



# Urban Insect Biodiversity – Effects of Native Landscaping

Caedmon Morgret and Dr. David Warners  
Calvin University, Grand Rapids, MI



## Introduction

Urban development comes with the cost of destroyed natural habitats. Urban infrastructure flattens entire ecosystems, replacing them with impervious, life-inhibiting constructions.

Alleviating the impacts of urbanization is possible. Green infrastructure mitigates habitat loss by restoring native habitats within urbanized areas. One benefit of green infrastructure is the reestablishment of biodiversity, benefitting plants, animals, and insects alike. Biodiversity creates a healthier habitat and location than urban infrastructure – and lack of biodiversity – does.

To investigate this benefit we performed a **pilot study**, sampling lawns and curb-cut raingardens (CCRGs). We compared biodiversity between restored and unrestored urban habitats.

## Objectives

- Determine if insect biodiversity is greater in restored CCRGs than in unrestored lawn.
- Establish a foundational dataset for ongoing research during the next several years.



**Figure 1:** Image of a CCRG environment – native plants and flowers are abundant

## Methods

### Survey Locations

Survey sites were selected with the following criteria:

- Had to be full sun, minimal shading.
- Any trees present must be young.
- Must be at least three years old (planted 2019 or older).
- Must be of a similar size.



**Figure 2:** Map of survey locations in SE Grand Rapids, MI

### Methods

We collected data in sunny weather and on the same day to reduce confounding variables. Our collection methods are as follows:

- Brush the tops of all plants with bug net in sweeping, back and forth motion.
- Collect data from CCRG and adjacent unrestored tree lawn at the same time.

We also recorded a variety of location attributes to account for potential influences:

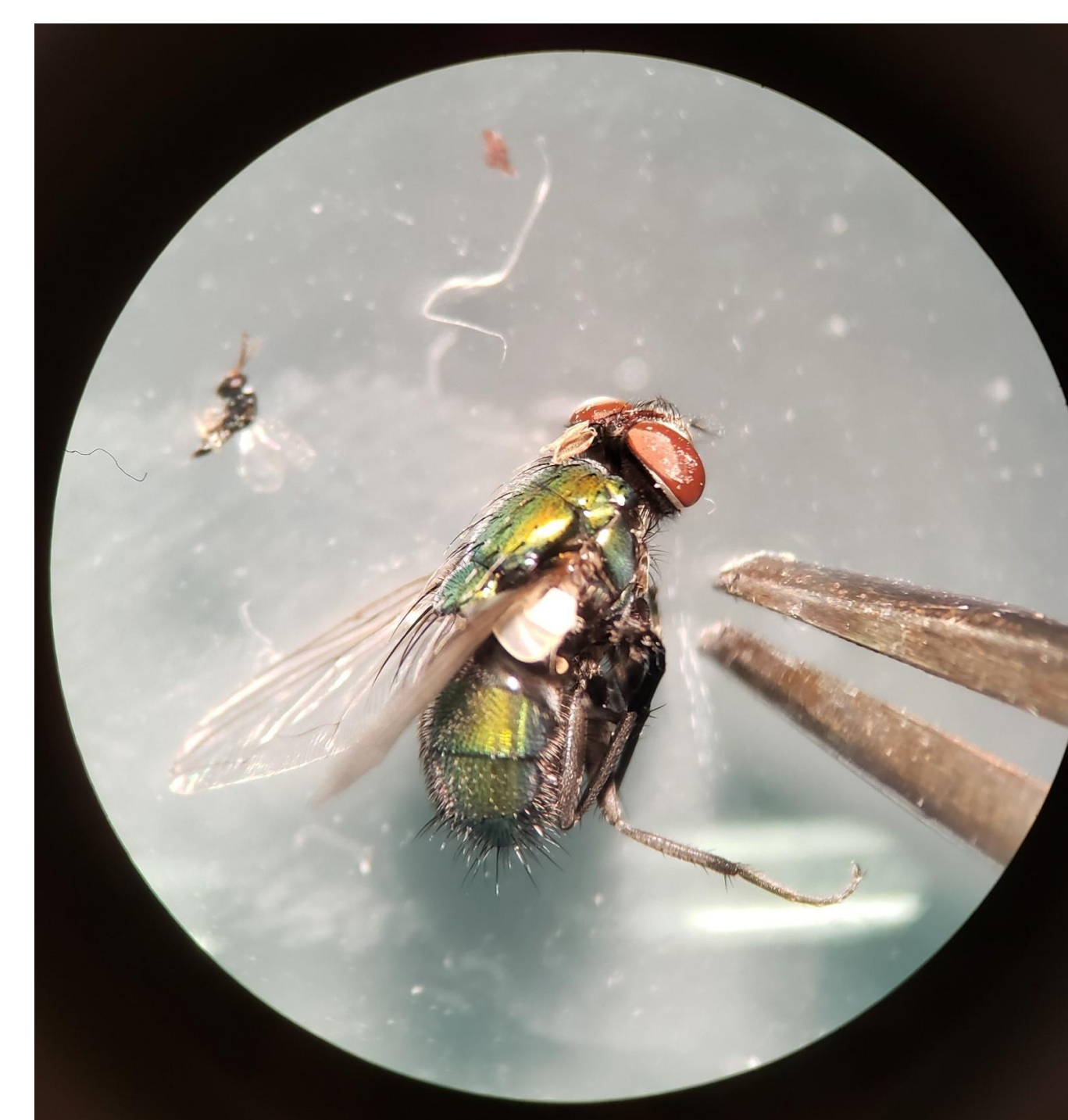
- Blooming species.
- Weather (Temperature, Wind speed, Humidity).
- Native/Nonnative plant ratio.
- Environment (Busyness of street, Neighborhood type, Front yard environment, Estimated % **impervious surface**).

### Insect Identification

- Identification was facilitated by the use of dissection microscopes.
- Insects were identified up to the order they belonged in.
- Insect data were tallied and input into an Excel document for later analysis.



**Figure 3:** Image of insects in a petri dish under a dissecting microscope



**Figure 4:** Microscope image of CCRG sample insect in the order Diptera (True Flies)

## Results

### Comparative Insect Biodiversity

- On average, the lawns contained **5 unique insect orders**, while the CCRGs contained 4 unique insect orders.
- We noticed that the lawn contained, on average, a higher number of insects (~244) per site than the CCRGs (~57).
- We did observe that insects in the lawns were mostly small black flies in the order Diptera.
  - Indicating **lower taxonomic evenness** within the lawns than the CCRGs.

## Future Plans

- Due to the resolution used (highest taxon – Order), our results aren't adequately indicative of the actual diversity present.
- Acquiring a **finer resolution** (Family, Genus) in future studies could provide more insight into actual diversity levels.
- This year was the first for data collection.
- The outlined methods and results are more preliminary than in future studies.
- Effort will be made to improve identification resolution and clarify the results for future studies.
- This study occurred once during the summer, in the future taking multiple samples throughout the summer could be helpful.

## Acknowledgements

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- 'Figure 1' taken from <https://calvin.edu/plaster-creek-stewards/restoration/rainscaping/>.