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

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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

<table>
<thead>
<tr>
<th>Competition</th>
<th>Limiting Resource</th>
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</thead>
<tbody>
<tr>
<td>□ Some degree of overlap in ecological niches of two populations</td>
<td></td>
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<tr>
<td>‣ Both depend on the same food source, shelter, or other resource</td>
<td>□ Factor or condition that limits the growth, abundance or distribution of an population</td>
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<tr>
<td>□ Negatively affect each other’s survival</td>
<td>□ Growth is controlled by the scarcest resource</td>
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</tbody>
</table>
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 on 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

Image Courtesy of Encyclopedia of Life

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
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

Nectar Volume (μL)

- Total Exclusion
- No Net
- Honey Bees Excluded
- Bumble Bees Excluded
Correlation Chart of Honeybees v. Bumble Bees

R-value = -0.739
P-value = 0.02
Any Questions?