

## Title: “Insectageddon”

- Authors: Martin Murphy, Jack Dunn, Eden Leder, Brian Heidbreder
- Course: Environmental Pollution (CAE 240)
- Institution: University of Miami

### Introduction

The University of Miami is quite unique amongst many of the country’s top universities due to the nature oriented aesthetic of the campus. Our team hopes to add to this campus aesthetic by constructing a new garden, similar to the arboretum, to hopefully encourage the recruitment of various different insect species such as butterflies and dragonflies, to name a few. We hope that constructing a new garden with various insect attracting plants and herbs will lead to a more diverse and healthy ecosystem on the Coral Gables campus, while also acting as a food source through the various herbs that will be planted. The UN SDG’s that most closely align with this project’s goals are “Sustainable Cities and Communities” and “Life on Land.” Both of these sustainable development goals address topics involving preservation of terrestrial lands and general sustainability for long term growth. The creation of a new garden on the Coral Gables campus would elevate the university’s level of sustainability through the introduction of various diverse insect species that would enrich the ecosystem through the creation of new ecological relationships.

### Project Rationale

The reason for this project is to recruit a diverse population of insects that will benefit the University of Miami and broader Miami community. Diverse species of insects encourage pollination, which can help maintain plant populations and habitats for other small animals. In addition, diverse insect populations help with the biological control of certain parasites, weeds, and other pests that harm plants. Another benefit of this project is the use of plants native to Florida, such as the purple passion flower. Native plants reduce water consumption and won’t require pesticides or fertilizers. Finally, herbs from the garden can be used for food related services on campus.

### Scope

The project is targeting students and faculty of University of Miami, as well as those in the immediate surrounding area of Coral Gables. The stakeholders of the project are the project developers, university students, university faculty, and residents of Coral Gables. We plan to build the garden in close proximity to the Knight Physics Building because of the building’s close proximity to the preexisting University arboretum. We believe that the corner of campus by

the Physics building can act as an escape for students to immerse themselves in peaceful and natural spaces. The timeline of the project is approximately one year. A year gives the plants plenty of time to grow into mature adults, and insect populations tend to grow from generation to generation significantly faster than any common mammal does. Our team of 4 members will be sufficient to implement the project as we have it planned now.

## Research

One of the three main plants that we plan to incorporate into our garden, the Purple Passion Flower, is actually native to the area. Mint and thyme, on the other hand, are not native to the area. The fact that the passion flower is native will help reduce the financial and physical costs due to the fact that it requires less attention to grow and thrive. The herbs will take more care and effort to ensure the success of the crop. Some examples of native flora in Florida are the blanket flower, the coral bean, and coral honeysuckle to name a few. Examples of native fauna include the Florida panther, bobcats, American alligator, and pythons etc. In terms of an energy budget estimate for the duration of a year, it would most likely be a couple hundred or even a thousand kilowatt hours of electricity. This is simply a rough estimate, and is subject to change if given the opportunity to actually implement this project. The amount of water used annually, on the other hand, would be significantly higher than the amount of electricity. Roughly speaking, the project would most likely require around 1500 gallons of water per year. Similarly to the energy consumption, it could turn out to be a lot less than we imagined. The gallons of water used would be dependent on how much rainfall is received throughout the year. With sufficient rainfall throughout the course of the year, the passion flower should be able to survive. In the dry season, the passionflower may need to be watered about once a week until the ground is saturated. The surrounding environment, including the plants around the newly implemented flora should experience an increase in biomass. The new plants will attract butterflies who can help to pollinate. The butterflies in turn will attract birds who prey on them, furthering the cycle of fertilization and the spread of seeds from around the garden.

The passion flower, once planted and sprouted, is a climbing vine, which can attach to a substrate and continue its growth. The passionflower can be placed on the east side of the current sustainability garden. To encourage a continuous look for the arboretum, some natural wood trellis can be built to allow for the passionflower to climb. This area of the arboretum is slightly lower than the surrounding areas, allowing for the rain water to flow into the ground where the passion flower is planted. There is currently enough drainage in the area to accommodate the new growth.

## Implementation Roadmap

The operation will initially start on a small scale to test the concept. The money will be used to buy seeds, plants, and soil as well as for the maintenance of the garden. For example, watering the plants and keeping the surrounding areas clean. In order to ensure the sustainability and longevity of the project we will budget accordingly. Money will be saved to supplement the project with extra plants if needed. In terms of communication and marketing, we will create a social media page and advertise in different student organizations. We will hold all members of our team accountable and will use group chats, Zoom, and Google Docs to ensure clear communication. We anticipate that we will have team meetings at least once a week, but maybe more especially during the initial implementation stage. This will be crucial to the success of our project and we will be sure to monitor the progress of insect recruitment from the beginning. We will do this by keeping detailed records of types of plants, base level of insects, increases and/or decreases in insects, and types of insects.

## Challenge Question

With a budget of one million dollars, our group would definitely have to scale up the entire operation. Infrastructure improvements would definitely be made. This entails paving a walkway for visitors, building fences and arches along the walkway, and even some ornate fountains to enhance the aesthetic. Additionally, the square footage of the garden itself could be extended and be integrated into the pre-existing arboretum.

## Acknowledgements

We would like to thank Dr. James Englehardt for informing us of this wonderful competition, in which we hope to be able to make a positive impact on campus life. We would also like to thank the University of Miami's student government for giving us a platform to address certain environmental topics that need to be addressed, such as the biodiversity issue that we hope to improve.

## Bibliography

Lannotti, Marie. How to Grow a Passionflower. The Spruce.

[https://www.thespruce.com/passion-flowers-1403114#:~:text=To%20keep%20your%20passionflower%20vines,or%20more%20in%20cooler%20climates\).](https://www.thespruce.com/passion-flowers-1403114#:~:text=To%20keep%20your%20passionflower%20vines,or%20more%20in%20cooler%20climates).)