

Managing Watermelon Pests with Pollinators in Mind

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Pollinators

- Managed Pollinators
 - Honey bees
 - Bumble bees
- Native Pollinators
 - Bumble bees, sweat bees, carpenter bees, syrphid flies, butterflies, moths



Pollinator Importance



- 35% of crops are dependent on pollinators
- Crucial for fruit set in cucurbits
 - Watermelon, squash, cucumbers, muskmelon, pumpkin, etc



Watermelon

- Indiana is among the top watermelon producing states in the U.S.
- Transplanted as seedlings
- Transplant mid-May, final harvest August
- Watermelon fruit set is entirely dependent on pollination
 - Male and Female flowers, Seedless varieties
- Watermelon not susceptible to bacterial wilt



Striped Cucumber Beetles



- The striped cucumber beetle is the primary pest of concern in watermelon.
- Overwinters as an adult
- Two generations present during the season
- Damages leaves, stems, roots, flowers, and fruits
- Watermelon threshold: 5 beetles/plant

Objectives

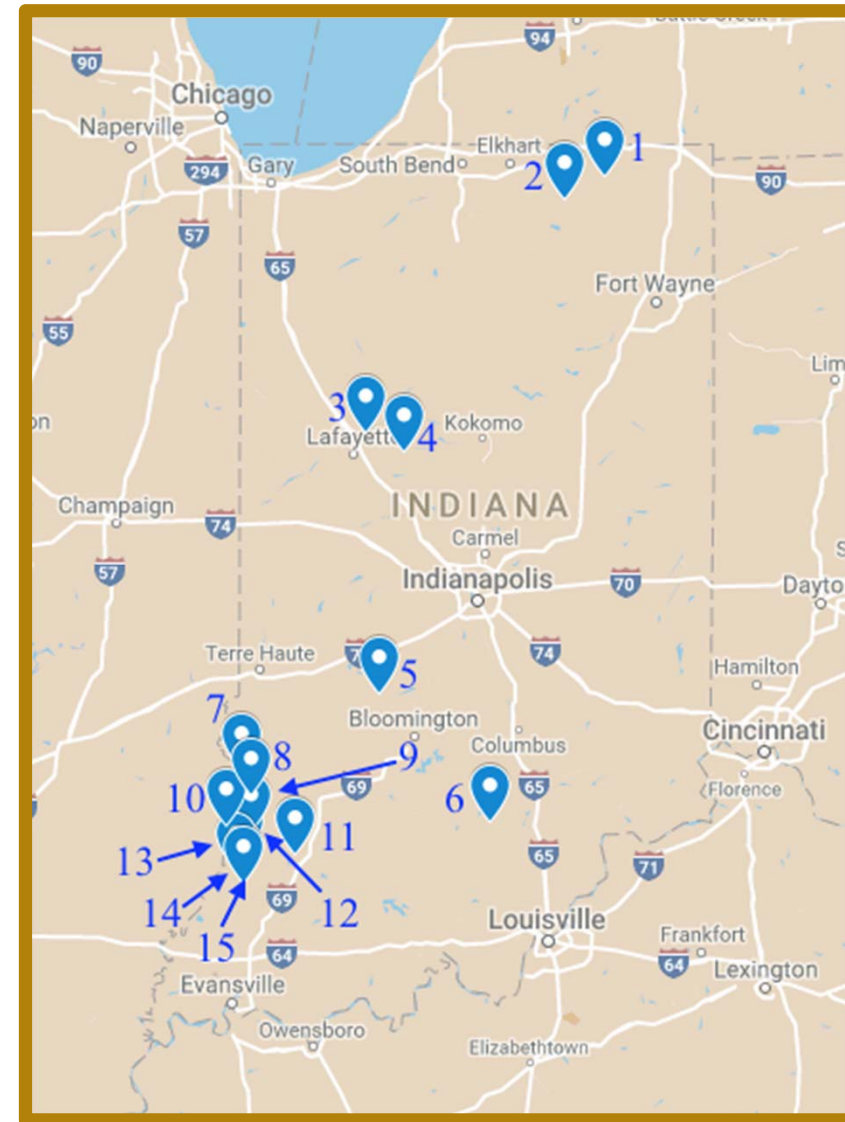
- Assess Pollinator species present in watermelon fields and their impact, to better understand how to limit non-target exposure.
- Quantify field realistic insecticide exposure in watermelon fields using various management strategies.
- Identify management strategies which provide optimal pest management while prioritizing pollinator health.



Methods

Watermelon Fields

Farm	Field Size (acres)	Description of Operation
1	1.78	Conventional, Diversified
2	3.29	Conventional, Diversified
3	2.00	Conventional, Diversified
4	0.686	Organic, Diversified
5	0.578	Conventional, Diversified
6	20.5	Conventional, Diversified
7	100.0	Conventional, Monoculture
8	22.4	Conventional, Diversified
9	43.0	Conventional, Monoculture
10	31.7	Conventional, Monoculture
11	2.50	Conventional, Diversified
12	15.7	Conventional, Monoculture
13	28.0	Conventional, Monoculture
14	13.7	Conventional, Diversified
15	29.5	Conventional, Monoculture

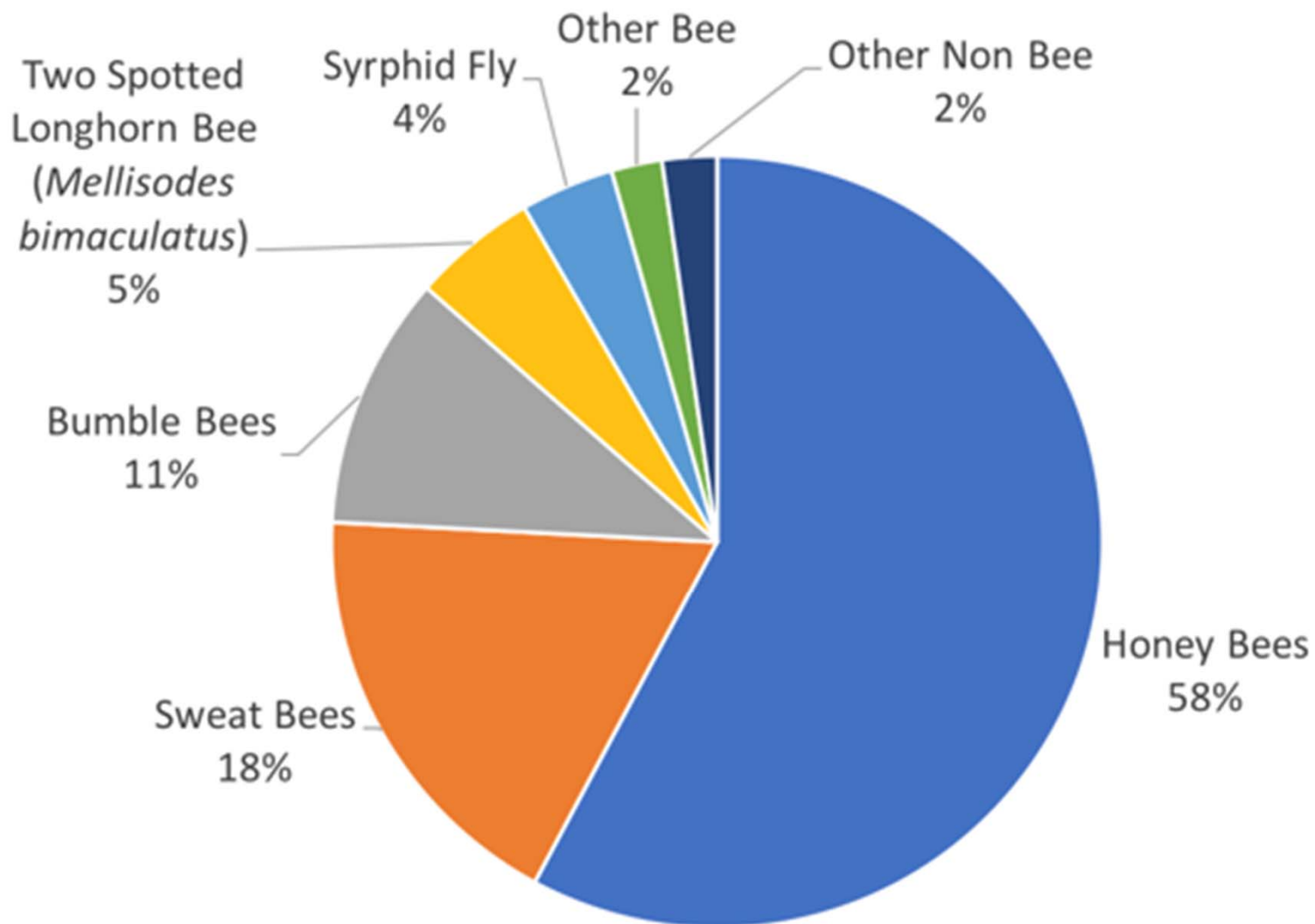


Sampling

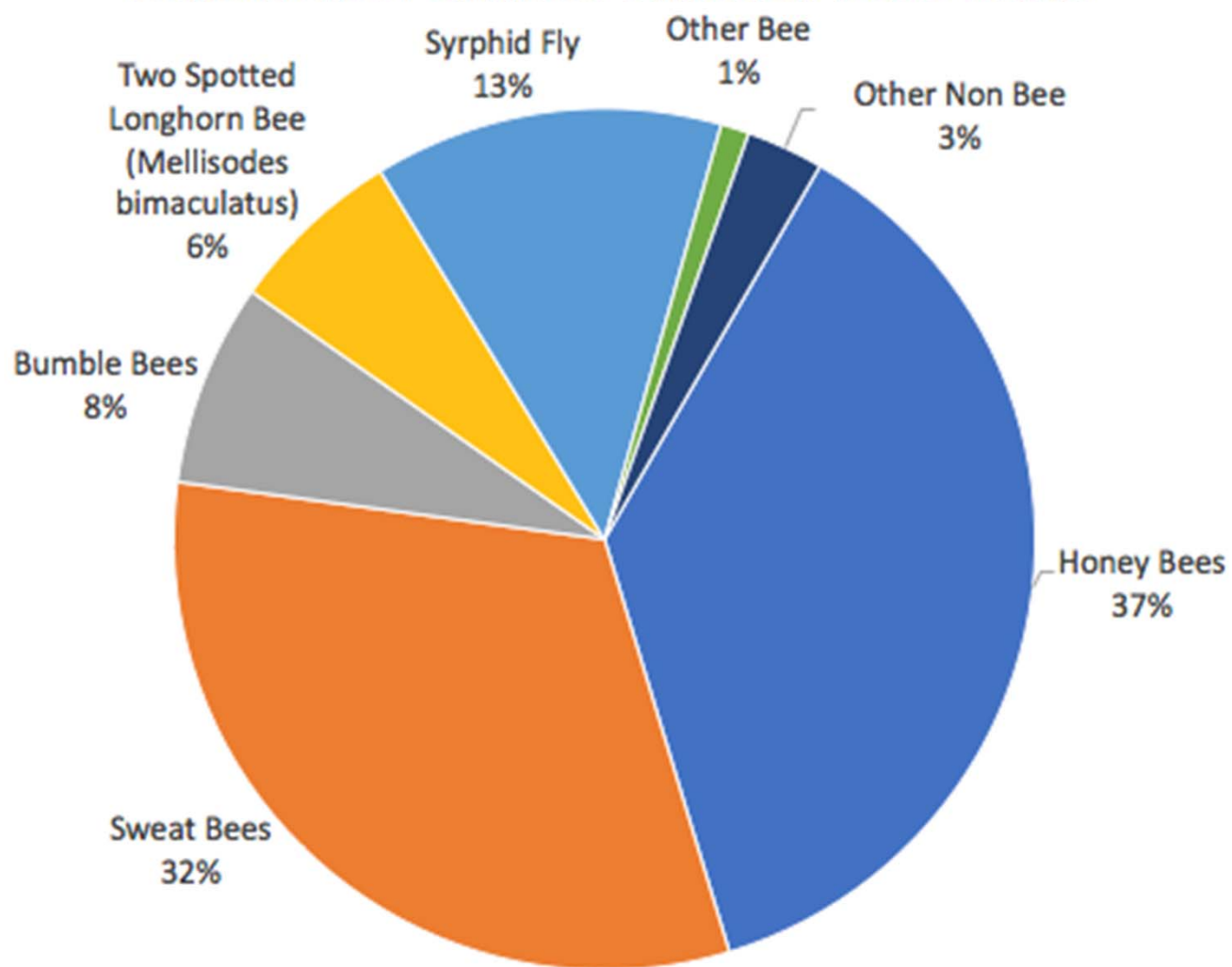
- Pest Sampling
 - Striped cucumber beetles sampled on individual plants
 - Assess pest pressure
- Pollinator Sampling
 - Pollinator visual sample and collection
 - Catalog pollination services and pollinator species present in fields
- Residue Sampling
 - Pollen, leaf, and soil samples
 - Quantify insecticide residues in fields which could lead to pollinator contact

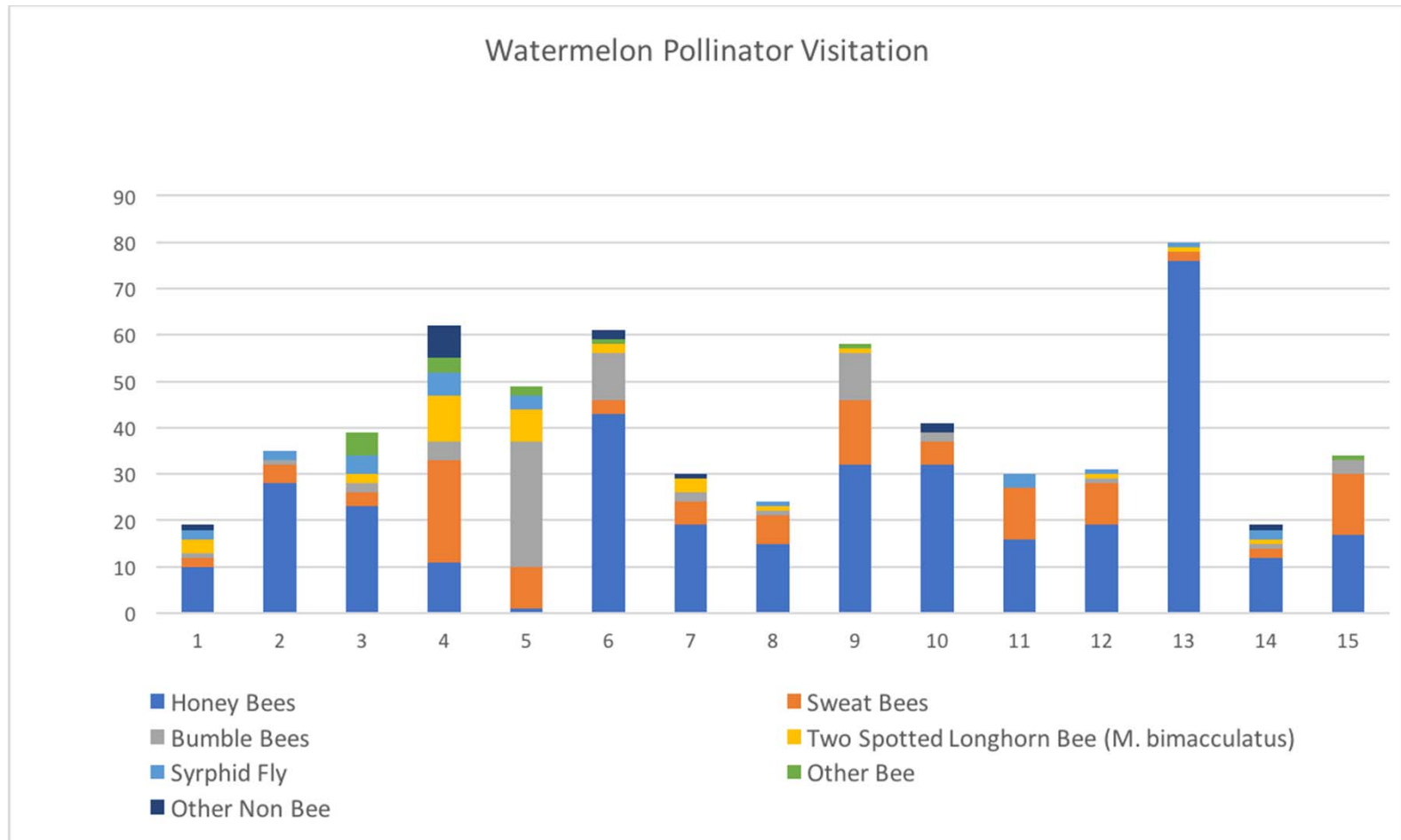


Watermelon Pollinator Visitation Collection



Watermelon Pollinator Visitation Observation





- Field abundance ranges from 19-80 collected pollinators
 - Average abundance 40.8



Honeybees



- Primary Managed Pollinators
- Large eusocial colonies, queen and workers
- Generalist foragers
- Introduced to North America
- Mid-size bees



Bumblebees

- Native to North America
- New managed pollinator (*Bombus impatiens*)
- Primitively eusocial colonies, queen and a 100+ workers
- Generalist foragers
- Large bees



Sweat Bees

- Native to North America
- Solitary species, males and females
- Generalist foragers
- Small bees
- Diverse appearances, bright green, blue, black, tan with various patterning



Syrphid Flies/Hoverflies

- Native to North America
- Not bees
- Small to mid-size
- Diverse appearances, often look like bees
- Feed on aphids as immatures

Questions?

