Honey Bee Use of Shelterbelt Plantings in Two Regions Of North Dakota: Project Updates

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Shelterbelts for Humans and Wildlife in Dakotas

- Soil stability, wind reduction, and homestead protection
- Variable
- Protection, food/foraging, reproductive habitat, and corridors for wildlife
- Spring flowering

Potential Use of Shelterbelts by Pollinators

- Shelterbelts could fill a temporal forage gap for pollinators
- Spring flowering coincides with:
  - Pollinator emergence
  - Completion of yearly migrations
  - Beekeeper and honey bee returns to the region

Photos: Savannah Adams Ricks

Research Objectives

Objective 1: Quantify the relationship between honey bee colony growth and shelterbelt cover across varying spatial scales

Objective 2: Identify tree and shrub species found in shelterbelts that are used by honey bees

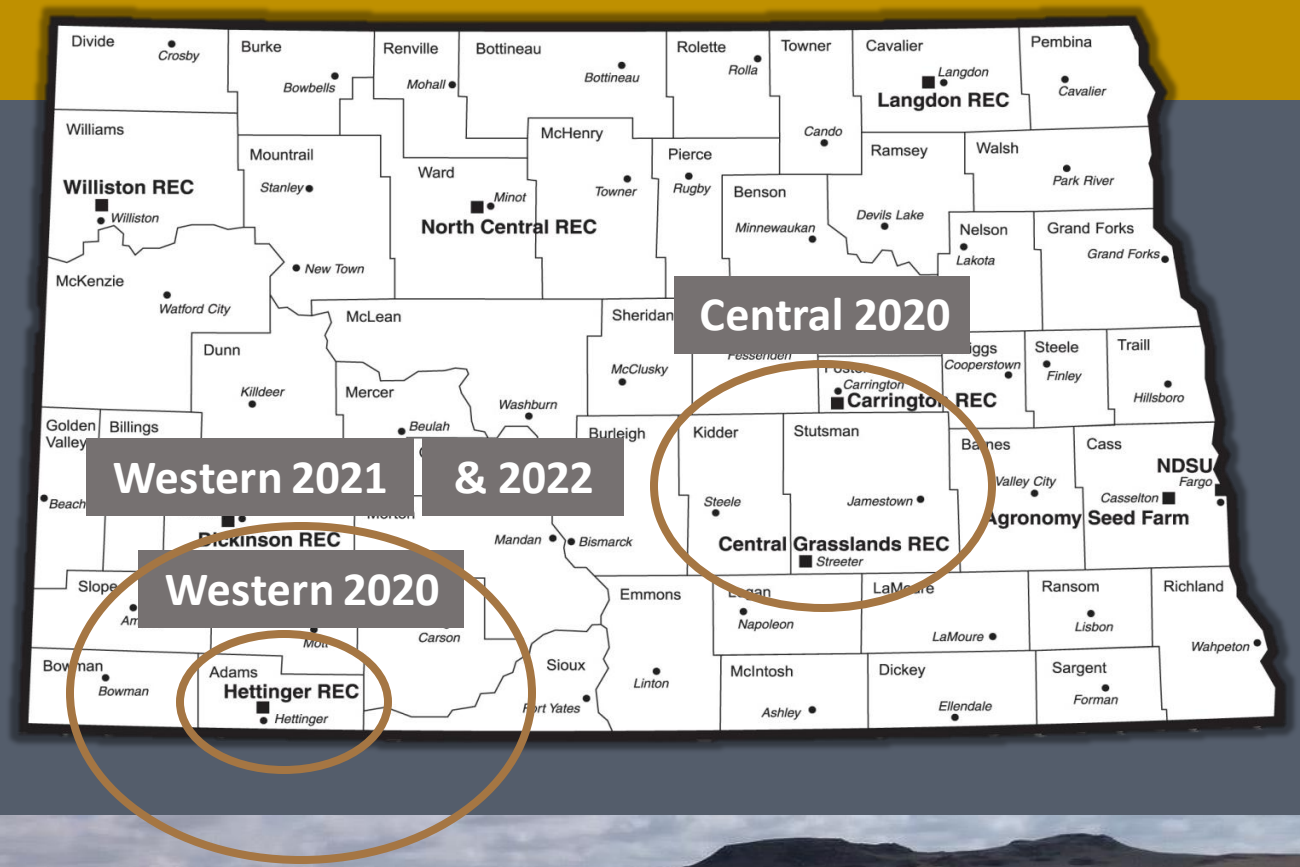
Photo: Rachel Kranz

Study Location

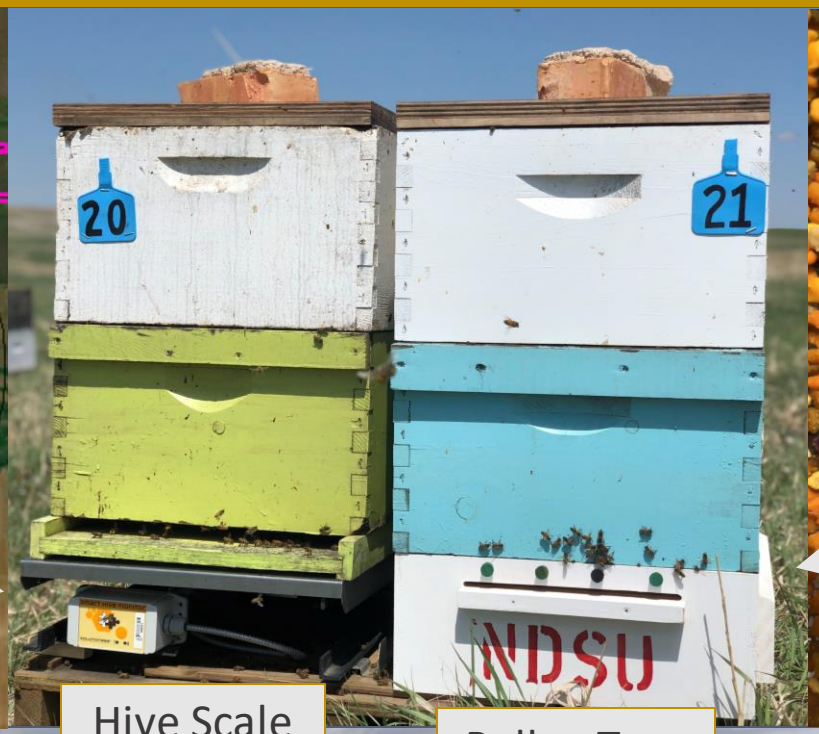
2020 (24 sites)
- Central
  - 9 sites
- Western
  - 15 sites

2021 (27 sites)
- Western (expanded into SD)

2022 (~30 sites)



Data Collection



Hive Scale

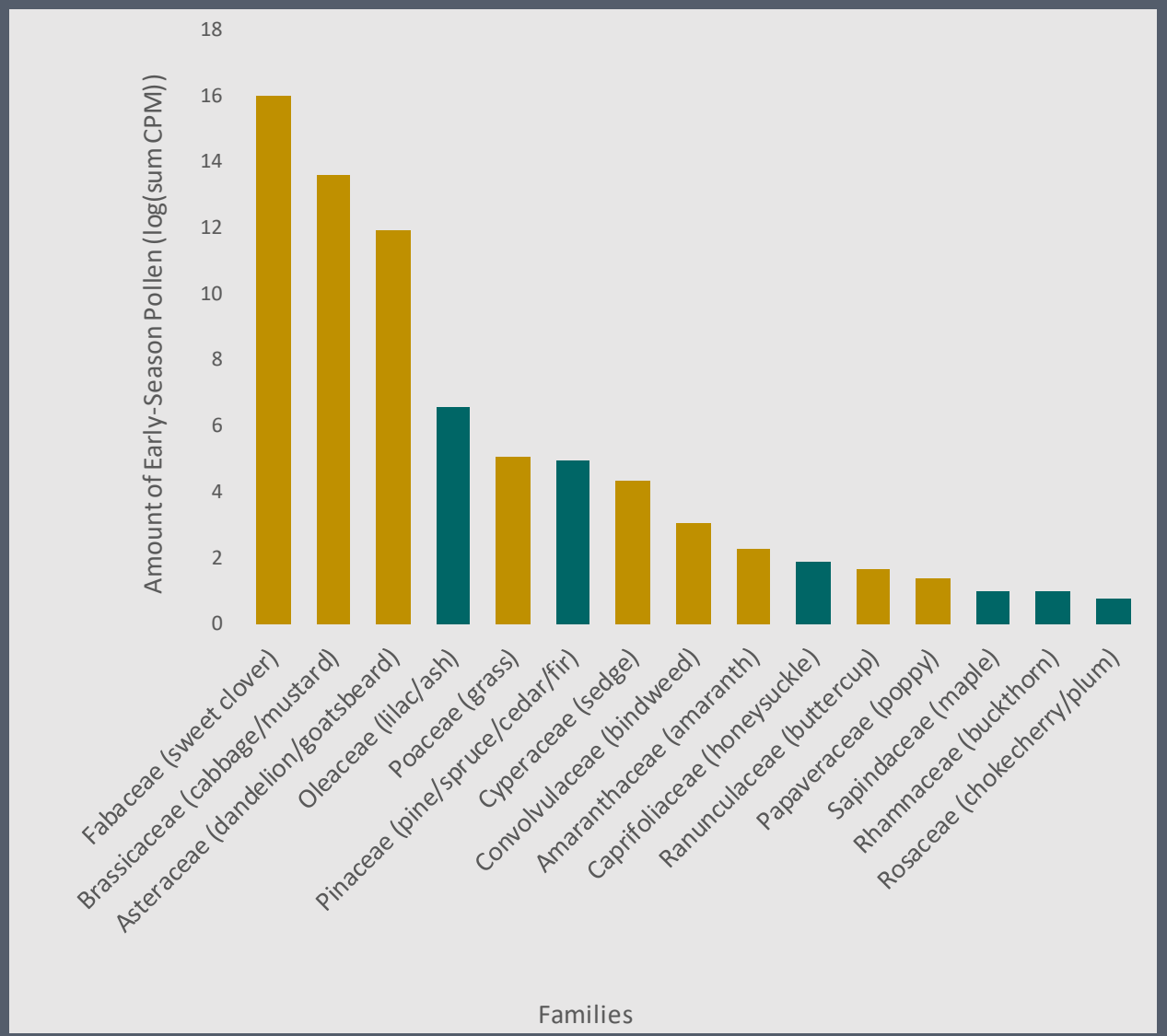
Pollen Trap

2020 Available Shelterbelt Species

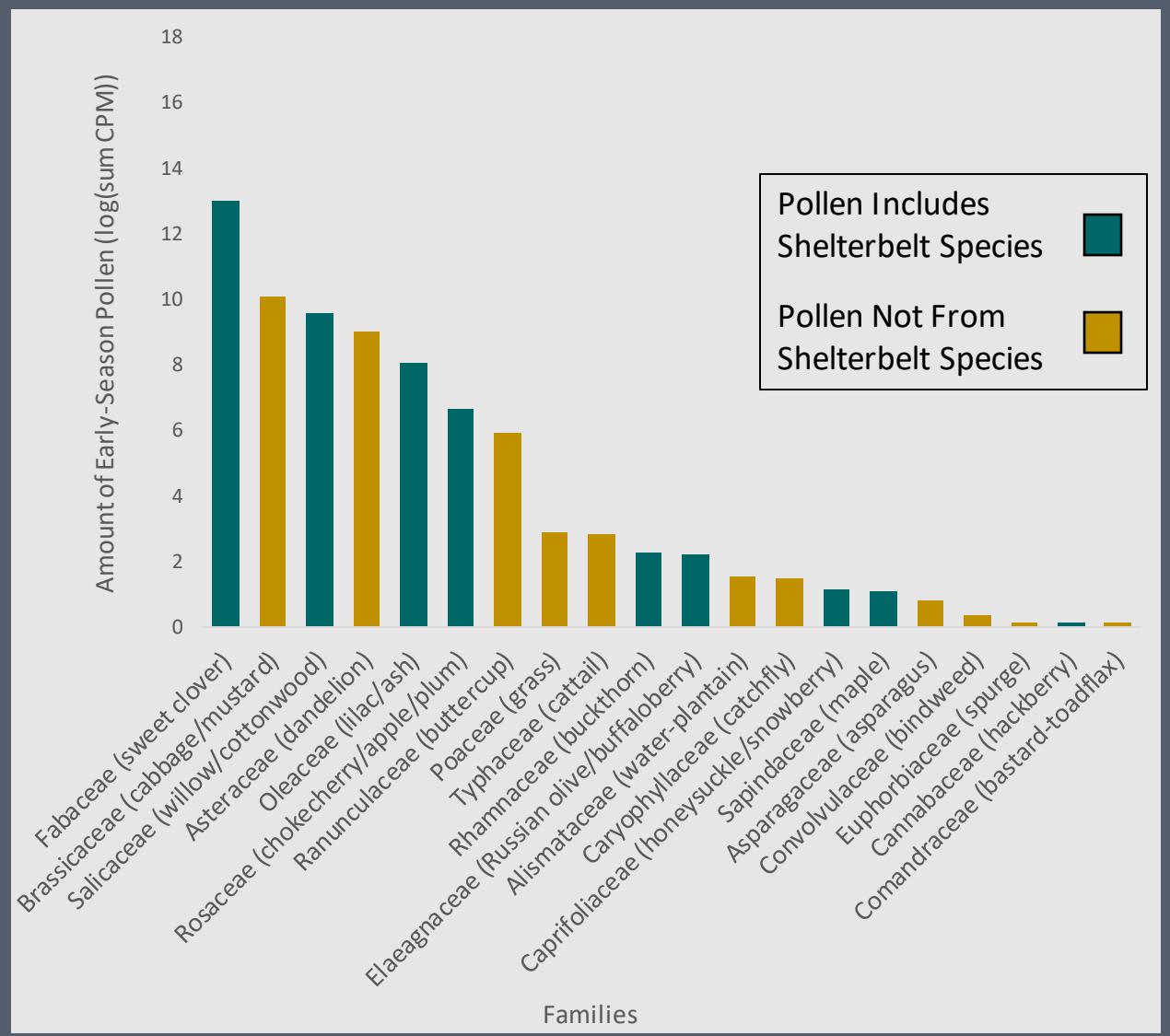
Shelterbelt Families Near 2020 Sites	Common Names of Most Abundant Shelterbelt Species
Anacardiaceae	sumac
Betulaceae	birch
Caprifoliaceae	**honeysuckle**
Cannabaceae	hackberry
Cornaceae	dogwood
Cupressaceae	juniper
Elaeagnaceae	**Russian olive, buffaloberry**
Fabaceae	**Caragana/peashrub**
Fagaceae	oak
Grossulariaceae	currant
Oleaceae	**ash, lilac**
Pinaceae	**spruce, pine**
Rhamnaceae	buckthorn
Rosaceae	**plum, apple, chokecherry**
Salicaceae	**cottonwood, willow**
Sapindaceae	**maple, boxelder**
Ulmaceae	**elm**

2020 Pollen Results-Most Common Species

Western

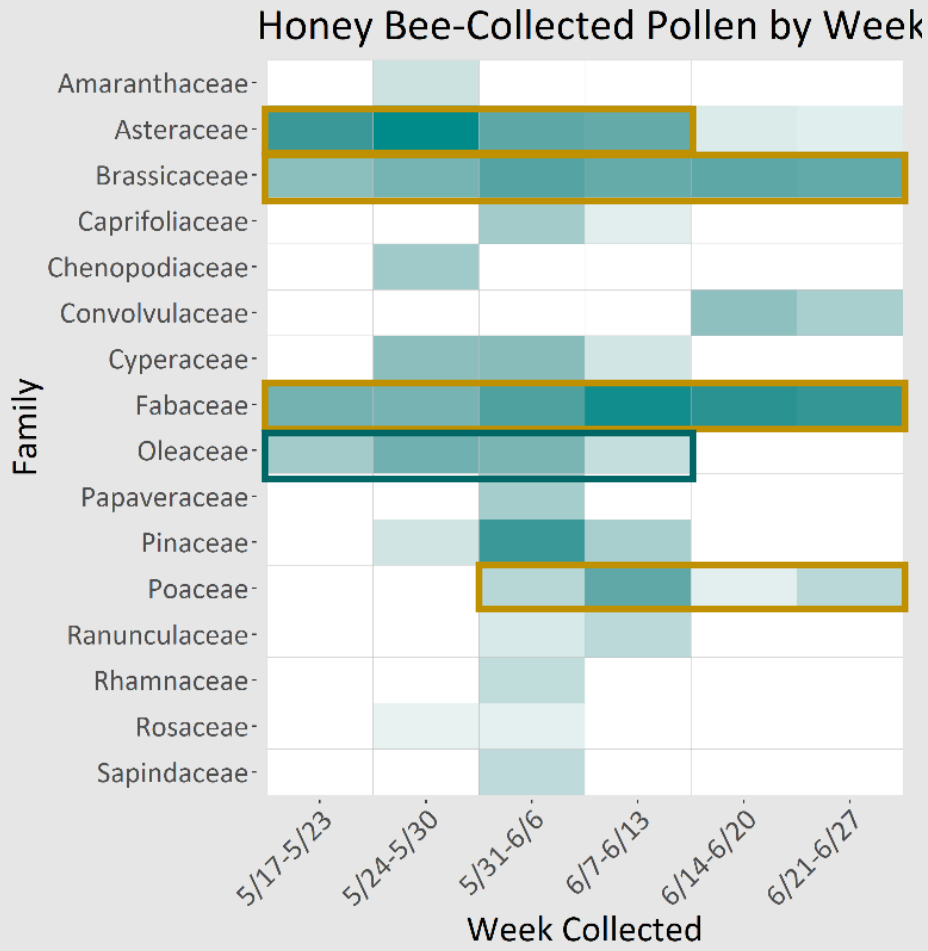


Central



Results-Top Early-Season Families

Western



Top Families:

1. **Fabaceae:** sweet clover/ milkvetch/sainfoins
2. **Brassicaceae:** cabbage/mustard
3. **Asteraceae:** dandelion/goatsbeard
4. **Oleaceae:** lilac/ash
5. **Poaceae:** grass

Legend

Relative Amount of Pollen

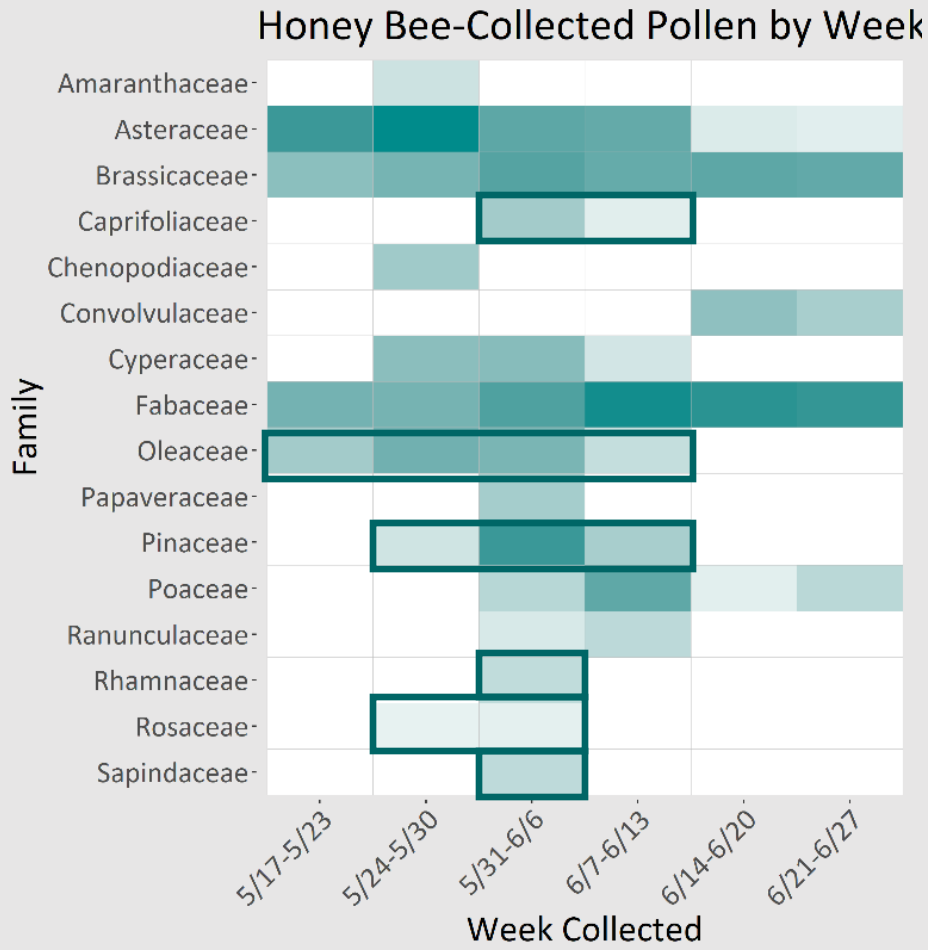
Low — High

Pollen Includes Shelterbelt Species

Pollen Not From Shelterbelt Species

Results-Shelterbelt Families

Western



Shelterbelt Families:

1. **Oleaceae**: lilac/ash
2. **Pinaceae:** pine/spruce
3. **Caprifoliaceae:** honeysuckle
4. **Sapindaceae:** maple
5. **Rhamnaceae:** buckthorn
6. **Rosaceae:** chokecherry/plum

Legend

Relative Amount of Pollen

Low — High

Pollen Includes Shelterbelt Species

Results-Top Early-Season Families

Top Families:

1. **Fabaceae:** sweet clover/milkvetch
2. **Brassicaceae:** cabbage/mustard
3. **Salicaceae:** willow/cottonwood
4. **Asteraceae:** dandelion
5. **Oleaceae:** lilac/ash

Legend

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Pollen Not From Shelterbelt Species

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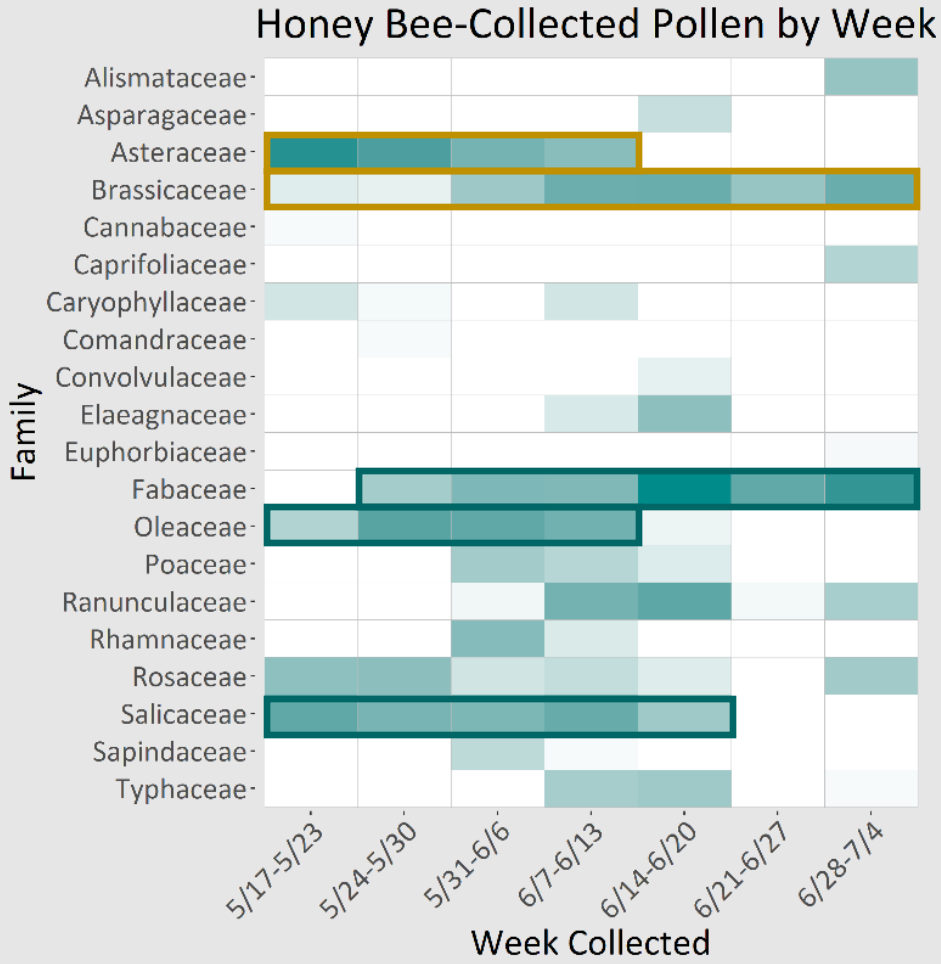


Results-Shelterbelt Families

Shelterbelt Families:

1. **Fabaceae:** sweet clover/milkvetch
2. **Salicaceae:** willow/cottonwood
3. **Oleaceae:** lilac/ash
4. **Rosaceae:** chokecherry/apple/plum
5. **Rhamnaceae:** buckthorn
6. **Elaeagnaceae:** Russian olive/ buffaloberry
7. **Caprifoliaceae:** honeysuckle/snowberry
8. **Sapindaceae:** maple
9. **Cannabaceae:** hackberry

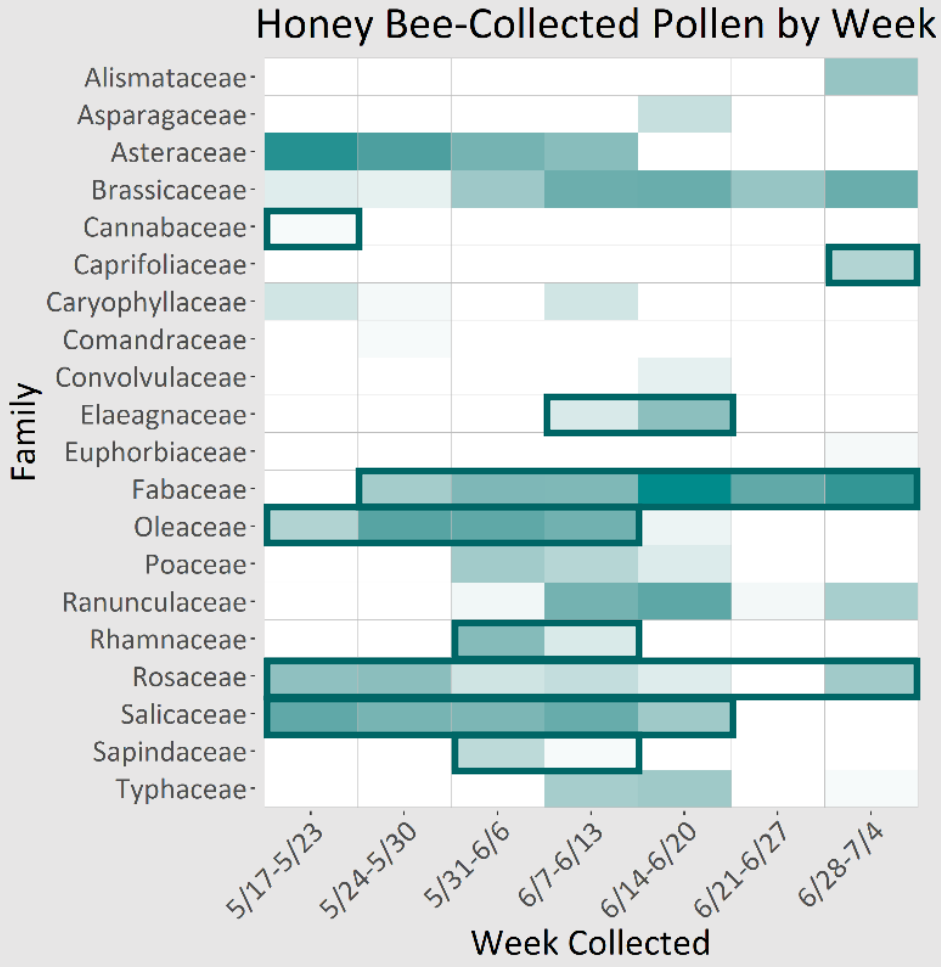
Legend

Relative Amount of Pollen

Low — High

Pollen Includes Shelterbelt Species

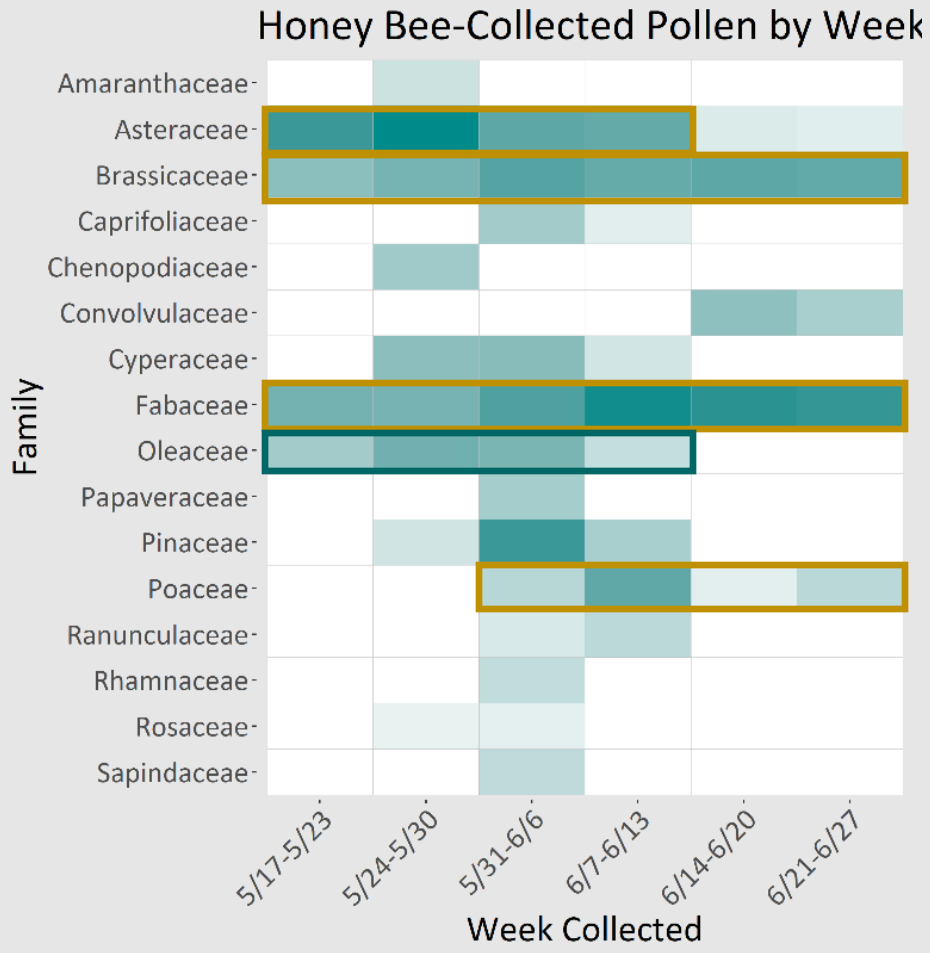
Central



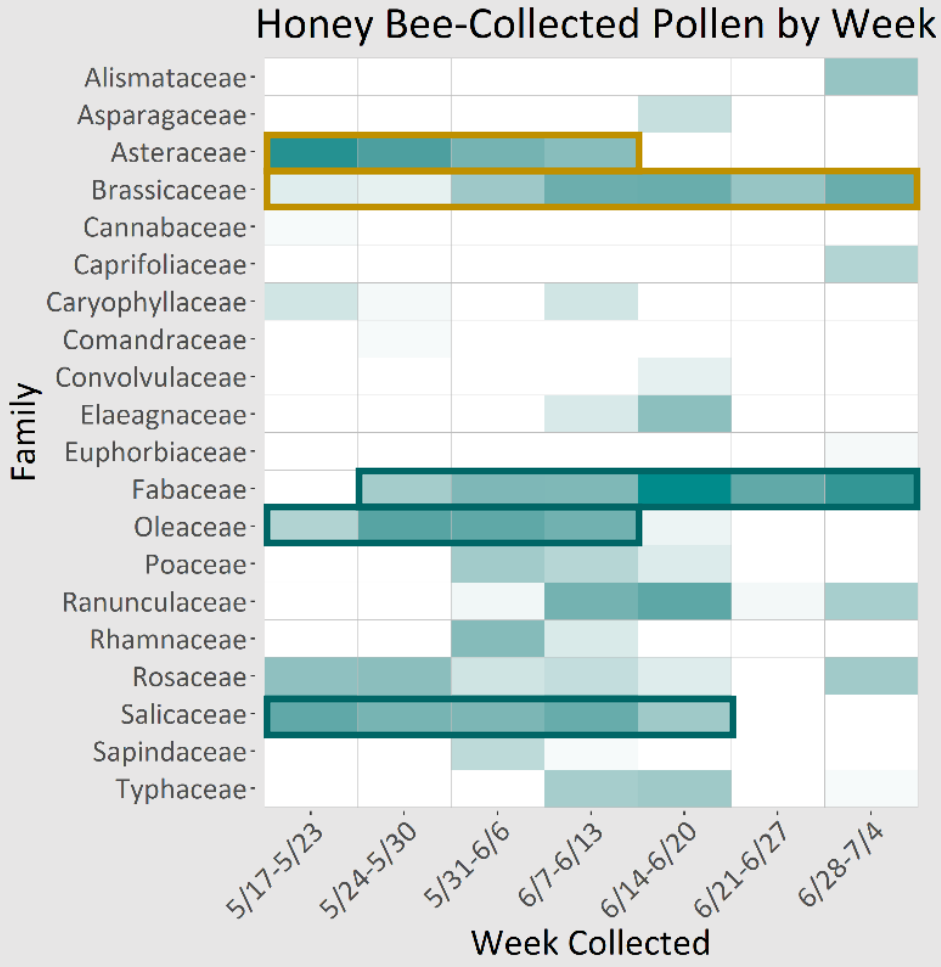
Results-Top Early-Season Families

Legend
Relative Amount of Pollen
Low — High
Pollen Includes Shelterbelt Species
Pollen Not From Shelterbelt Species

Western



Central



Results-Shelterbelt Families

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Relative Amount of Pollen
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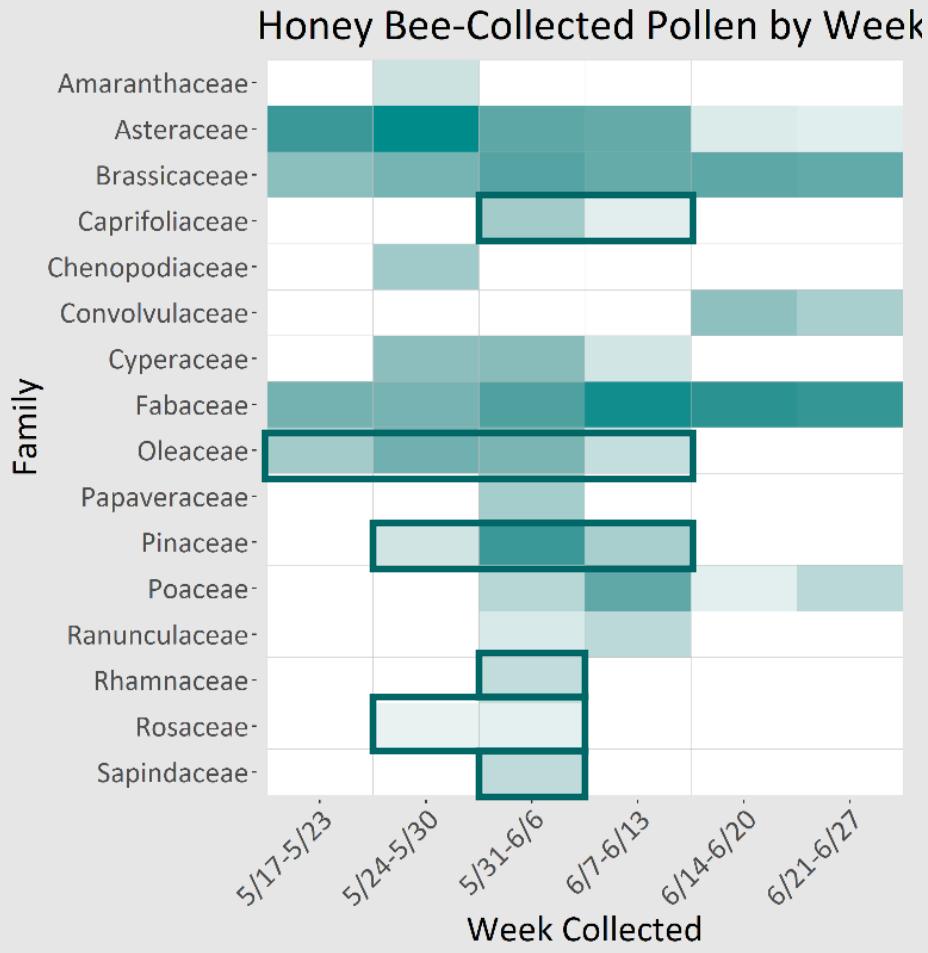
Pollen Includes Shelterbelt Species

Western



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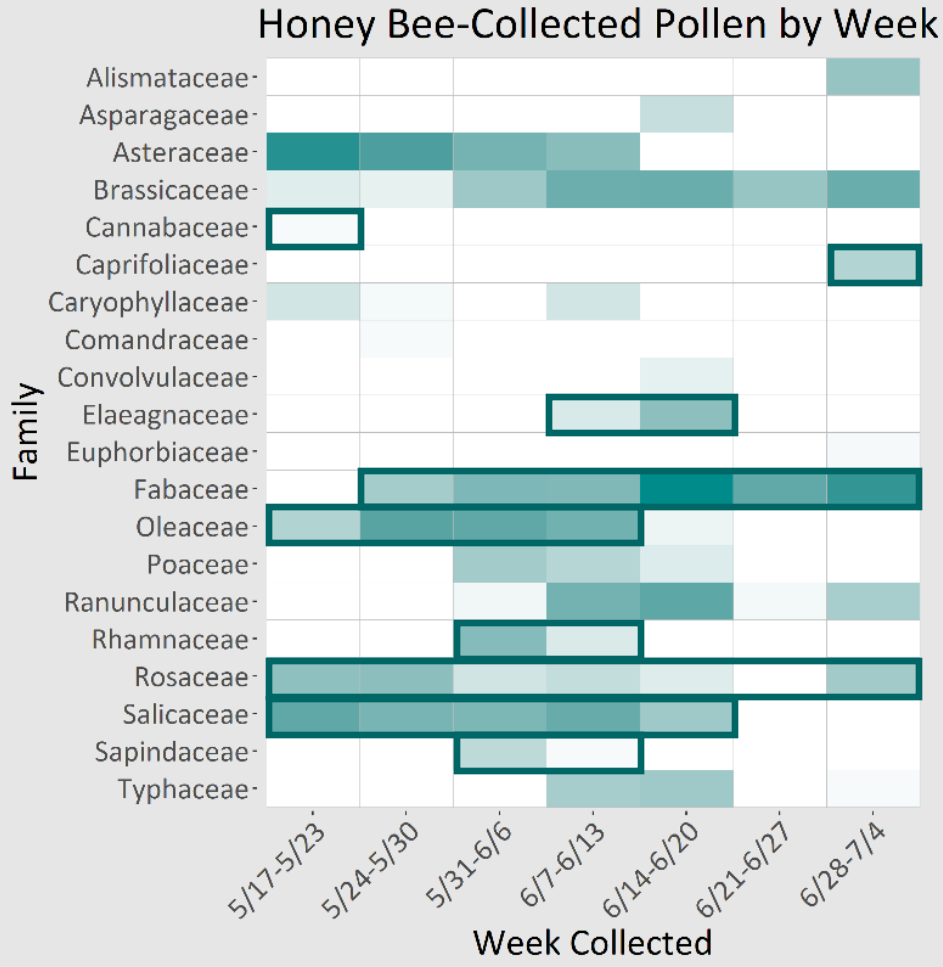

Discussion

- **Fabaceae** (sweet clover/milkvetch/sainfoins)
  - Central: Top family with shelterbelt species, Caragana in low amounts
    - Nectar?
- **Salicaceae** (willow/cottonwood)
  - Central: Willows highly used
  - Western: Not commonly available or used
- **Oleaceae** (lilac/ash)
  - Both: Lilacs highly used in both regions, some ash use
- **Rosaceae** (chokecherry/apple/plum)
  - Central: Used throughout early season

Discussion

- **Pinaceae** (pine/spruce)
  - Potentially from resin
- **Rhamnaceae** (buckthorn)
  - Not planted in shelterbelts
- **Elaeagnaceae** (Russian olive/buffaloberry)
  - Russian olive widely available but used less
    - Nectar?
- **Caprifoliaceae** (honeysuckle/snowberry)
  - Some honeysuckle, mostly western snowberry
- **Sapindaceae** (maple)
  - Species in Acer genus (boxelder or maple)

Conclusion

- Fabaceae, Brassicaceae, Asteraceae, and Oleaceae consistently top early-season families used by honey bees across the state
- 9 total shelterbelt families used by honey bees throughout ND
  - Willows-Central
  - Lilac-Both regions
  - Rosaceae-Central
- Including these species in future plantings may benefit managed honey bees and other pollinators

Future Work

Data Collection

- 3rd field season (2022)
  - Similar to 2021

Data Analysis

Hive Scale Data

- Compare hive weights with distance to and area of nearby shelterbelt cover in past and future years

Vegetation Survey Data

- Compare presence/absence of shelterbelt species available with species used

Acknowledgements

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NORTH CENTRAL SARE Sustainable Agriculture Research & Education

Browning's Honey Est. 1921

Have questions?
Email me at hailey.keen@ndsu.edu.