More than Meets the Eye?

The Role of Annual Ornamental Plants in Supporting Pollinators

KEY FINDINGS

- **Ornamental annuals have long bloom times and can be crucial forage resources when native plants are not in bloom**
- **Ornamental annual cultivars are not as attractive as their native and wild counterparts**
- **All plants attracted at least 2 taxonomic groups of pollinators**
- **Floral display and visitor abundance are closely related**

INTRODUCTION: Pollinator populations are in decline, in part due to loss of foraging resources (Potts et al. 2010). Urban greenspaces can support pollinator populations and promote human well-being (Barton & Rogerson 2017); with annual ornamental plants commonly used in managed greenspaces. There is a rise in interest by home gardeners and landscaping professionals to provide pollinator habitat (Campbell et al. 2017). However, information on what to plant for pollinators is often inconsistent and unreliable. Additionally, few studies have described the interaction between ornamental plants and pollinators (Garbuzov et al. 2017; Garbuzov & Ratneiks 2015).

GOAL: To understand the potential of ornamental plants for supporting a complex pollinator community by evaluating their function in a semi-natural context.

METHODS:

- Selected 5 plant genera that were commercially significant and common in PA
  - *Marigold, Zinnia, Lobularia* (Sweet alyssum)*, Lantana,* & *Pentas* (Starcluster)

Tagetes Marigold | *Lobularia* Sweet alyssum | *Zinnia* | *Lantana* | *Pentas* Starcluster

METHODS CONT':

- 2 semi-natural field sites located in Central PA during the growing seasons of 2016 & 2017
    - Plots were arranged in block design with 1 of each cultivar per block & 4 block per plot
- 10-minute observations of pollinator visitations
    - weekly morning and afternoon sampling
    - July-September
    - Plants were observed in sets of 4
- Biweekly pollinator collections
- Weekly floral area measures

Top: Photo of one of the plots. All plants were potted so growth media was the same throughout the study

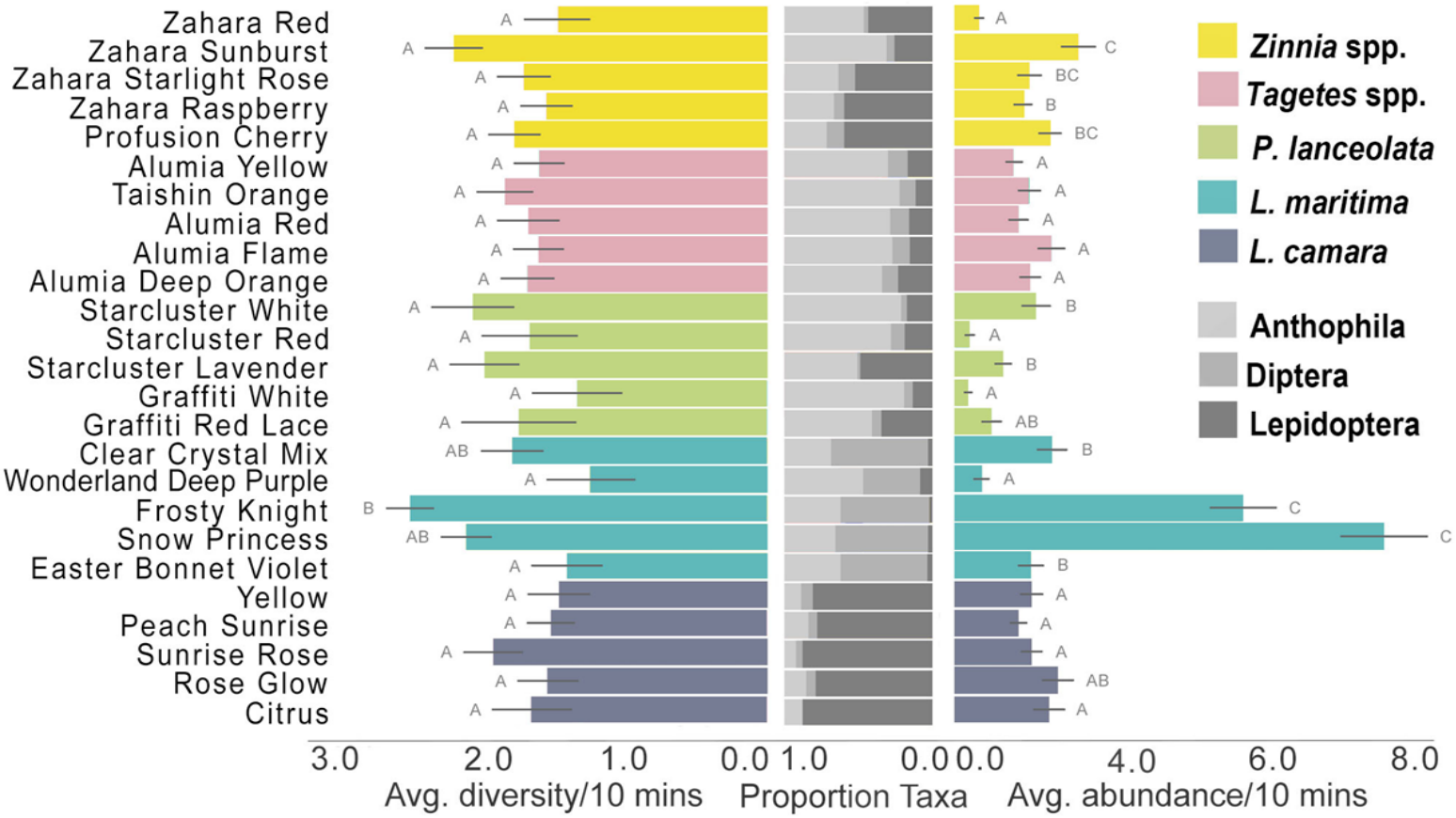
Bottom: A floral area measurement being taken. Research suggests floral display has a strong effect on the attractiveness of a plant to pollinators. Additionally, these area measures were used to standardize the statistical analysis.

RESULTS:

- In terms of average diversity and abundance, *Lobularia* exhibited highest variation among its cultivars, and *Lantana* exhibited the lowest variation among its cultivars
- Besides *Lobularia,* all cultivars in this study based on descriptive comparisons between this and similar research, the cultivars in this study were generally less attractive than many native or perennial plants
- All plants attracted at least 2 taxonomic groups of pollinators

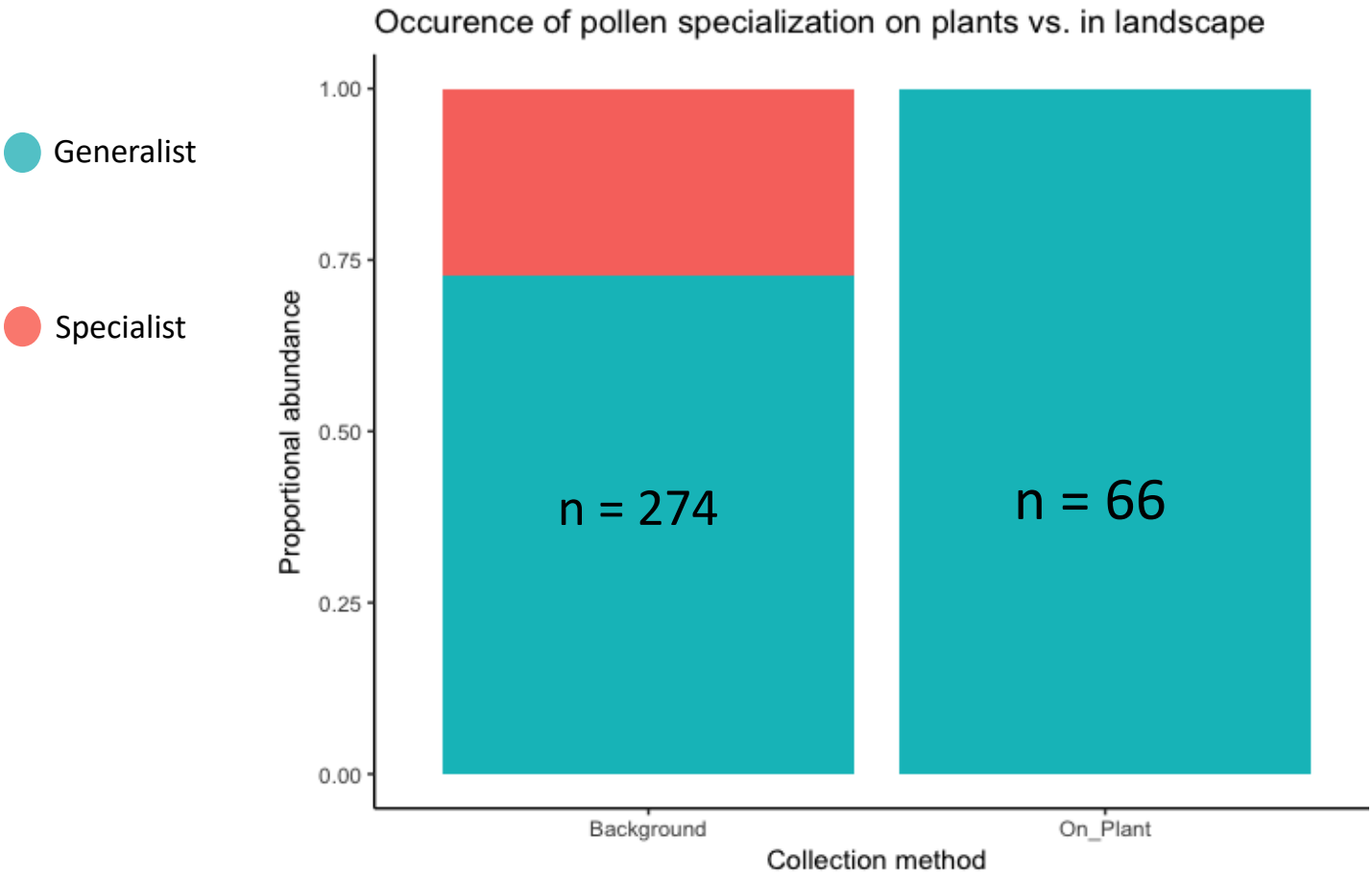
- There appeared to be a dominant pollinator for each of the 5 genera
- Background collections contained both specialist and generalist pollinators, but visitation pollinators appeared to be all generalists
- The plants in this study would play a limited role in supporting a complex pollinator community
- 18 of the 25 cultivars showed no significant variation between sites
- Floral display and visitor abundance are closely related
    - Ornamental plants have been bred for prolonged bloom times then their "natural" counterparts
    - Because of this, ornamental plants can be crucial forage for when native plants and perennials are not in bloom

VISITOR ABUNDANCE and DIVERSITY



***Above**: Estimated Marginal Means of total visiting pollinator abundance and the inverse Simpson's Diversity Index, and the proportional abundance of pollinator functional groups visiting observed cultivars. Different letters indicate means that a significantly different from each other within the genera. Light grey represents bees, medium grey flies, and dark grey butterflies.*

SPECIES IDENTIFICATION



Above: *Proportional abundance of generalist (forages on a wide range of plants) and specialist (forages on a few or one type of plant) bees. The left bar represents the background collections (traps set up along the perimeter and around the native vegetation) and the bar to the right represents bees collected on the cultivars via sweep netting.*

The 3 types of collection in this study: (left) bee bowls, (middle) blue vane trap. The colors used are attractive to bees.(right) A "bee vac", used to live specimens.

TAKEAWAYS & RECOMMENDATIONS:

- When possible, opt for native and perennial plants
- Select a diversity of plants with a range of bloom times so you can provide resources all season
- Avoid spraying pesticides, especially on flowering plants or peak times of pollinator activity
- Leave some bare ground in your garden and hold off on clearing stems and leaf litter until spring to create habitat for ground and stem nesting bees

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Erickson E, Adam S, Russo L, Wojcik V, Patch HM, Grozinger GM (2020). More than meets the eye? The role of annual ornamental flowers in supporting pollinators. *Environmental Entomology,* vol. 49(1), pp. 178-188. https://doi.org/10.1093/ee/nvz133

Photo Credits:
Darby B, Bryant R, Keller A…(2020). Molecular sequencing and morphological identification reveal similar patterns in native bee communities across public & private grasslands of eastern North Dakota. https://doi.org/10.1371/journal.pone.0227918

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