

# Effects of Urban Land Use on Pollinator-Insect Community Structure

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## Introduction

The Sonoran Desert has one of the most diverse insect communities in the world, particularly in terms of insects that pollinate flowering plants. This community may be threatened by habitat alteration in the form of urban development. We are currently conducting a study to examine how the pollinator community differs under different forms of urban land use in the Phoenix metropolitan area. A reduction in the number of pollinating insects would translate into diminished plant reproduction, which would in turn affect not only the plants but also herbivorous animals, predators of the herbivores, and so on in a trophic cascade. Thus, conservation of "keystone" species such as pollinators is important in preserving overall biodiversity.

## Research Questions

We are addressing three questions:

- 1. How does the ratio of native species to the exotic honeybee differ among natural desert, urban desert remnants, and residential areas that also have flowering plants?
- 2. How does insect pollinator community structure (richness, composition, and abundance) differ among natural desert, urban desert remnants, and residential areas?
- 3. How does insect pollinator community structure differ with different residential horticultural practices (xeriscaping with native plants vs. watered lawns with exotic plants)?

## Methods

We are doing the following analyses:

- comparing pollinator richness, composition, and diversity among 4 types of urban land use

Boundaries of Phoenix metropolitan area

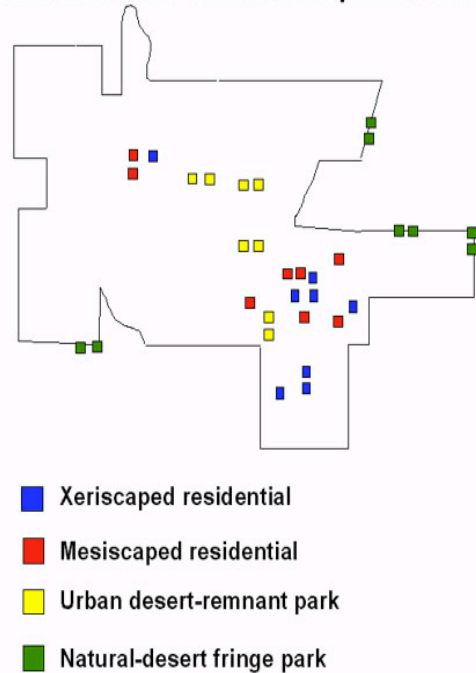


Figure 1. Sites where pollinator-insects are being sampled.



Figure 2. The honeybee (*Apis mellifera*) is an

- assessing the importance of various aspects of vegetation at 2 spatial scales (2m, 20m) in each of the 4 land-use types

We are sampling pollinators at 32 locations throughout the Phoenix metropolitan area (Fig. 1)

We are sampling in 4 types of urban land use:

- xeriscaped residential yards (8 sites)
- mesiscaped residential yards (8 sites)
- urban desert remnant parks (8 sites)
- desert parks on fringe of metro area (8 sites)

We are using water traps to collect pollinators:

- 4 water traps per sampling location
- 2 sampling periods (Sept. 1998 & April 1999)
- all arthropods are being identified to order, Hymenoptera to species

exotic species that may out-compete native Sonoran Desert pollinators for floral resources.

## Initial Results

The pollinator community of the Phoenix metropolitan area is diverse. Some taxa are particularly abundant (especially Halictidae, Apidae, and Buprestidae).

The honeybee was not as widespread or abundant as initially anticipated. No honeybees were found in any of the samples we collected in September 1998.

## Future Plans

We will sample pollinator insects again at the same sampling locations in April 1999 during the spring bloom.

After all field samples have been collected and sorted, specialists will be consulted for taxonomic verification of morphospecies.

We will then examine whether certain habitat features are good indicators of the presence and abundance of pollinators.

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Figure 3. Approximately every third bite of food that you take comes from a plant that was pollinated by insects.

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