Building Better Homes For Pollinators: How Native Plants Benefit Pollinator Communities in Suburban Landscapes

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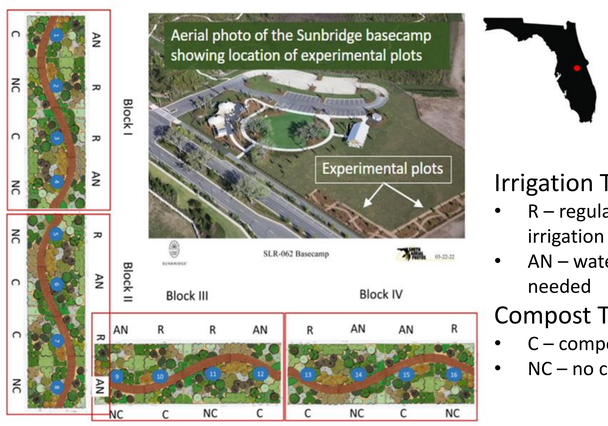
Introduction

- One third of our global food production is dependent upon polliantors[5]
- Bees, one of the most effective and widespread pollinators, are currently in decline[1,3]
- This decline is often linked to habitat loss caused by anthropogenic land-use change and a decrease in the native plants bees rely on[1, 4]
- Many people are turning to urban areas as a potential source for pollinator habitat and conservation[2]
- There are still many questions about how to properly establish pollinator habitats in suburban areas including decisions about plant selection and management

Research Questions

1. What combination of management actions (irrigation and soil treatments) support the highest abundance of pollinators in native-based landscapes?
2. Which species of plants attracts the greatest abundance of pollinators?

Methods



Irrigation Treatments:
- R – regular, weekly irrigation
- AN – watering as needed

Compost Treatments:
- C – compost added
- NC – no compost added

Figure 1. Aerial view of experimental plots. Surrounding diagram shows layout of the 16 randomized and replicated plots.

- 27 native plant species established in each plot
- Pollinator and floral abundance was assessed seasonally from June 2022 to September 2023 (spring, summer, fall)
- Pollinators were assessed visually by recording each pollinator on each flower species in each plot
- Floral sampling was conducted in tandem, by recording all open flowers for each species

Results

- 4,068 individual pollinators were recorded, including 157 species from 48 families.
- Bees and wasps were the most abundant groups of pollinators
- The best model for predicting pollinator abundance included: irrigation, compost, block, flower species, flower abundance, and the random effects of season and year
- Irrigation did not have a significant impact on floral abundance or overall pollinator abundance but negatively impacted bees and wasps (p=0.031)
- Compost had a significantly positive impact on both pollinator and floral abundance (Figures 2 and 3)

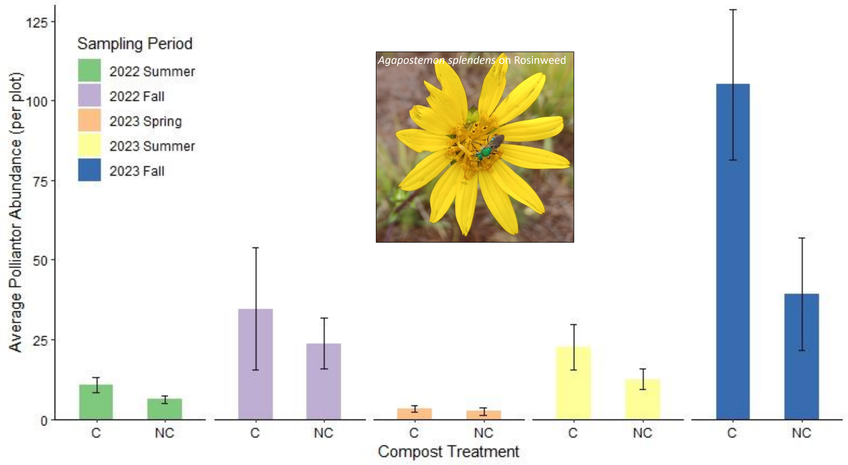


Figure 2. Compost effect on average pollinator abundance per plot. Compost treatments are C: compost added or NC: no compost. Compost had a significantly positive effect on overall pollinator abundance (p=0.015). Error bars represent a 95% confidence interval.

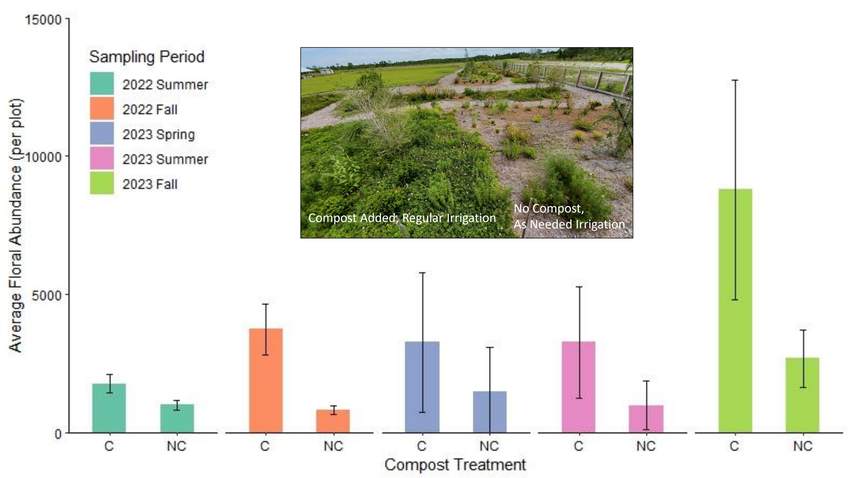


Figure 3. Compost effect on average floral abundance per plot. Compost treatments are C: compost added or NC: no compost. Compost had a significantly positive effect on overall floral abundance (p < 2e-16). Error bars represent a 95% confidence interval.

Results

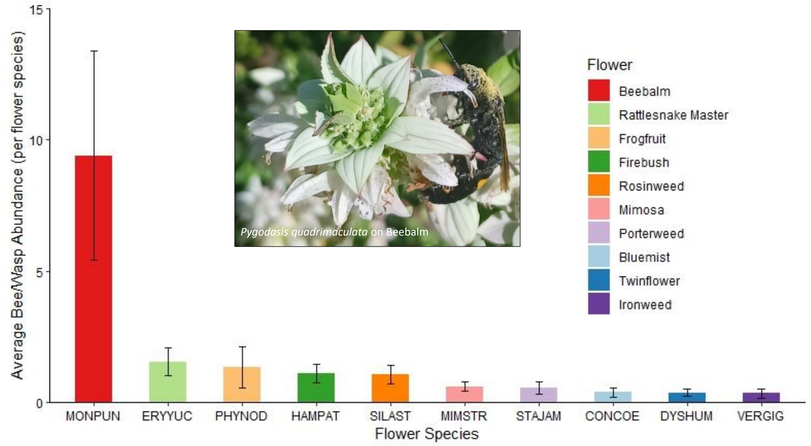


Figure 4. The top ten pollinator plants based on average bee and wasp abundance. Flower species had a significant impact on pollinator abundance (p=0.003). Error bars represent a 95% confidence interval.

Discussion

- Native plants produce just as many flowers and attract just as many pollinators with minimal irrigation and are a good choice for water conservation.
- The addition of compost increases both floral and pollinator abundance, so it is a good management practice for designing and establishing suburban landscapes with native plants.
- Beebalm (*Monarda punctata*) attracted the greatest number of pollinators and mainly blooms in the fall. Including multiple native plant species supports a more diverse pollinator

Acknowledgements

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