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# Competition between honey bees (*Apis mellifera*) and native bees: an investigation in urban community gardens in St. Louis, Missouri



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## Introduction

- Urban areas boast high bee abundance
- Community gardens provide habitat for bee species in cities
- Urban areas have limited and patchy floral resources
- Habitat patchiness = higher competition among bees
- Can be exacerbated by the presence of managed honey bees
- Honeybees provide pollination, but are non-native and often outcompete native bees for resources
- Little is known about bee competition in urban areas, or how the presence of managed honeybees impacts resource competition

**Question 1:** What behaviors are utilized by competing bees while foraging for floral resources in urban community gardens?

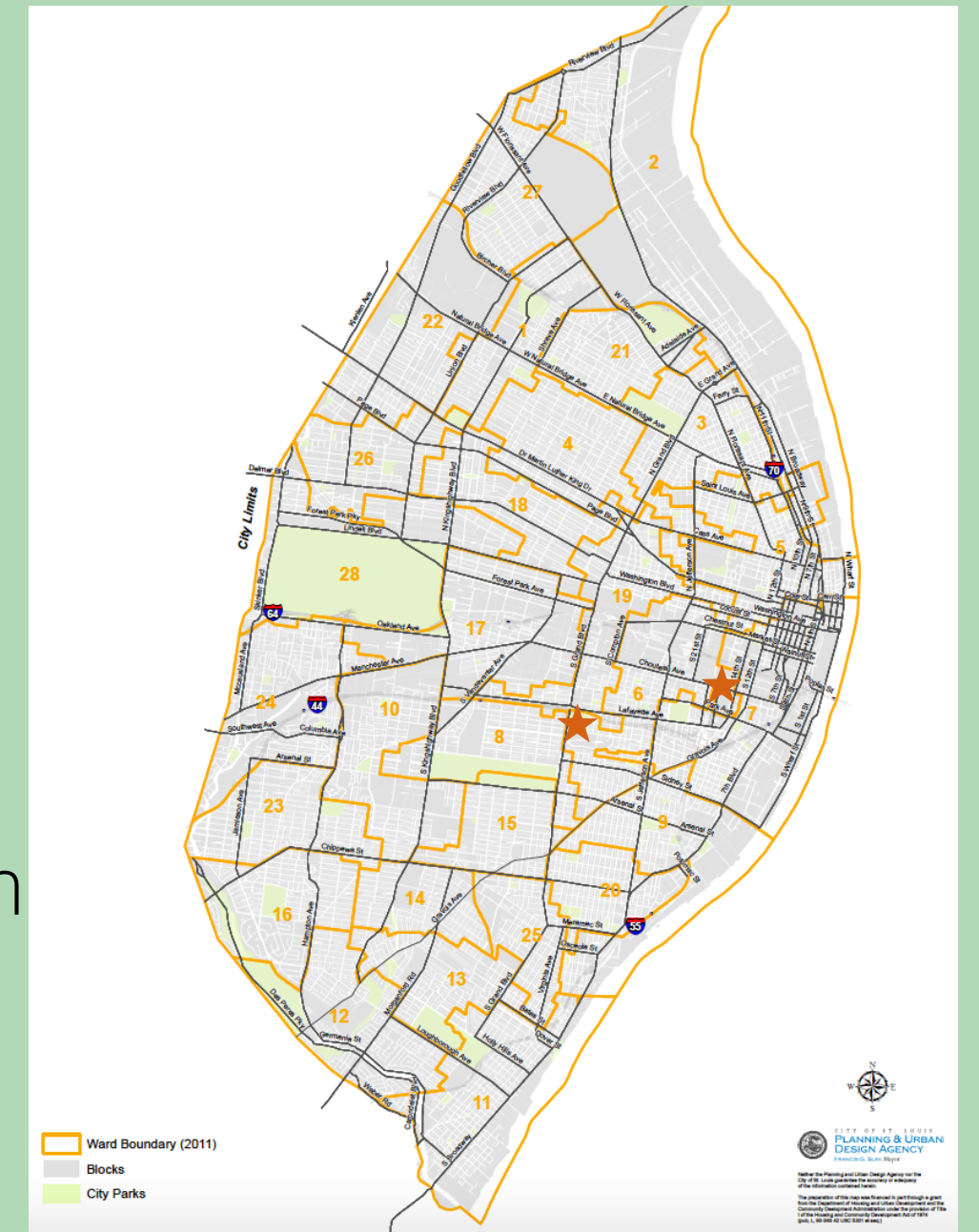
**Hypothesis 1:** Bees will utilize a variety of behaviors including pollen robbing, attacking, and chasing in order to win a resource.

**Question 2:** Do competitive interactions between honey bees and wild bees increase in the presence of managed bee colonies?

**Hypothesis 2:** Presence of honey bee colonies near a habitat will directly impact the rate and intensity of competitive interactions between honey bees and native bees.

## Methods

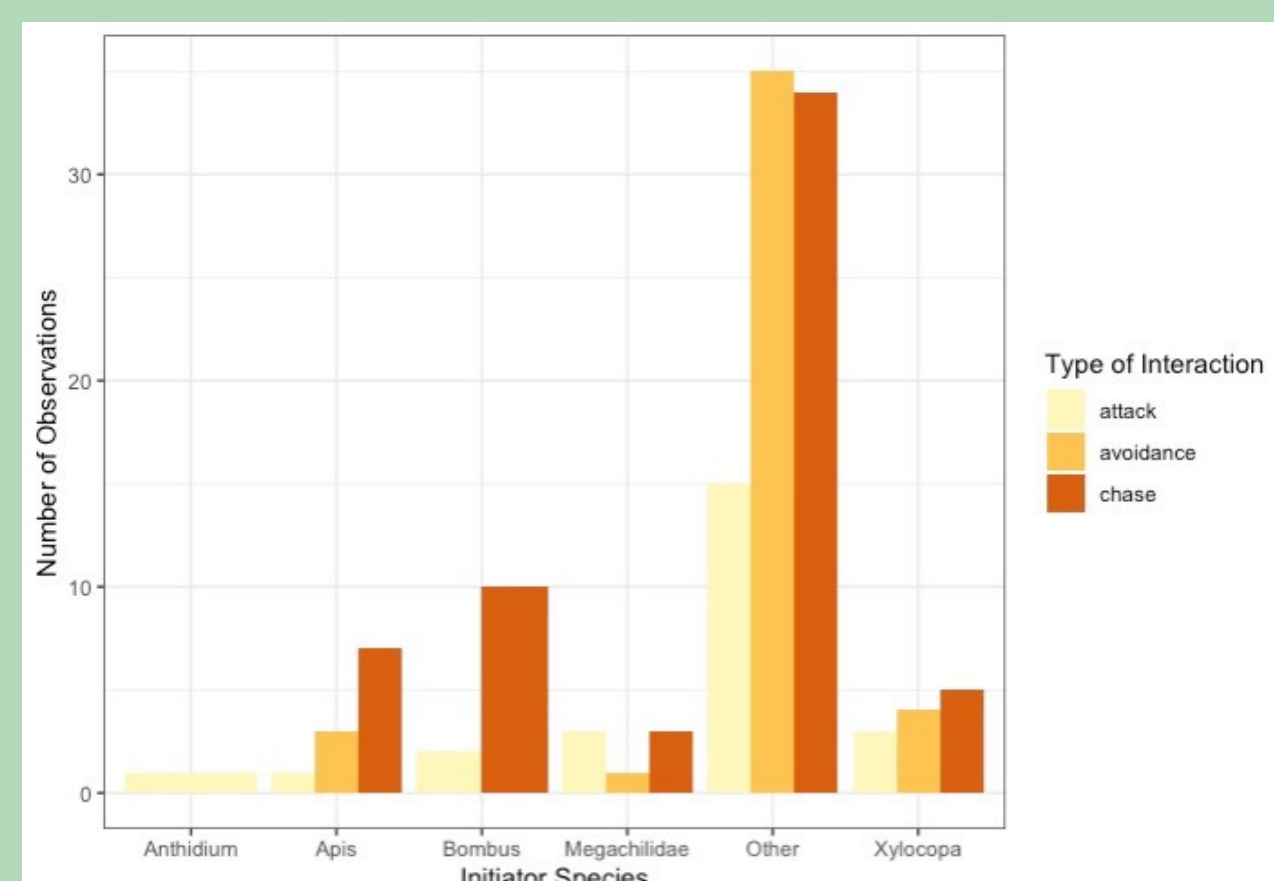
- Observed bees in three urban community gardens sample sites in St. Louis, MO
  - LAF- No managed bees on site
  - 13th- No managed bees on site
  - BH- 4 Honeybee colonies on site
- Filmed patches of flowers frequently used by both native bees and honey bees weekly from June-September
- Used BORIS software to extract behavioral data including the type of interactions, the species involved, who instigated, interaction duration, floral species
- Utilized Poisson Distributions to understand if competitive behavior varied significantly between species



## Results

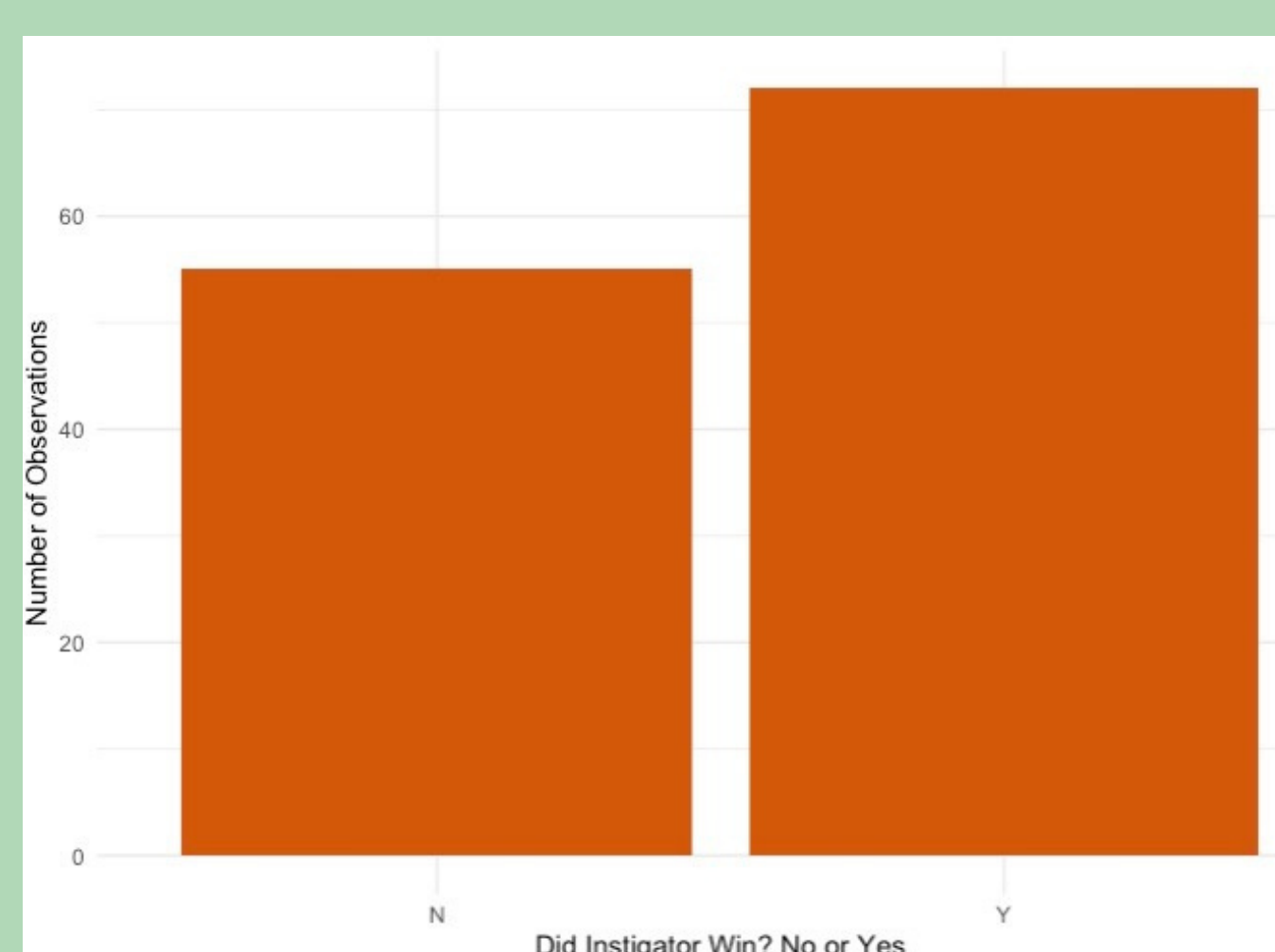
### Who's most aggressive?

Number of initiated competitive behaviors varied between species. However, honeybees were not significantly more aggressive than any other bee species



### Which behavior is best?

Bee species performed competitive behaviors at varied rates across sites: (A=BH, B=Laf, C=13th) indicating the influence of habitat on behavior

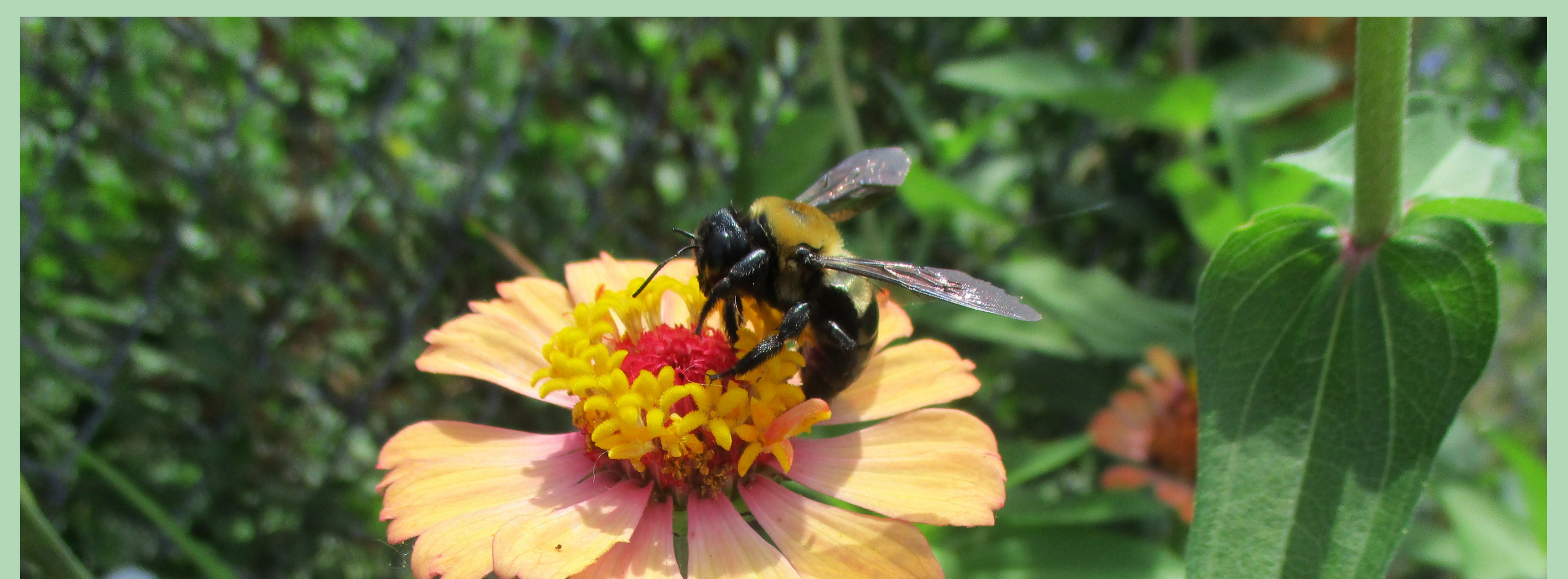


### Strike first or bee struck first

Bees that instigated an interaction were significantly more likely to win, and remain on the floral resource

## Conclusions and Future Directions

- Results were not what we hypothesized as we expected there to be more interactions in the presence of managed honey bee colonies
- Behavior is clearly shaped by the environment
- It is energetically costly to compete, but being the instigator offsets this
- Behaviors varied between species and could be related to body size
- The relationship between managed honey bees and wild pollinators is complex
- More research is need to understand how these behaviors may affect pollination services



## Acknowledgements

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