

Observational Analysis of Pollinators and their Resources: Long Island Central Pine Barrens Forest

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Abstract

Long Island Central Pine Barrens forest provides an array of varied ecosystems for pollinators, vegetation, and other species. Pollinators *Bombus* species (bumblebees) and their resources e.g., *Securigera varia* (purple crown vetch) and other vegetative species were observed on solar farms and forest interior sampling sites used for this baseline observational study during early June through July of 2018. Solar farms encompass flat- opened terrains and meadowlands leading into forest's edges, compared to forest interiors which is usually comprised of scattered patches of sunlight, shrubs, and dense canopy. This baseline study will focus on bumblebee sightings/visitations between solar arrays# 1 and #2 of Long Island Solar Farm. Analyzing and comparing sightings/visitations during observation periods was used to determine the preferred vegetative resource selected by bumblebees at random geographical location points. In contrast, I was only able to collect data in solar farms for 3 weeks and the remainder of observations were completed in the forest's interior. Inconclusively, lack of full flight season of bumblebees creates a need for continuation and funding of this baseline research. Possible findings could include frequency points of bumblebees increases/decreases on solar farms and forest interior based on the available resources. Furthermore, continuing this project may include: understanding phenological periods of northeastern region, whether reduction of vegetative species is based on climate, selectivity or other unknown factors that possibly play a role in increase/decrease frequency of sightings/visitation to the solar farms versus interior forestry points by bumblebees of Long Island Central Pine Barrens forest.

Introduction

This project will focus on observations of *Bombus* spp. (bumblebee) using random location to locate sighting of bumblebees plant species within a 7m radius of each sampling point. Sampling points were used at various locations on Long Island's Central Pine Barrens forest including solar farm, meadowlands, forest's edge, and forest interior points. Between the months of June and July, bumblebees were observed at each sampling site with the use of radio-transmitters outfitted by Eastern Box turtles. Early June, bumblebees were collected on solar farms and identified using a cool down method which allows the surveyor to possibly determine the specific species compared to forest interior. The goal is to determine specific period of bumblebee ingestion to the forest, also if possible to understand the selectivity of plant species. It is possible that phenology periods may influence increase/decrease of sightings in forest interior contrast to solar farms¹ (Buisson, Alvarado, Le Stradic, & Morellato, 2016).

Methods & Materials

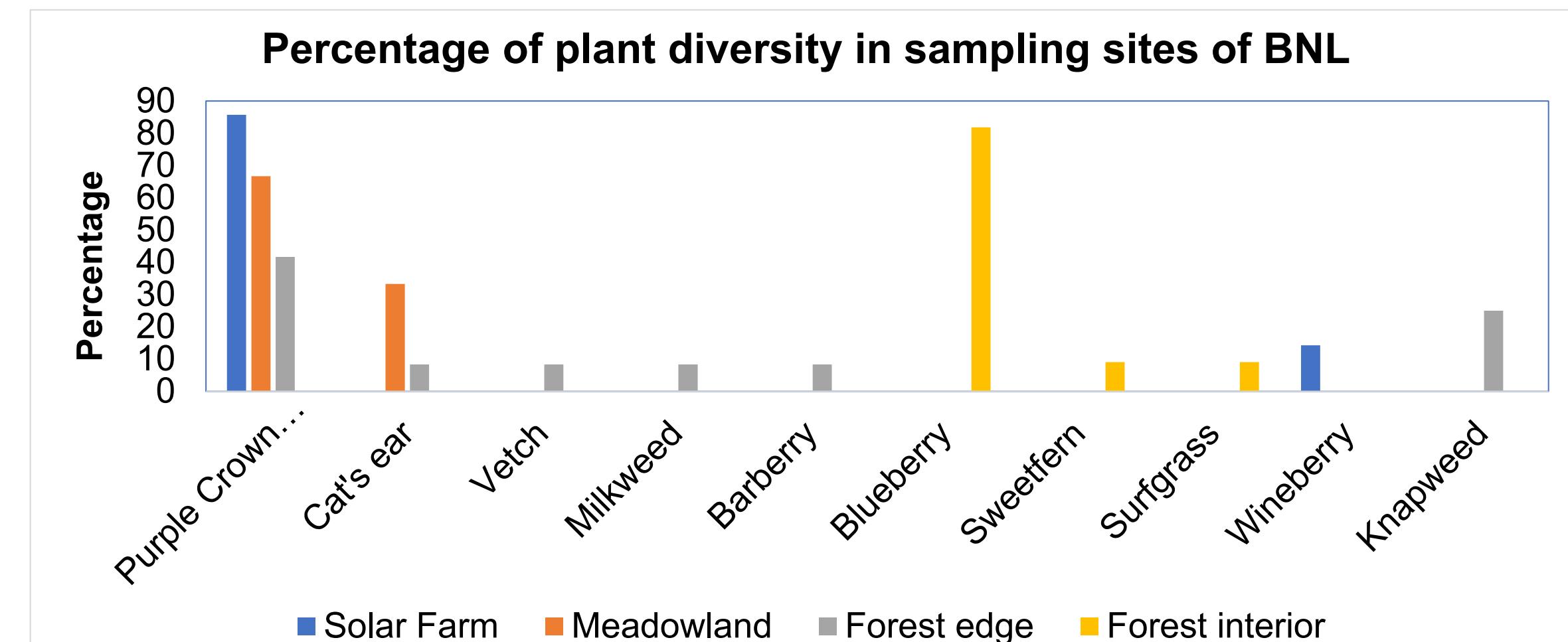
1. 50 m transects and 1 m² quadrants were used to measure, analyze and collect data on solar farm # 1, #2.
2. Anemometer, hand-held devices (Kestrel model 4000) weather station were use to collect atmospheric conditions on solar farms.
3. Falcon tubes and ice were used to collect and visually identify specific *Bombus* species, ice was used to slow metabolism of species on solar farm.
4. Radio-transmitters outfitted for Eastern Box turtles was used to collect random geographical locations.
5. Observations/sightings of bumblebees and vegetation was collected within 7m radius of sampling site.



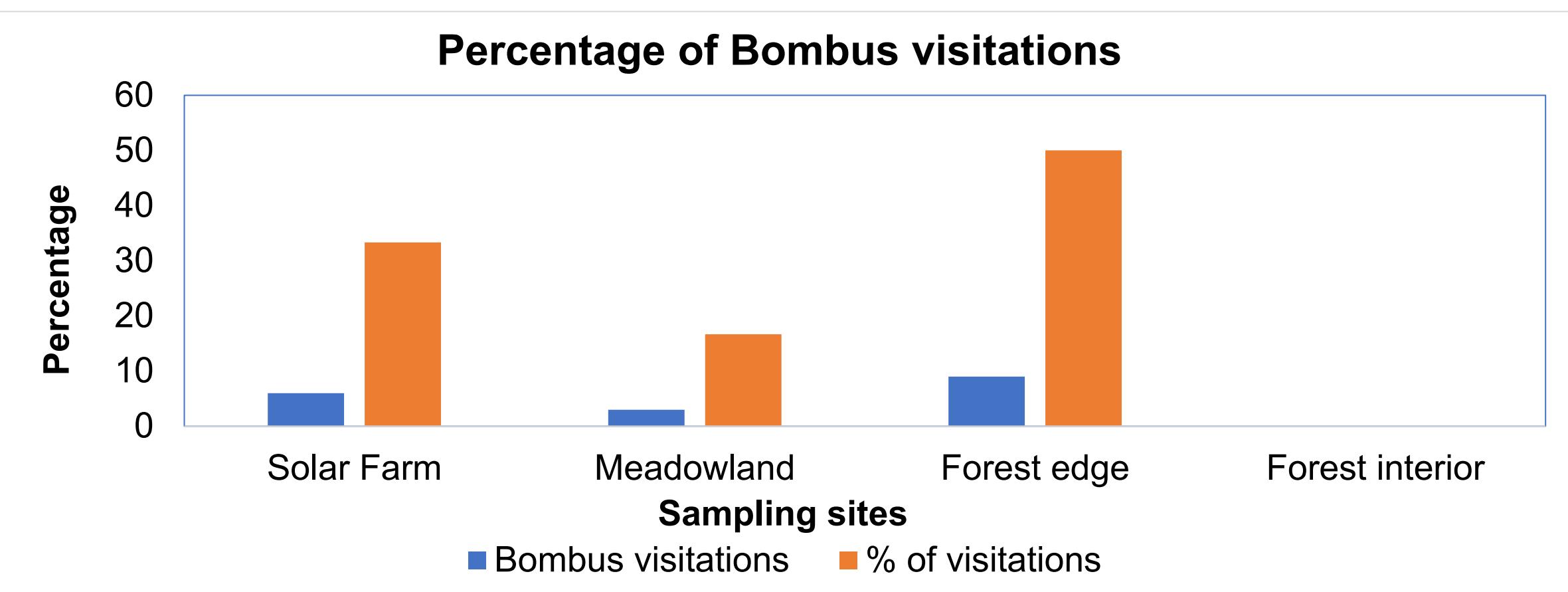
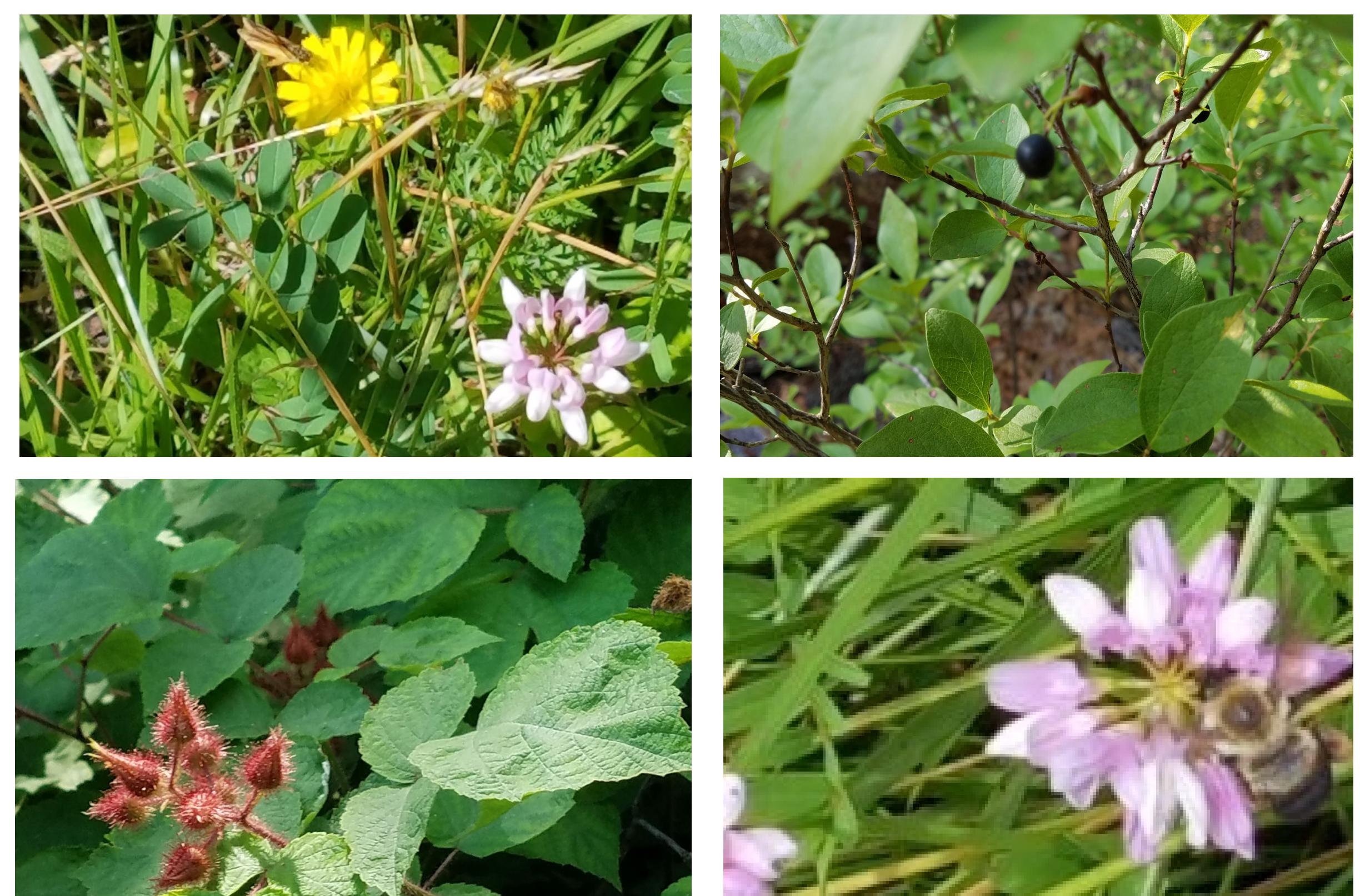
References

¹Buisson E., Alvarado S. T., Le Stradic S., Morellato L. P. C. (2016) Plant phenological research enhances ecological restoration. *Restoration Ecology* 25: 164–171

Results



Purple Crown Vetch was the dominant flowering plant located on solar farms, meadowlands, and forest edges. Data during observational period also shows the forest's interior main plant species were blueberry at each random site.



Forest edges were the dominant selective locations chosen by bumblebees. Next, the solar farm where other variety of plant species were located. Notice the forest interior with zero sightings, compared to other sampling sites.

Discussion & Conclusion

After comparing observations between solar farms and forest interior. Data proves during the months of June and July bumblebees are not the prevalent or the dominant pollinator during the data collection period. Bumblebees were very selective and gravitates more to solar farm, meadowlands, and forest edges where the abundance of purple crown vetch. Although Blueberry was sighted, various stages of development were observed during the observational period within the forest interior. It is unclear if the bumblebee visits this particular plant in one full flight season or periodically. A number of factors could contribute to the forest interior resulting in zero sighting of bumblebees at random locations. Full flight season was not captured to fully understand at which point of the season are bumblebee ingestion to forest interior.

Acknowledgements

I would like to thank Dr. Murty S. Kambhampati, Dr. Timothy Green, Southern University at New Orleans MSEIP program personnel, Brookhaven National Lab, Office of Educational Programs, Department of Energy, and National Science Foundation for financial assistance, facilities, and mentoring.