

## Abstract

Bee monitoring methods should be tested for their effectiveness to prevent under sampling, especially in habitats that differ from those in the current literature. Ten bee bowls of each color (blue, yellow, and white) were evenly and randomly distributed in nineteen prairies in Illinois. It was determined that the dominant bloom color of a site is not a significant predictor of the number of bees in each color of bee bowl.

## Introduction

With an estimated 20,000-30,000 species of bees worldwide [1] and concerns over global bee decline, bee monitoring has become more prevalent [2]. Although it has been determined that the use of bee bowls to collect smaller species of bees is cost effective and easy to conduct [3], the effectiveness of each color (blue, yellow, and white) has not been further tested. Because there have only been a few pieces of literature on bee monitoring in urban grassland areas, it is imperative that bee monitoring methods in prairies and grasslands be further tested for their effectiveness [4].

Bee bowls, which are a type of pan trap, are small plastic cups that have been sprayed with fluorescent spray-paint. In the field, they are filled with water and a small amount of dish soap (to act as a surfactant) [2]. Bee bowls are frequently used for monitoring small bee species in desert habitats [2], which typically have much less dense vegetation than prairies in Illinois.

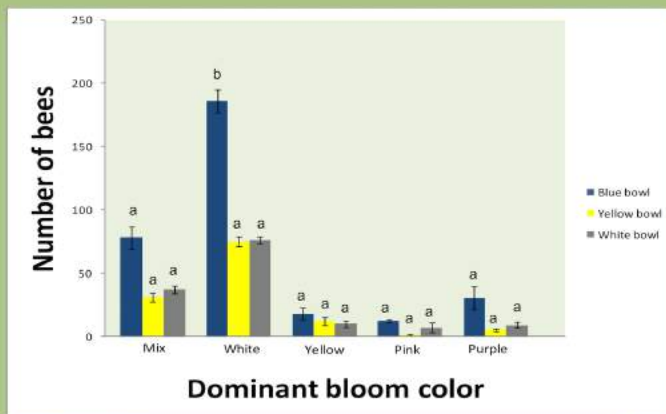


Figure 1. Number of bees collected in bee bowls by site type. (ANOVA Mix, Pink, Purple, and Yellow Sites,  $p > 0.05$ . White sites,  $p = 0.0321$ ) Lower case letters above standard deviation bars denote significance.

## Hypothesis

If bees are attracted to bee bowls of the dominant color of the vegetation at a study site, then there will be a higher number of bees caught in bee bowls with the same color as the dominant vegetation.

## Objectives

- To further test the quality of bee bowls as a type of pan trap
- To improve bee monitoring in prairie habitats

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### Map of sites

- Mix
- White
- Yellow
- Pink
- Purple

## Methods

- 19 one hectare prairie sites: Cook, Lake, McHenry and DuPage counties, IL, USA.
- 30 bee bowls were placed along three transects at 0m and 1.5m between 0900 and 1000, and collected between 1500 and 1600.
- A vegetation survey was conducted with 35 1m<sup>2</sup> quadrats of general cover class and plants in flower were identified to species.
- Using importance values of bloom number and bloom percent coverage, sites were assigned as either white, pink, purple, yellow or mixed.

## Acknowledgements

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## Results

- At mix, pink, purple, and yellow bloom dominated sites bloom color was not a significant predictor of the number of bees by bowl color (ANOVA,  $p > 0.05$ ).
- At white bloom dominated sites, bloom color and site had a significant additive effect on the number of bees collected by bowl color (ANOVA,  $p = 0.0321$ ).
- Although the number of bees collected in white bowls was not significantly different from the number collected in yellow bowls (Tukey's post-hoc  $p > 0.05$ ), there were significantly more bees collected in blue bowls compared to white or yellow bowls at white bloom dominated sites (Tukey's post-hoc,  $p < 0.05$ ).



## Discussion/Future Research

- The same number of each bee bowl color should be used for collecting, because bloom color of sites is not a significant predictor of the number of bees in bowls.
- Further monitoring research in specific habitats, such as prairies, should be conducted to ensure precise sampling.
- After identifying blooms as "purple" instead of "blue," a comparison of blue bowls and purple bowls would be interesting addition to bee bowl studies.
- In order to determine whether or not a specific bowl color is more attractive, independent of the dominant bloom color at a site, it could be revealing to investigate surveys conducted using one bee bowl color during each visit to a site during one blooming period.
- Changing the height of the bee bowl with respect to the height of the vegetation could also be another route to test bee bowls in areas of dense vegetation, such as Illinois prairies.

## References

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