

# Bee-O-Diversity

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## Abstract

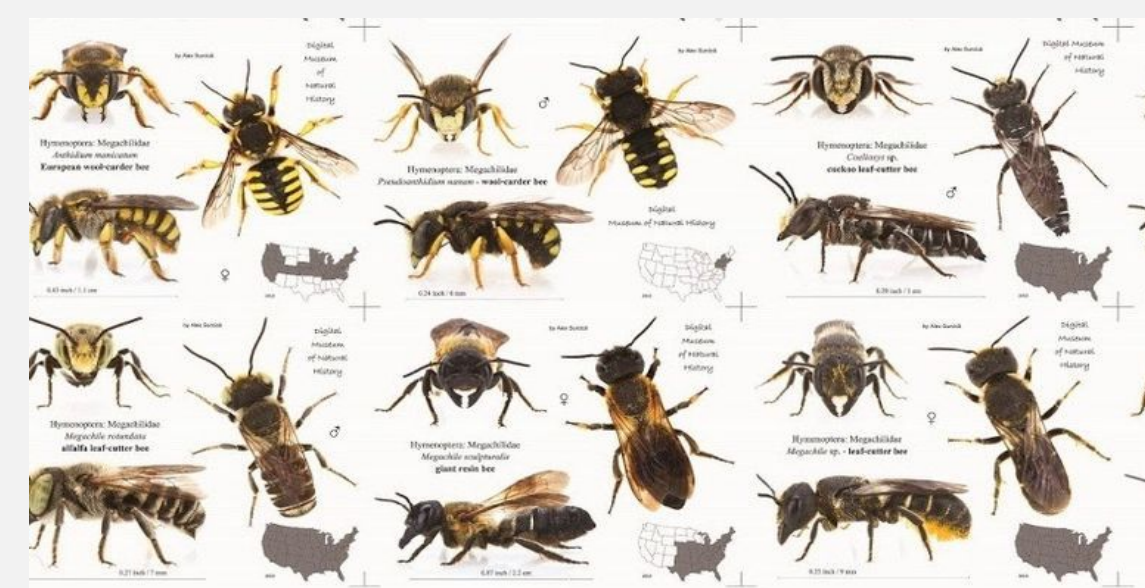
Have you ever wondered why there are bees swarming your city blocks and neighborhood? It turns out that these tiny creatures are vital components of the complex web of life that keeps our ecosystems functioning and our plates full, not merely busy pollinators. The goal of this research is to learn more about bees' hidden life, especially in the various urban and suburban landscapes. Our food, from juicy fruits to crunchy nuts, owes a huge debt to bees. They're the unsung heroes, pollinating crops that keep our plates colorful and our diets diverse. But are these little heroes faring better in the hustle and bustle of the city or the quieter outskirts of the suburbs? That's the question we're tackling. This study focuses on the importance of bees to the environment and economy. Bees are major players in agriculture, influencing everything from crop productivity to food prices, even outside of the delicious honey they make. We hope to identify possible dangers to the safety of our food supply by monitoring bee populations. But here's the catch: we're comparing the bees, not just counting them. How can suburban landscapes and urban jungles affect the biodiversity of bees? Are our buzzing friends facing a challenge or an opportunity in the city life? Our results hold the potential to shed light on the hidden elements influencing their life, such as pollution levels and the presence of compatible companions. As students, this is our way of bridging the gap between textbooks and the real world. We want to humanize the bees, turning them from just insects into neighborhood buddies that play a vital role in our lives. By comparing how bees thrive in urban versus suburban spots, we hope to uncover insights that go beyond the classroom and into the streets where we live.

## Research Question



Does the biodiversity of bees vary based on suburban versus urban environments?

## Methods



Using data found on iNaturalist, we were able to discover the range of number of species found in both the suburban area of Nassau County and the urban area of Brooklyn. Studies show that the Common Eastern Bumble Bee is seen the most in both areas and environments. Clearly that specific species do not need to necessarily be in a specific area in order to survive but in able to remain in all types of habitats. Another method we used was to see the range and amount of various species found in both urban and suburban habitats in order to determine biodiversity of bees. However, there seems to be a large range and population in both environments. Our independent variable was the type of environment, and our dependent variable was the amount of bee species and population of bees overall. Our control was Nassau County and the borough of Brooklyn.

## Results

### Brooklyn

1	Common Eastern Bumble Bee	258
2	Brown-belted Bumble Bee	155
3	Western Honey Bee	139
4	Eastern Carpenter Bee	118
5	Ligated Furrow Bee	52
6	Metallic Sweat Bees	44
7	Virginia Carpenter Bee	41
8	European Woolcarder Bee	27
9	Pure Green Sweat bee	26
10	Sculptured Resin Bee	25
11	Lemon Cuckoo Bumble Bee	21
12	Golden Northern Bumble Bee	17
13	Two-spotted Longhorn Bee	17
14	Modest Masked Bee	16
15	Two-spotted Bumble Bee	14
16	Bicolored Striped Sweat Bee	14
17	Eight-toothed Cuckoo Leaf-cutter Bee	14
18	Dark-veined Longhorn Bee	10
19	Rufous-backed Cellophane Bee	9
20	Masked Bees	9

According to iNaturalist data from 2022, there was a total of **61** bee species recorded in Brooklyn, NY. There was a total of 1,143 observations made that year and each bee species had varying abundance recorded. The most recorded bee species was the Common Eastern Bumble Bee. There were 24 bee species that were recorded once.

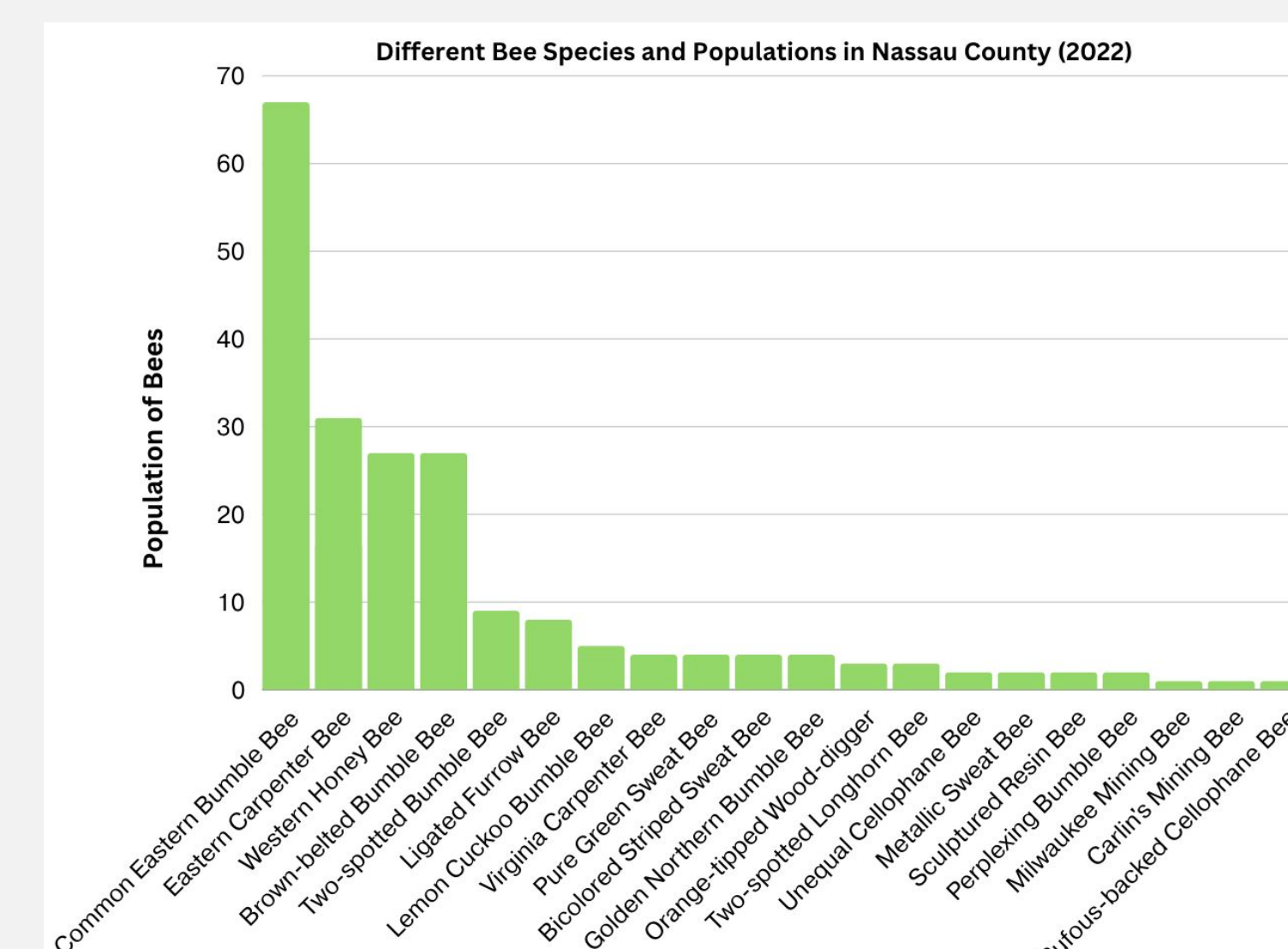
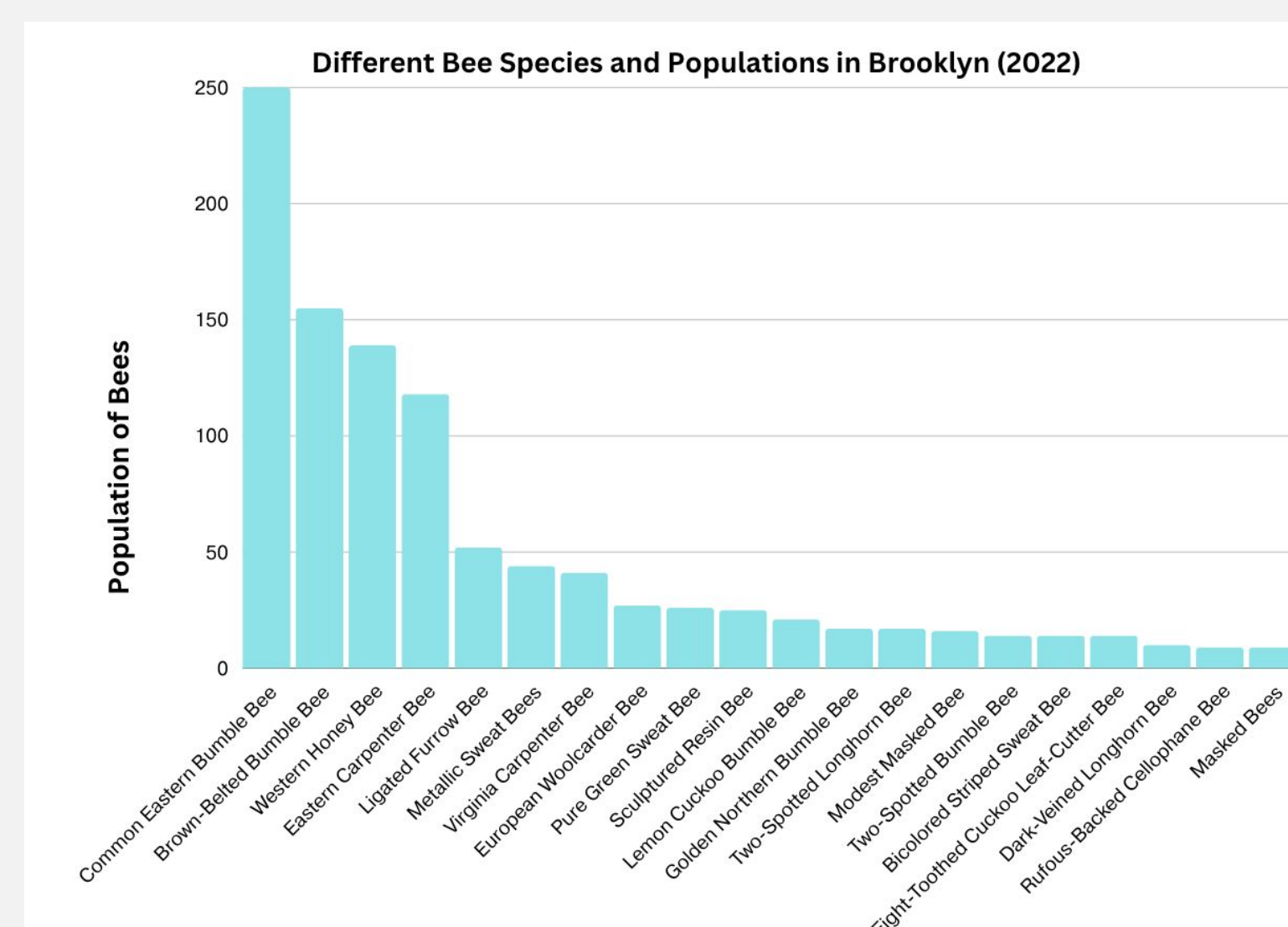
### Nassau County

1	Common Eastern Bumble Bee	67
2	Eastern Carpenter Bee	31
3	Western Honey Bee	27
4	Brown-belted Bumble Bee	27
5	Two-spotted Bumble Bee	9
6	Ligated Furrow Bee	8
7	Lemon Cuckoo Bumble Bee	5
8	Virginia Carpenter Bee	4
9	Pure Green Sweat bee	4
10	Bicolored Striped Sweat Bee	4
11	Golden Northern Bumble Bee	4
12	Orange-tipped Wood-digger	3
13	Two-spotted Longhorn Bee	3
14	Unequal Cellophane Bee	2
15	Metallic Sweat Bees	2
16	Sculptured Resin Bee	2
17	Perplexing Bumble Bee	2
18	Milwaukee Mining Bee	1
19	Carlin's Mining Bee	1
20	Rufous-backed Cellophane Bee	1

According to iNaturalist data from 2022, there was a total of **32** bee species recorded in Nassau County, NY. There was a total of 221 observations made that year and each bee species had varying abundance recorded. The most recorded bee species was the Common Eastern Bumble Bee. There were 15 bee species that were recorded once.

## Analysis

1. The dominance of the Common Eastern Bumble Bee as the most recorded species in both locations suggests its ecological importance and adaptability to urban environments.
2. In Nassau County, 15 bee species were recorded only once and in Brooklyn, 24 bee species were recorded only once, indicating the presence of less common or potentially rare species. Protecting and comprehending the ecosystems that support these uncommon species of bees could be a valuable priority for the county's conservation efforts.
3. The amount of observations recorded in Brooklyn was approximately 5 times the amount that was recorded in Nassau County, likely a result of the doubled human population in the urban area. As a result, less bee species are recorded in Nassau County than in Brooklyn.



## Conclusions

Our research found an unexpected trend: urban environments in Brooklyn, NY had a higher diversity of bee species compared to their counterparts in Nassau County. This surprising discovery casts doubt on widely held beliefs on the detrimental impacts of urbanization on biodiversity. It implies that, despite common sense, some elements of urban environments might actually foster a flourishing bee colony. Various flora in parks, green roofs, and community gardens that offer a variety of foraging opportunities are examples of potential contributors. Knowing these dynamics could help create conservation efforts, showing that well-planned urban areas can be vital to maintaining and increasing bee biodiversity.



## Future Research

After conducting a comparative study on the population of bees in suburban areas like Nassau County and urban places like Brooklyn, it becomes imperative to delve deeper into the specific effects of urbanization on bee health. While population comparisons provide valuable insights into the overall distribution of bees, studying the impact of urbanization allows us to understand the underlying factors influencing their well-being in urban environments. Investigating the health of bee colonies in the context of urbanization entails a comprehensive examination of multiple stressors. This includes assessing the levels of exposure to pollutants arising from urban activities, evaluating the availability and diversity of forage resources in both urban and rural settings, and scrutinizing the prevalence of pesticides, which can be more pronounced in urban areas due to landscaping practices. By scrutinizing these factors, researchers can elucidate the complex interactions between bees and urban environments, offering nuanced perspectives on how urbanization affects bee health. This knowledge is instrumental for devising targeted conservation strategies that promote the resilience and sustainability of bee populations amidst ongoing urban development.

## Works Cited

