



Local and landscape factors affecting biodiversity in urban community gardens in Seattle

Heidi Liere¹, Sanya Cowal¹, Emily Nguyen¹, and Caroline Grandia²
¹Environmental Studies and ²Biology Departments, Seattle University



College of Arts and Sciences

Abstract

Beneficial insects provide important ecosystem services for food production, like pollination and natural pest control. We surveyed natural enemies (predatory and parasitic insects that consume crop pests) in community gardens in the city of Seattle. We assessed how the local garden features interact with the surrounding green spaces to allow these beneficial organisms to occupy and persist in these habitats. Our findings could contribute to mitigate urban biodiversity loss and improve human well-being.

Introduction

The **purpose of my research** project is to investigate how garden management practices and landscape context affect beneficial arthropods in urban community gardens.

Understanding **this is significant because**, despite the overall detrimental effects of urbanization to biodiversity, there is a growing recognition of the **potential value of cities** and their various green spaces ¹ for **biodiversity conservation**, especially for small organisms².

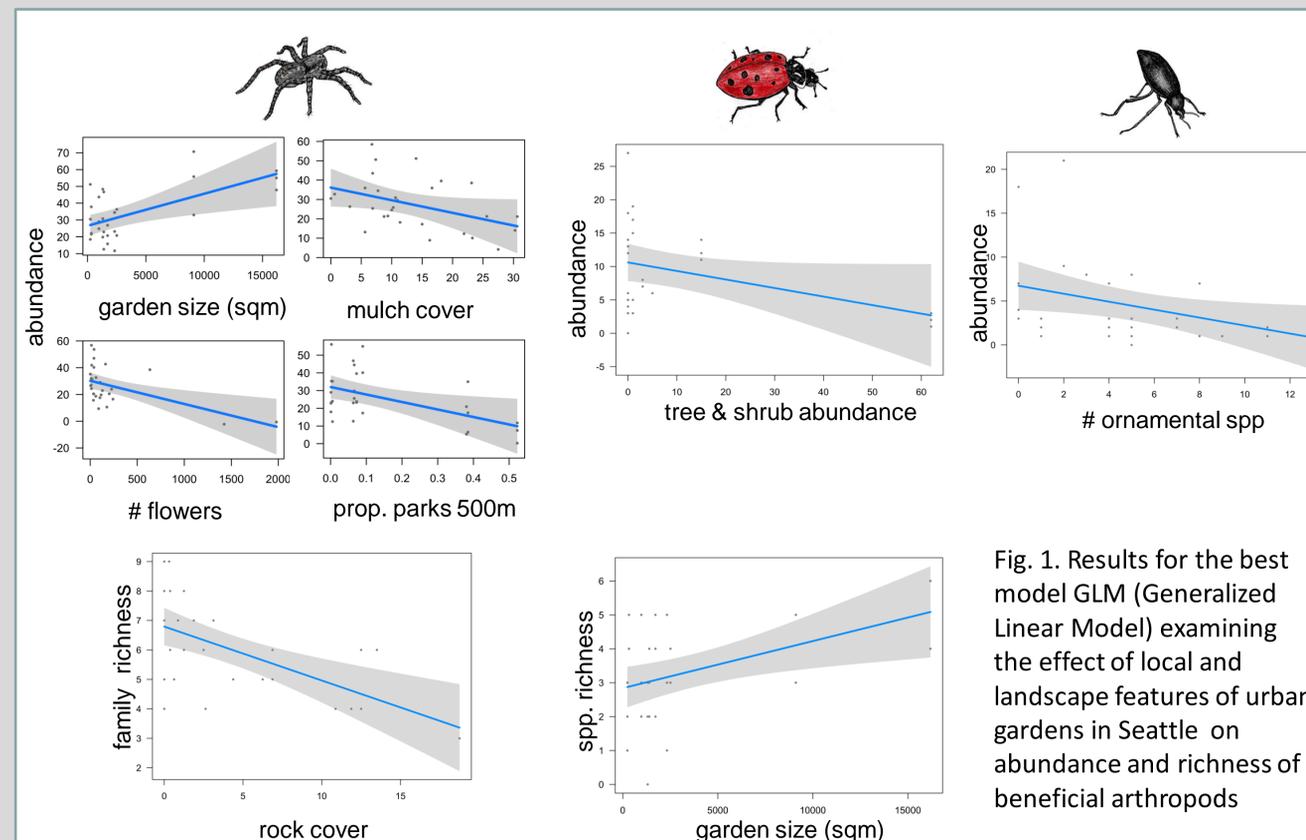
Farm and community garden management practices, such as planting hedgerows of nectar-rich plants or setting aside beetle refuges, can directly or indirectly benefit both pollinators and pest control agents ³.

Even so, due to limited size, relative isolation from natural areas, and constant disturbances, small-scale urban agricultural systems **may not be able to sustain** the necessary biodiversity to fulfill their pollination and pest control needs.

Thus it is important to also investigate whether the maintenance of biodiversity in these habitats **depends on the quality of the surrounding landscape**.

Results

- Groundbeetles (Coleoptera: Carabidae, Staphylinidae): 127 individuals
- Ladybeetles (Coleoptera: Coccinellidae): 276 individuals from 13 species
- Spiders (Arachnida and Opiliones): 743 individuals from 12 Families



Conclusion

These preliminary analyses show that beneficial arthropods respond to both local garden management features and landscape context.

Some of the trends found here contrast with those expected from rural agricultural systems.

Methods/Experimental design

Study site

10 community gardens in Seattle
 Gardens varied in local and landscape composition



Independent variables

Local: ground cover and vegetation variables
 Landscape: prop. of area (in 500m buffers) covered by city-managed parks



Arthropod surveys

3 sampling rounds (June, July, August) 2019
 3 sampling methods (visual, sticky traps, pitfall traps)



Data analysis

Eliminated collinear variables
 GLM to test the effect of local and landscape variables ⁴



For each dependent variable, we tested all combinations of the selected explanatory variables (with the 'glmulti' package in R⁵) and selected the top model based on the AICc

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