

Bees, Blooms, and Boroughs: Analyzing Pollinator Patterns in Urban Community Gardens

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Introduction:

With bees playing a vital role in plant pollination and urban environments becoming increasingly important for sustainable living, understanding how different community gardens in Brooklyn influence bee visitation rates is a pressing concern. By examining the influence of factors such as socioeconomic status, design, and plant diversity, we can uncover the relationship between the diversity of flowers and bee conservation, particularly with the effect of high socioeconomic status.

Research Question:

Do different community gardens in Brooklyn, based on their location (socioeconomic status) and design (plant diversity and inclusion of natural structures), influence bee visitation rates?

Methods and Materials:

We examined Greene Acres, Pacific Bears, Clifton Place, Serenity, Newkirk, and Q Gardens' Farm community gardens. Floral diversity was assessed by identifying flowering plant species, utilizing plant identification apps. The Shannon diversity index was calculated to quantitatively assess floral diversity, considering the number of different plant species and their abundances within each garden. Bee abundance was measured by counting the number of bees visiting flowers within standardized areas on 3 separate occasions. Socioeconomic data were collected from public records, providing information on the neighborhoods surrounding each garden.

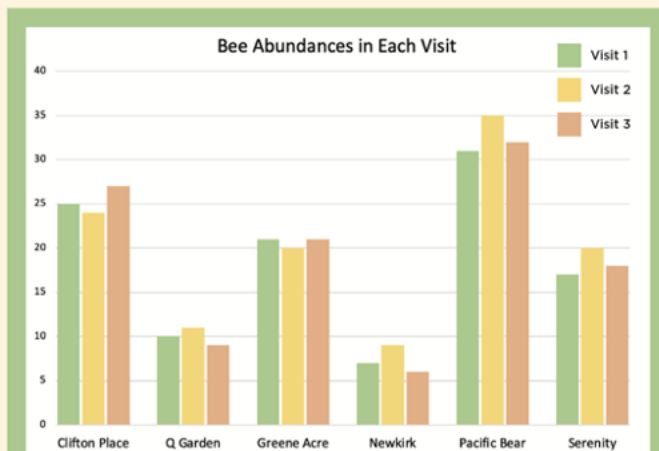


Figure 1: Number of bees counted in each garden

	Clifton Place	Serenity	Greene Acre	Pacific Bear	Newkirk	Q Gardens
Clifton Place	1	0.1429	0.2308	0.1765	0	0.0769
Serenity	0.1429	1	0.1818	0.2143	0.1111	0.2222
Greene Acre	0.2308	0.1818	1	0.3846	0.2222	0.2
Pacific Bear	0.1765	0.2143	0.3846	1	0.1538	0.1429
Newkirk	0	0.1111	0.2222	0.1538	1	0.2857
Q Gardens	0.0769	0.2222	0.2	0.1429	0.2857	1

Figure 3: Floral Similarity (Jaccard Index) between Community Gardens

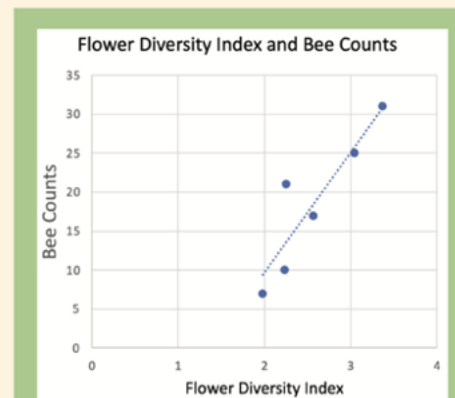


Figure 2: Relationship Between Flower Diversity and Bee Counts



Figure 4: Map of 6 community gardens in Brooklyn

Data Analysis:

Gardens like Clifton Place and Pacific Bear, distinguished by high structural diversity and a rich variety of flowers, demonstrate significantly higher bee counts. The Jaccard Index further emphasizes the unique floral compositions of each garden, highlighting the distinct plant species present. The observed positive correlation between structural diversity, flower diversity index, and bee abundance shows that diverse plantings and features like bird baths positively influence local pollinator populations. The high mean income areas of Clifton Place and Pacific Bear underscore how economic factors contribute to the creation of biodiverse urban green spaces.

Conclusion:

Our data reveals the relationship between community garden features and bee abundance. Gardens exhibiting greater structural diversity, a variety of floral landscapes, and additional water features tend to attract more bees. The observed positive correlation between flower diversity index and bee counts underscores the significance of designing urban green spaces that accommodate both plant and pollinator needs. Furthermore, the impact of socioeconomic factors on garden attributes suggests that community engagement and resources play crucial roles in promoting vibrant urban ecosystems.

Literature Cited:

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Acknowledgments:

We would like to express our gratitude to Professor Betina Zolkower for her invaluable guidance and support throughout this project. Additionally, we extend our appreciation to Macaulay Honors College for providing us with the opportunity to undertake and excel in this research endeavor.

Further Information:

The community gardens featured in this study are primarily funded by residents within their respective neighborhoods, contributing to their sustainability and local impact. To assess the socioeconomic context of these gardens, median household income is utilized as a key metric, providing valuable insights into the economic dynamics that shape and support these communal spaces.