Using citizen science to test how urban greenspaces can support thriving plant-pollinator communities

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Introduction

- Urbanization is reshaping landscapes, with uncertain effects on pollinators in cities.
- Understanding how greenspace attributes influence pollinator diversity can inform urban management strategies.
- iNaturalist provides a large, accessible database of both pollinator and angiosperm observations that has the potential for more efficient data collection than traditional methods.

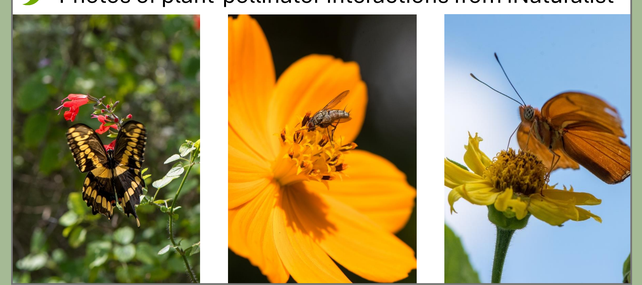
Objectives:

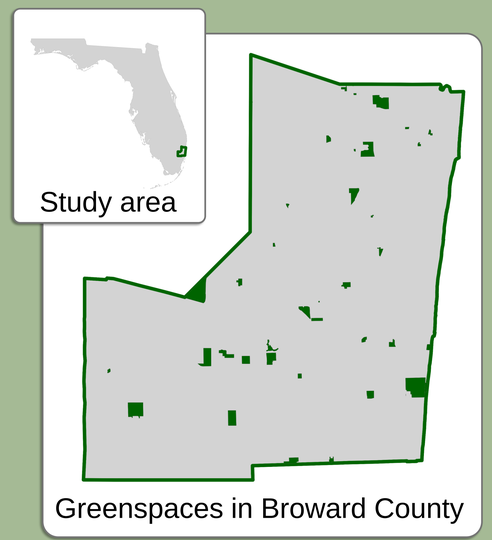
1. **Understand how greenspace attributes, including the proportion of native and non-native angiosperms, influences pollinator and plant diversity in urban greenspaces**
2. **Quantify the number of pollinator species observed interacting with specific plant species**

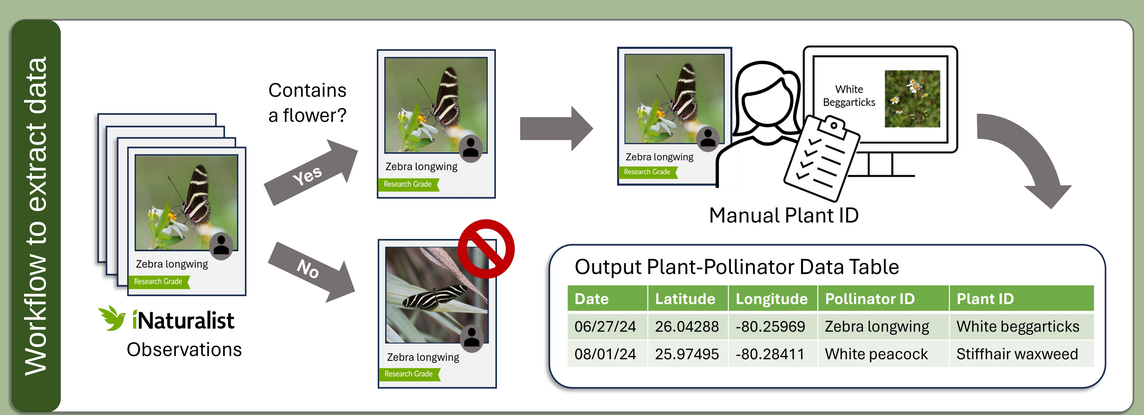
Methods

- Downloaded iNaturalist data via GBIF from 39 urban greenspaces in Broward County, Florida
- Downloaded raster data via Google Earth Engine on impervious cover, non-tree vegetation cover, and water cover, and calculated park size of each greenspace.

Photos of plant-pollinator interactions from iNaturalist







Results

- The angiosperm species that are visited by the greatest variety of pollinators are *Bidens alba, Richardia grandiflora, and Spermacoce verticillata.*
- Flowering plant diversity, urban greenspace area, and the extent of water features and impervious surfaces predict pollinator diversity.
- Pollinators may be adapting to non-native species diversity in urban greenspaces, highlighting the complexity of these novel ecosystems.

2,608 Images investigated | **61% had a flower** | **1,435 total interactions**

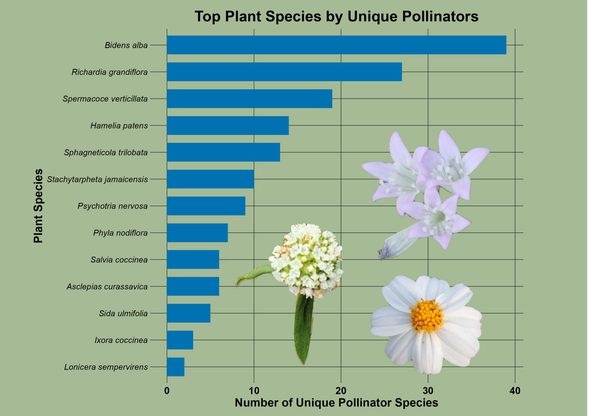


Figure 1. Top Plant Species by Unique Pollinators Bar chart showing the number of unique pollinator species observed on each of the top 13 most-visited flowering plant species.

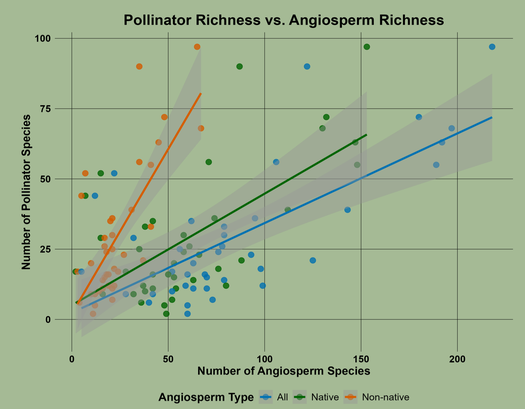


Figure 2. Pollinator Richness vs. Angiosperm Richness Scatterplot comparing pollinator species richness with richness of native, non-native, and total angiosperm species across parks. Each point represents a park.

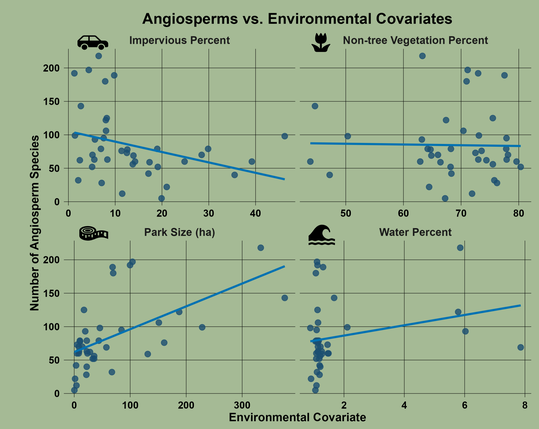


Figure 3. Angiosperms vs. Environmental Covariates Scatterplots show the relationship between the number of angiosperm species observed in each park and environmental covariates including impervious cover, non-tree vegetation cover, park size, and water cover.

Management Implications

To increase pollinator diversity:

- Even common plant species can support a wide variety of pollinators.
- Minimize impervious cover and increase water features and park area.
- Park managers can use iNaturalist and similar platforms to monitor pollinator–plant interactions, inform adaptive management, and foster community engagement in conservation.

Discussion

- iNaturalist images provide reliable data on plant-pollinator interactions, allowing us to document plants with the highest number of unique pollinator species visits.
- Our results highlight the utility of citizen science data in understanding the effects of urbanization on pollinator communities.
- More work in the future can allow for continued use of iNaturalist data in other settings.