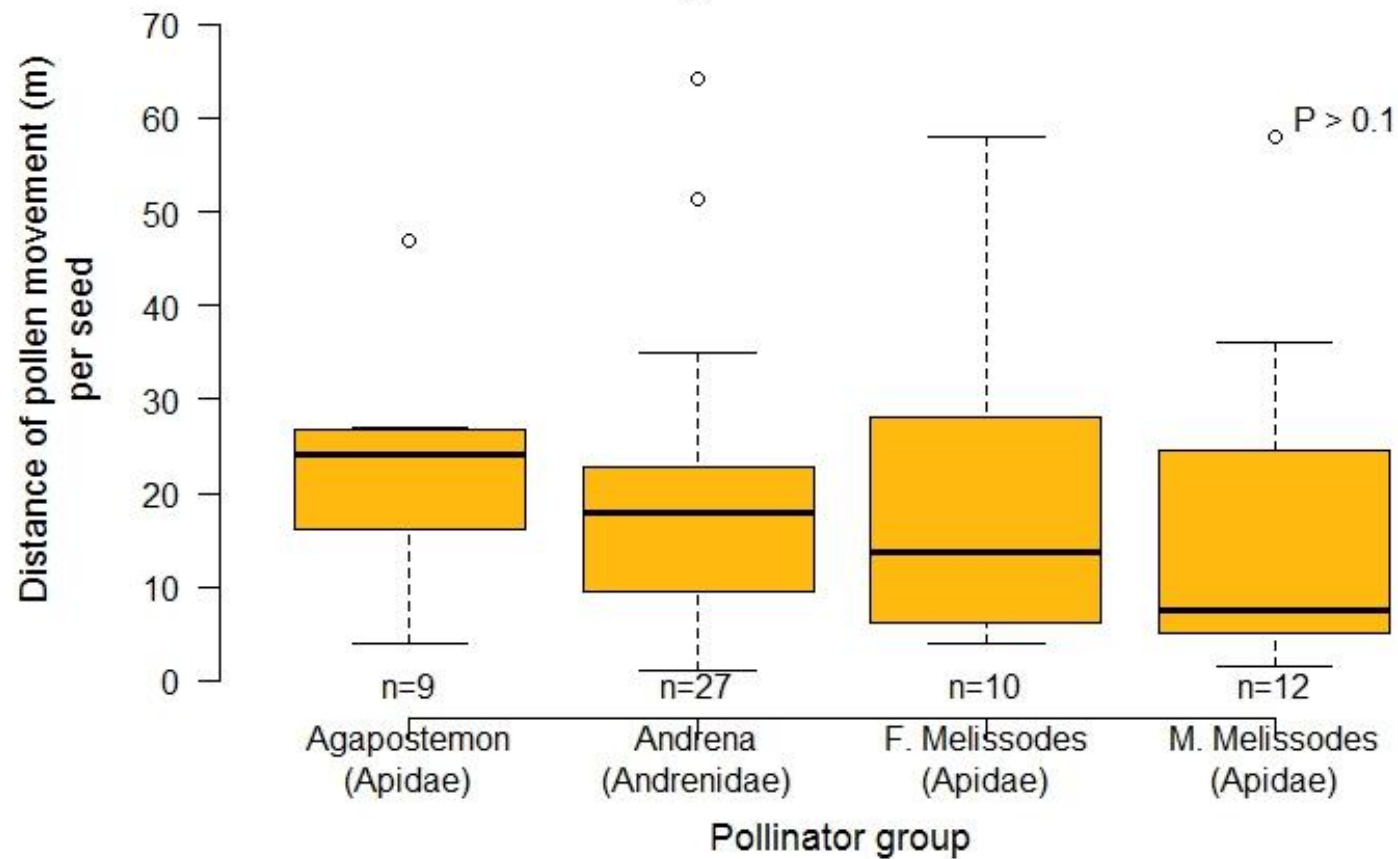
# Lab Methods



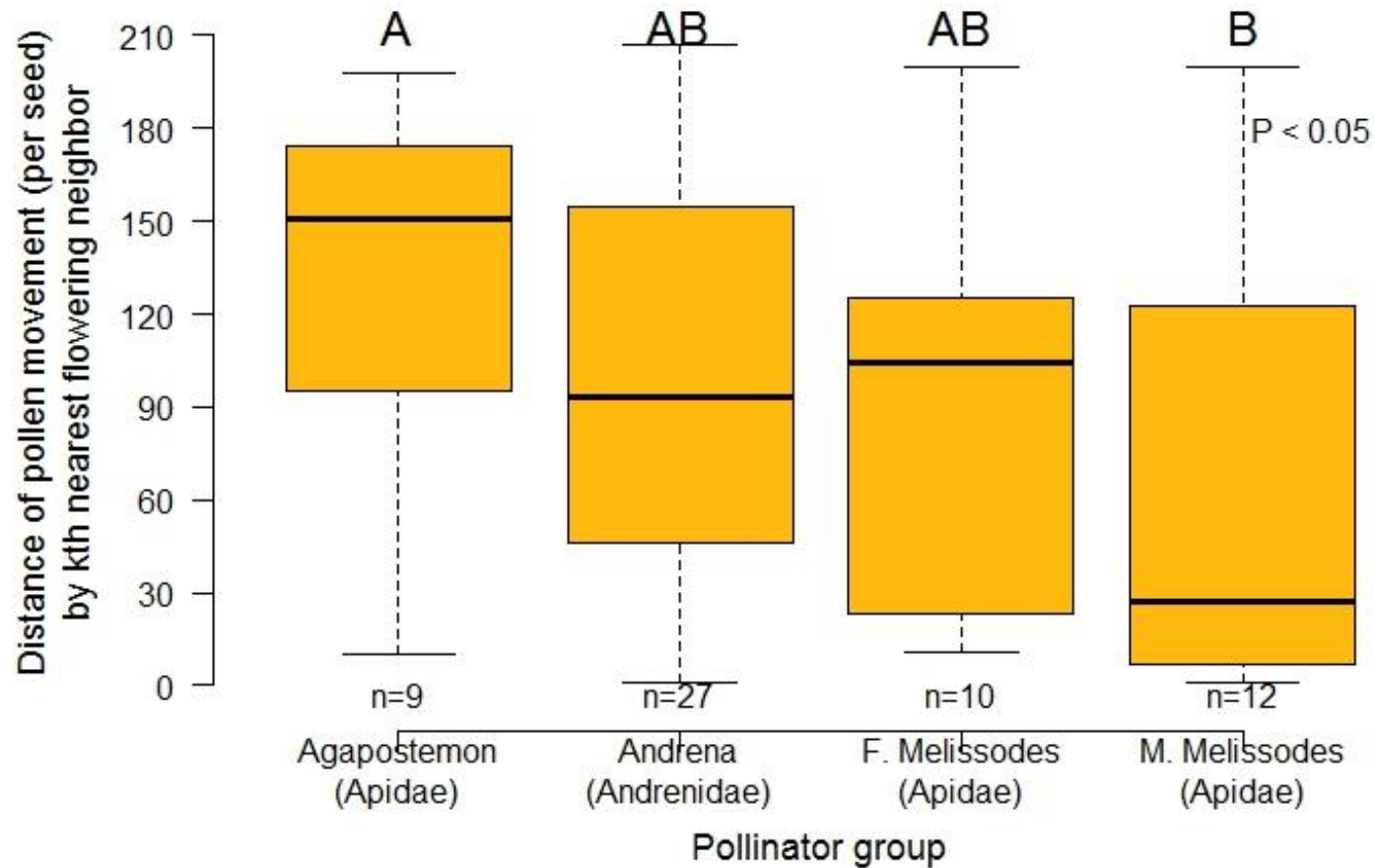
- 118 samples
  - DNA extraction
  - 11 microsatellite loci
  - Capillary electrophoresis
    - ✦ Fragment analysis
  - Paternity analysis



# Results: Absolute Distance



# Results: Distance to Nearest Neighbor



# Summary



- Fragmented habitats create small populations, which are at a greater risk of extinction.
- Native pollinator foraging habits are poorly understood.
  - Results: Different pollinators move pollen different distances.
  - Further research: More extensive pollinator surveys and observations.
- Conservation of the entire community, not just a single species, is vital to ensure ecosystem survival.



# Acknowledgments



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# Study Area: Experimental Plot

