Indirect Effects of Compost on Pollinators in Suburban Native Plant Landscapes

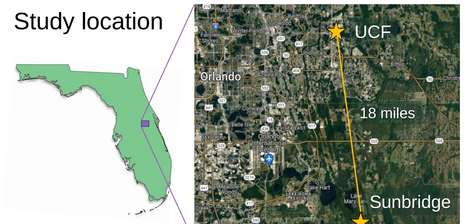
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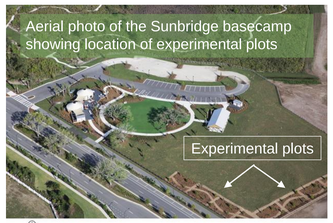
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Introduction

- Bees, wasps and other pollinators are critical for plant reproduction and for evaluating biodiversity and natural resource conservation in urban environments.
- Pollinator species respond differently to different landscape designs.
- Sustainable landscape design involves greater use of native plants, many of which directly benefit native pollinator species.
- Preexisting soil conditions can have a negative influence on native plants, which do not always perform well in urban soils.
- Soil amendments like compost addition may improve plant performance, but little is known about how the effects of compost on native plants might affect their associated pollinators.
- The Sunbridge Development District has established an experimental site to assess the effects of water and soil treatments on native plants and the associated ecological communities.

Study location





Objective

- Our research explores how compost addition influences flower abundance and pollinators in suburban native plant landscapes.

Results

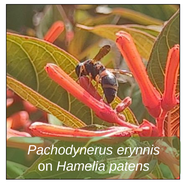




Table 1: Bees and wasps had the greatest species diversity followed by butterflies, flies and beetles.

Pollinator Categories	Number of Species
Bee	17
Wasp	15
Butterfly	7
Fly	4
Beetle	2
Grand Total	45





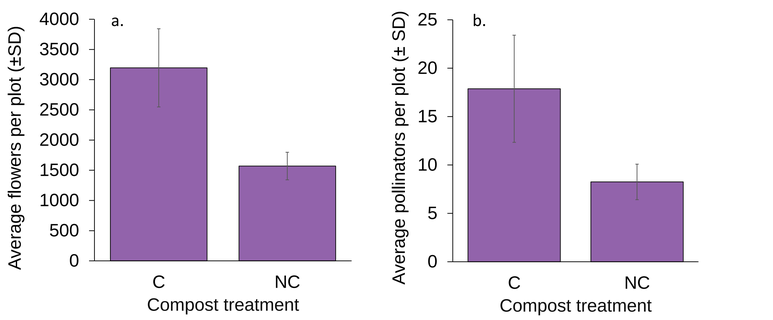


Fig. 2a,b: Plots with compost (C) had nearly twice as many total flowers (a) and pollinators (b) as plots without compost (NC).

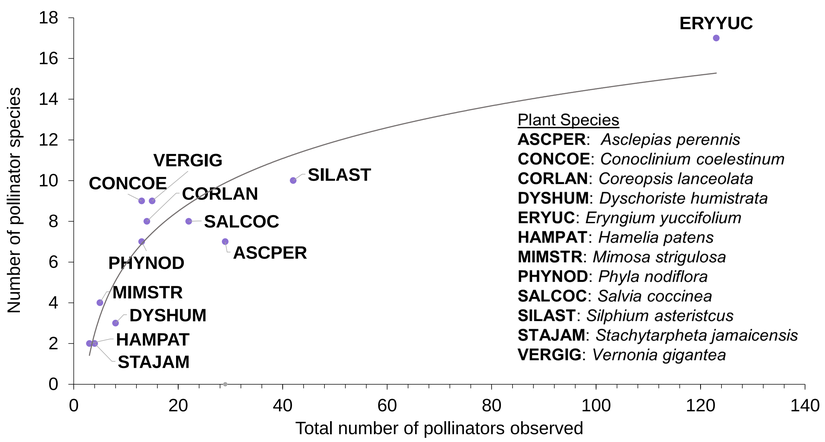


Fig. 1: Pollinator abundance on specific flowers was related positively to pollinator diversity on those flowers.

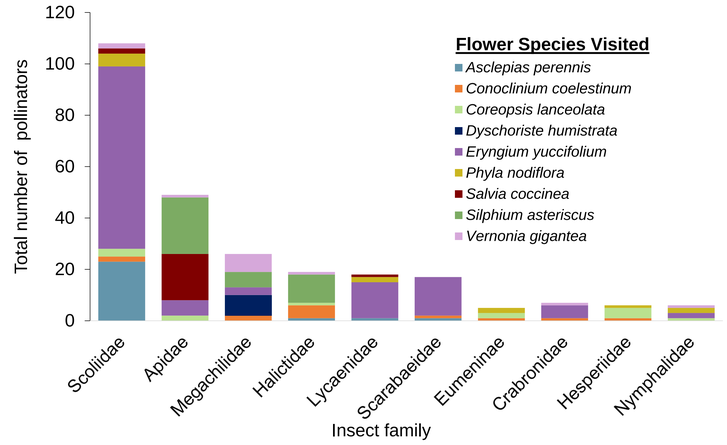
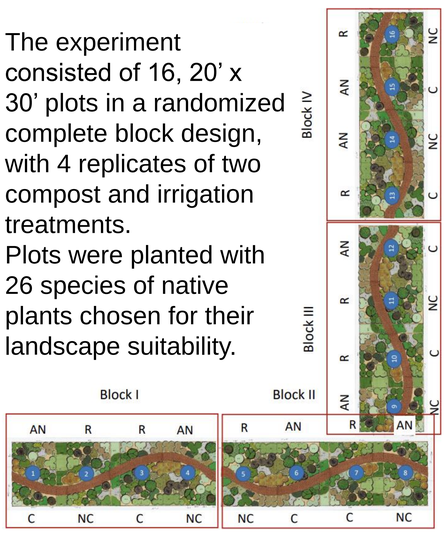


Fig. 3: The most abundant pollinators belonged to a limited number of families, and families differed in the flowers they visited.

Methods

- The experiment consisted of 16, 20’ x 30’ plots in a randomized complete block design, with 4 replicates of two compost and irrigation treatments.
- Plots were planted with 26 species of native plants chosen for their landscape suitability.



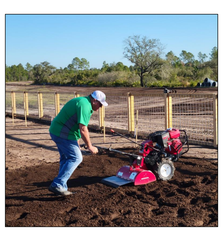
- The compost treatment involved incorporating 4 cubic yards per 1000 ft^2 of LifeSoils COMAND® compost into the soil prior to planting. Irrigation treatments were not yet implemented.

Compost treatments
C: with compost
NC: no compost

Irrigation treatments
AN: irrigate as needed
R: regular irrigation









- Counted total number of flowers per plot of the 15 plant species flowering in June 2022.
- Counted pollinators on all flowers visually and captured unknown species to return to lab for identification.
- Analyzed compost effects on total flowers and pollinators, and flower-pollinator interactions.

Discussion

- Results show that soil conditions can have a large indirect impact on the pollinators, mediated largely by increases in flower number. We did not assess the possibility that compost may have increased flower quality.
- Our results are limited to a single sampling period in June. A longer-term study would be needed to account for different bloom periods, and differences in total annual pollinator abundance and diversity.
- More research on site factors that influence native plants and their associated pollinator communities could help strengthen sustainable landscape design guidelines.

Acknowledgements

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