

Flowers, Location, and Bumble Bee Sex Ratios

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RESULTS

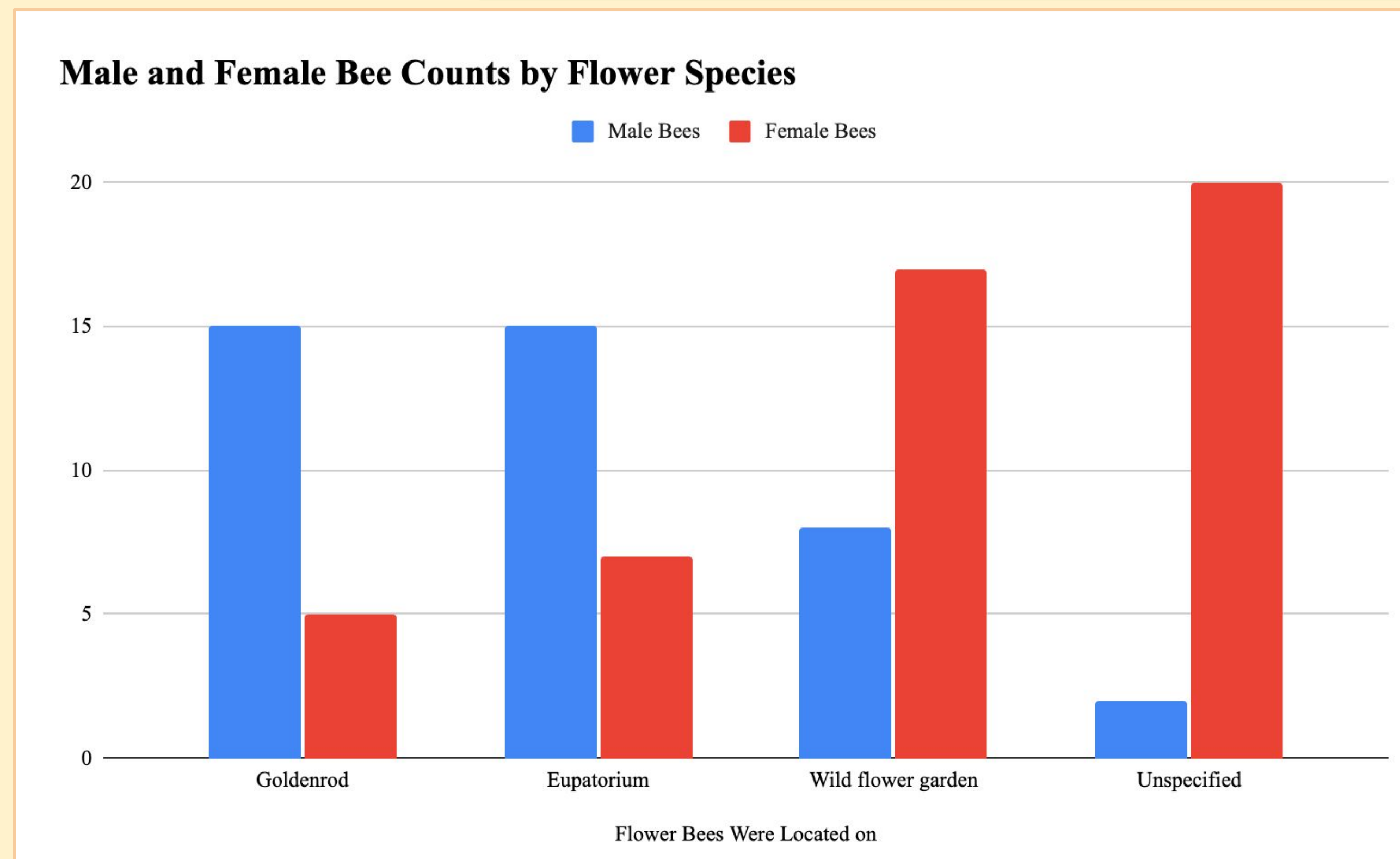


Figure 1: This bar chart displays the count of male and female bees observed on each flower species during BioBlitz

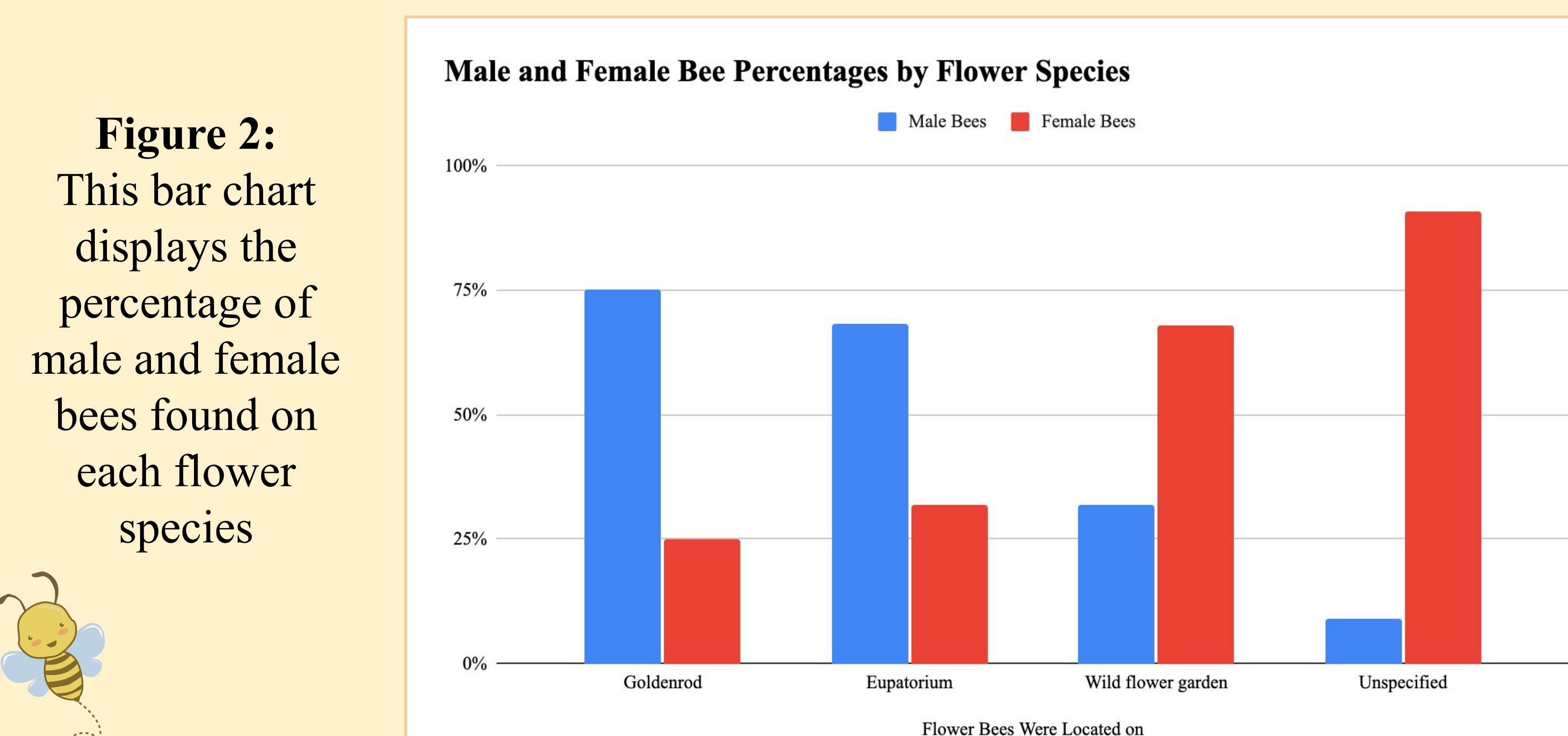
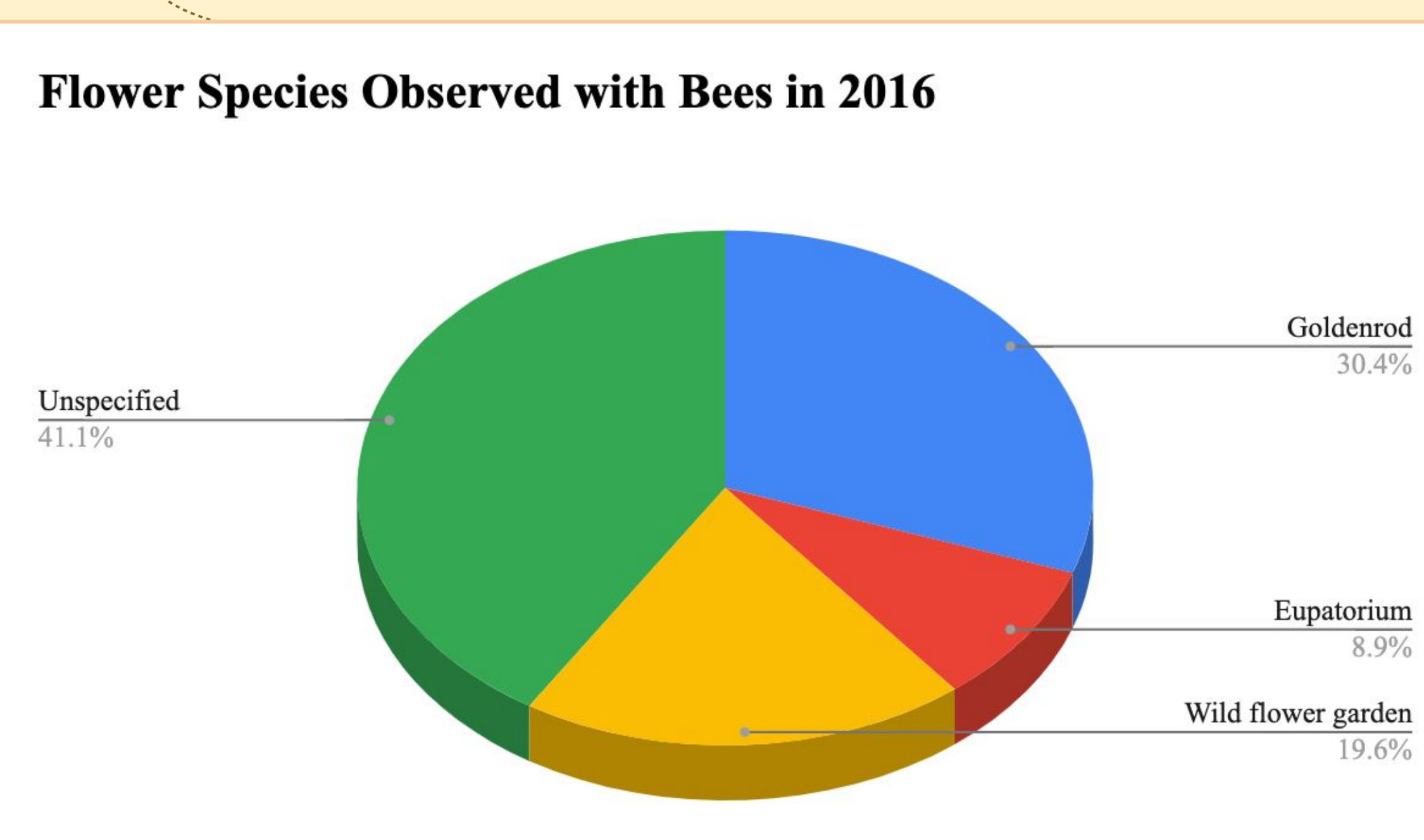
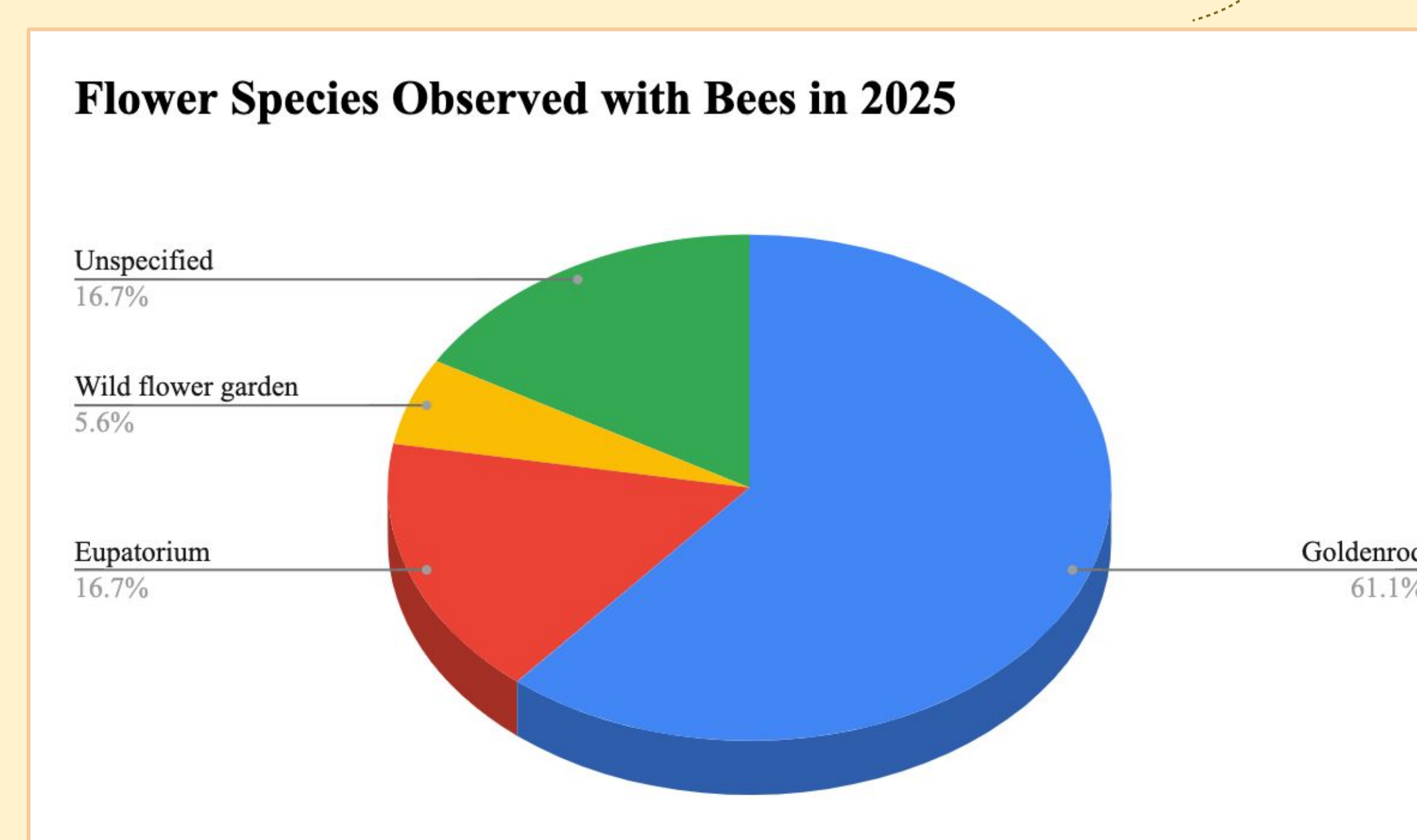


Figure 2: This bar chart displays the percentage of male and female bees found on each flower species



Figures 3 & 4: These pie charts compare the abundance of flower species observed in 2016 and 2025 respectively.



There has been a **significant decrease** in unspecified flowers, suggesting a shift toward more precise categorization and observation methods

RESEARCH QUESTION

How does the species and location of flowers affect the sex ratio of the Eastern Common Bumble Bee?

INTRODUCTION

The 2025 BioBlitz at Brooklyn Bridge Park allowed us to observe bees on diverse flowers, leading to an investigation into how flower species and location influence bee sex ratios. Our observations showed sex ratios changed depending on the specific flower, even within the same species like Eupatorium and goldenrod. Our results and data confirms that flower type and location are major factors. This aligns with the Conditional Sex Allocation Theory, where mother bees adjust their offspring's sex based on environmental conditions, producing more males when resources are scarce. Furthermore, female bees need more pollen and may prefer different flowers. Therefore, this study will specifically examine how flower species and location affect the sex of Common Eastern Bumble Bees.

METHODOLOGY

- **Data Collection:** We collected 2025 BioBlitz data that indicated how many Common Eastern Bumble Bees were found at different types of flowers as well as the sex ratios of these bees. We also used both 2016 and 2025 BioBlitz data to quantify how the number of flower species have changed over time.
- **Literature Search:** We gathered various peer-reviewed sources that discuss how flower type and location affect the sex ratios of bees.
- **Data Analysis:** We used the 2025 BioBlitz data collected to create bar graphs that demonstrate the male vs. female counts and percentages by flower species. We also used the 2016 and 2025 data to create pie charts that demonstrate change in flower species count over time.
- **Comparison of data and literature:** After analyzing and graphing the data, we used the literature to determine whether the data represents a broader trend regarding the effect of flower type and location on the sex ratios of bees.



DISCUSSION

As the data from the 2025 BioBlitz was analyzed, the results displayed a **significant difference in ratio** between **male and female bees** depending on **species and location of the flower**

Male Bees and Flower Species:

- A strong male bias was observed on *Eupatorium* and *Goldenrod* flowers
- These flowers are hermaphrodites, which have both female and male sex organs
- **Results:** Male bees prefer hermaphrodite flowers due to minimal daily needs, such as collecting nectar for energy production

Female Bees and Flower Species:

- Female bees were more likely to be on pollen-fertile cultivars, explaining the bias towards wildflowers and unspecified flowers
- **Results:** Female bees collect pollen to provide for nests and feed offspring, which is why seek flowers with pollen-fertile cultivars and nectar production.

Location Effect on Bee Ratio:

- Brooklyn Bridge Park, located in one of the most heavily-urbanized areas on Earth.
- Urbanization causes the population of female ground-nesting bees like the Eastern Common Bumble Bee to decrease with no effect on the male population



CONCLUSION & FUTURE DIRECTIONS

This study determined the effect the location and species of flowers in Brooklyn Bridge Park during the 2025 BioBlitz had on the sex ratio of Eastern Common Bumble Bees. There were more males than females on the hermaphroditic *Eupatorium* and only female bees on the dioecious *Solidago*. A future study can observe the effect the location and species of flowers has on honey production



REFERENCES

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