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The Effect of Honeybees on Native Bee Communities in Northeastern Illinois and Northwestern Indiana Tallgrass Prairie Restorations

Mary Carrington
Governors State University

Neal Jankowski
Governors State University

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THE EFFECT OF HONEYBEES ON NATIVE
BEE COMMUNITIES IN NORTHEASTERN
ILLINOIS AND NORTHWESTERN
INDIANA TALLGRASS PRAIRIE
RESTORATIONS

by Neal Jankowski and Mary Carrington

Focus of the Study

- To Determine if honeybees are competing with native bees in Tallgrass Prairies



Why is it Important?

- Pollinators essential for
 - Key ecosystem services
 - Portion of world's food supply
- Tallgrass Prairies
 - Refugia for native pollinators
 - But <1% remain
- Many Bee Species
 - Are declining

Apis mellifera



Image Courtesy of Encyclopedia of Life

Honey Bees

- ❑ Originated in Europe
- ❑ Non-native and Invasive
- ❑ Introduced to America in 1622
 - ▣ With the pilgrims
 - ▣ Reach Missouri by 1800
- ❑ Pollinate 80% of fruit, vegetable and seed crops in the US
 - ▣ Commercial livestock
- ❑ A single colony can have 20-60 thousand bees



Image courtesy of USGS Bee Inventory and Monitoring

Competition in Nature

Competition

- Some degree of overlap in ecological niches of two populations
 - ▣ Both depend on the same food source, shelter, or other resource
- Negatively affect each other's survival

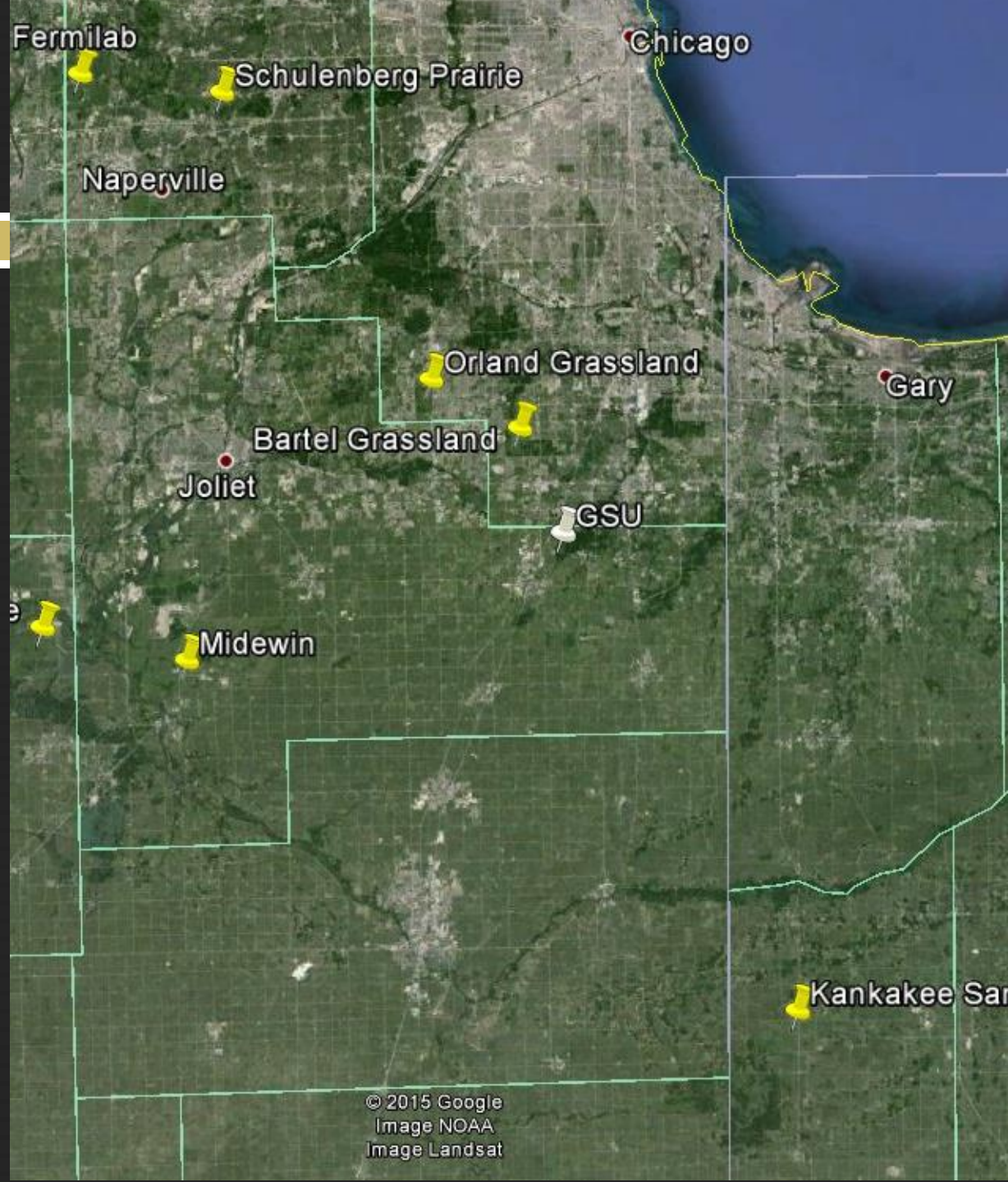
Limiting Resource

- Factor or condition that limits the growth, abundance or distribution of an population
- Growth is controlled by the scarcest resource

Hypotheses

- Are floral resources limiting in tallgrass prairie restorations?
- If they are, is there competition between honeybees and native bees?
- Are there foraging height niche shifts or community shifts based how close native bees are foraging near honeybee hives?

Sites



Methods – General

- Three sites have placed honeybee hives
- Four 100m transects at each site
- Bees
 - ▣ 12 traps
 - ▣ Open for 6 hours

Augochlora pura



Image Courtesy of Encyclopedia of Life

Methods – Floral Resources

- Bee balm is focal plant
- Four blocks per site
 - ▣ 4 plants
 - Total exclusion
 - No net
 - Bumblebees excluded
 - Bumblebees and honeybees excluded
- Nectar volume were measured at 8 AM and 4-6 PM

Monarda fistulosa



Image Courtesy of Encyclopedia of Life

Methods – Competition

- Transects were walked at 12-3 PM
 - ▣ Honeybees and Bumblebees counted
- First 20 Bumblebees seen were net captured
- For each bee captured
 - ▣ Body length measured
 - ▣ Corbicular pollen measured and collected

Apis mellifera



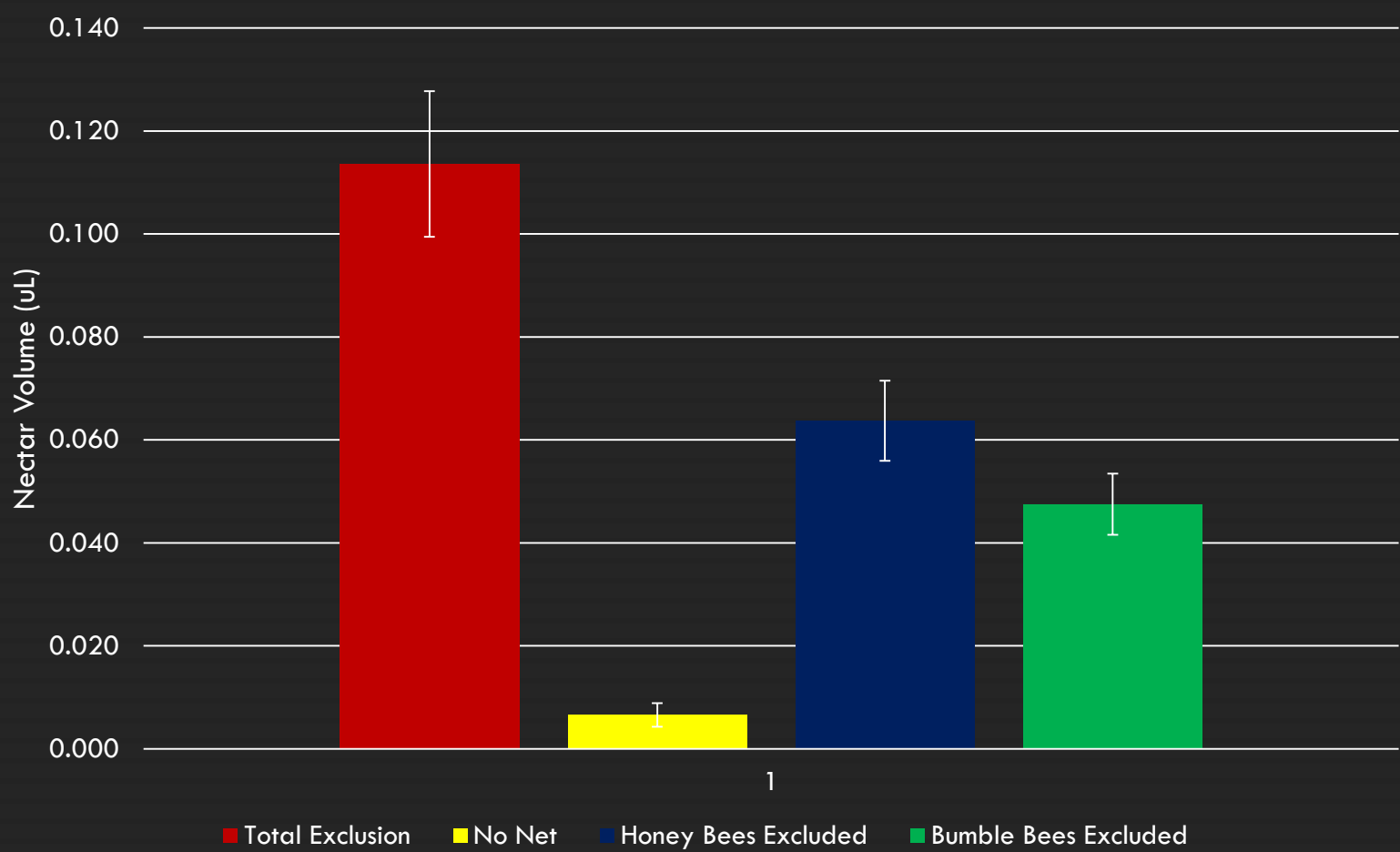
Image Courtesy of Encyclopedia of Life

Methods – Niche Examination

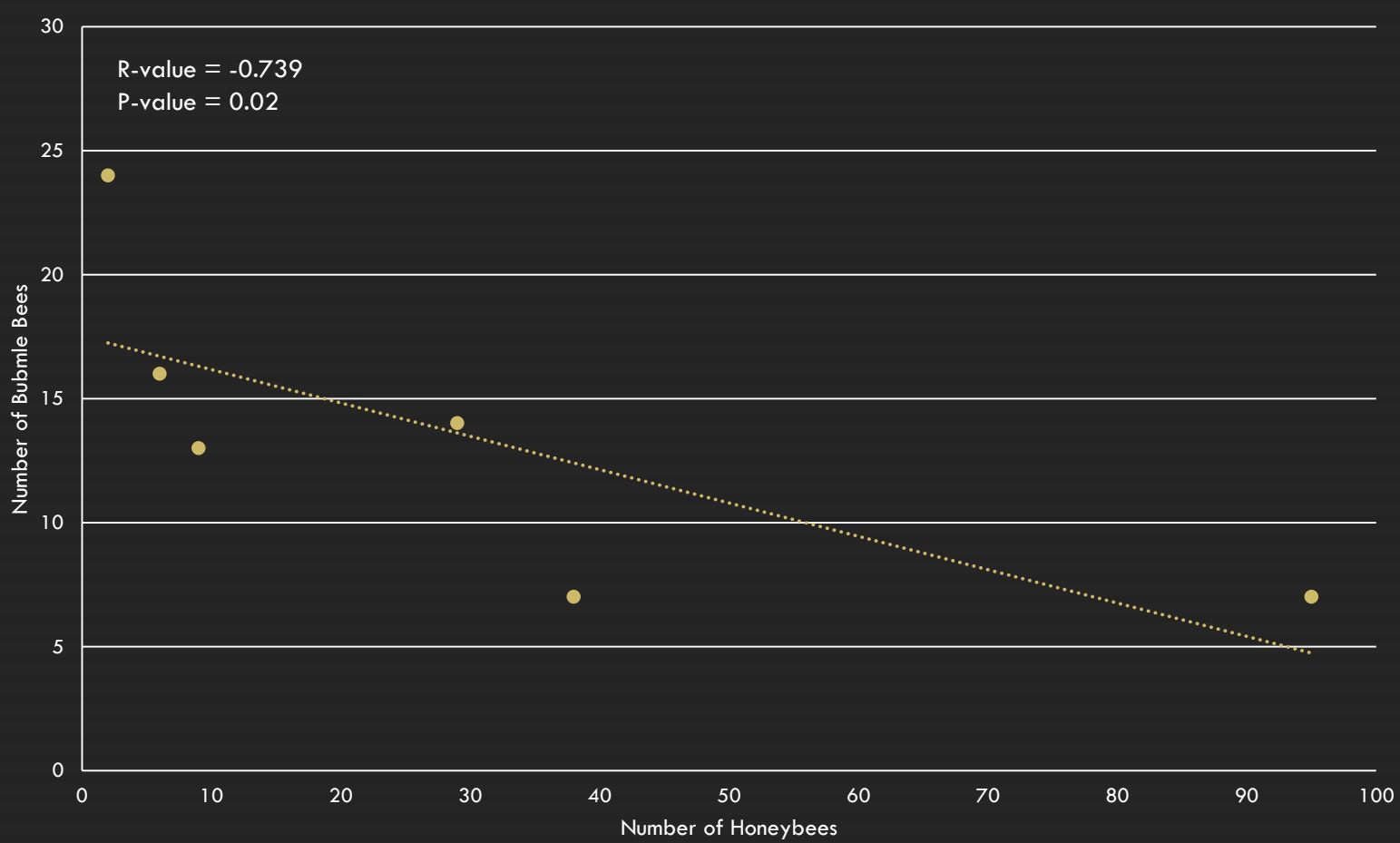
- Sites with placed honeybee hive will be compared to sites with no hives
- Pan Traps will have different heights (0m, 0.75m, 1.5m and 2.25m)
- At Honeybee sites
 - ▣ Transects will be at set distances away from the hive (50m, 250m, 500m and 1km)

Preliminary Results

- This is a two field season study
 - ▣ Only one field season's worth of data has been collected
 - ▣ Cannot come to any specific conclusions
- Bee Balm seems to be a limiting resource
- Honeybee presence influences number of bumble bees
- Cannot determine Niche data as of yet
 - ▣ Identification process still ongoing
 - ▣ Not enough data to analyze Distance from Hive



Bee Balm Nectar Exclusion Comparisons



Correlation Chart of Honeybees v. Bumble Bees

Any Questions?