

Prairie Reconstructions for Pollinators

Providing habitat for bees is now one of the primary goals of prairie restorations. This creates unique challenges because bees are a highly diverse group with a variety of life histories. The majority of prairie bees are solitary and nest in the soil. The rest nest in plant stems or other cavities (e.g., bumble bees nesting in abandoned rodent dens).



Which flowers do bees prefer?

Bees collect nectar and pollen to feed themselves and their larvae. Foraging behaviors and preferences can vary between bee species and are impacted by what flowers are available. Bees will use many different flowers for nectar, but tend to prefer flowers that match their tongue length (especially bumble bees). Bees tend to be pollen generalists, with about 80% of species in a typical community collecting pollen from the most abundant or resource-rich species. The rest are pollen specialists, only collecting pollen from a group of related flowers. Specialist bees are likely to only benefit from restorations where their host plants are present. Life histories, cost, and forb availability all provide challenges for a land manager so it's important to provide a diversity of species and select forbs with the greatest impact.

What do we know?

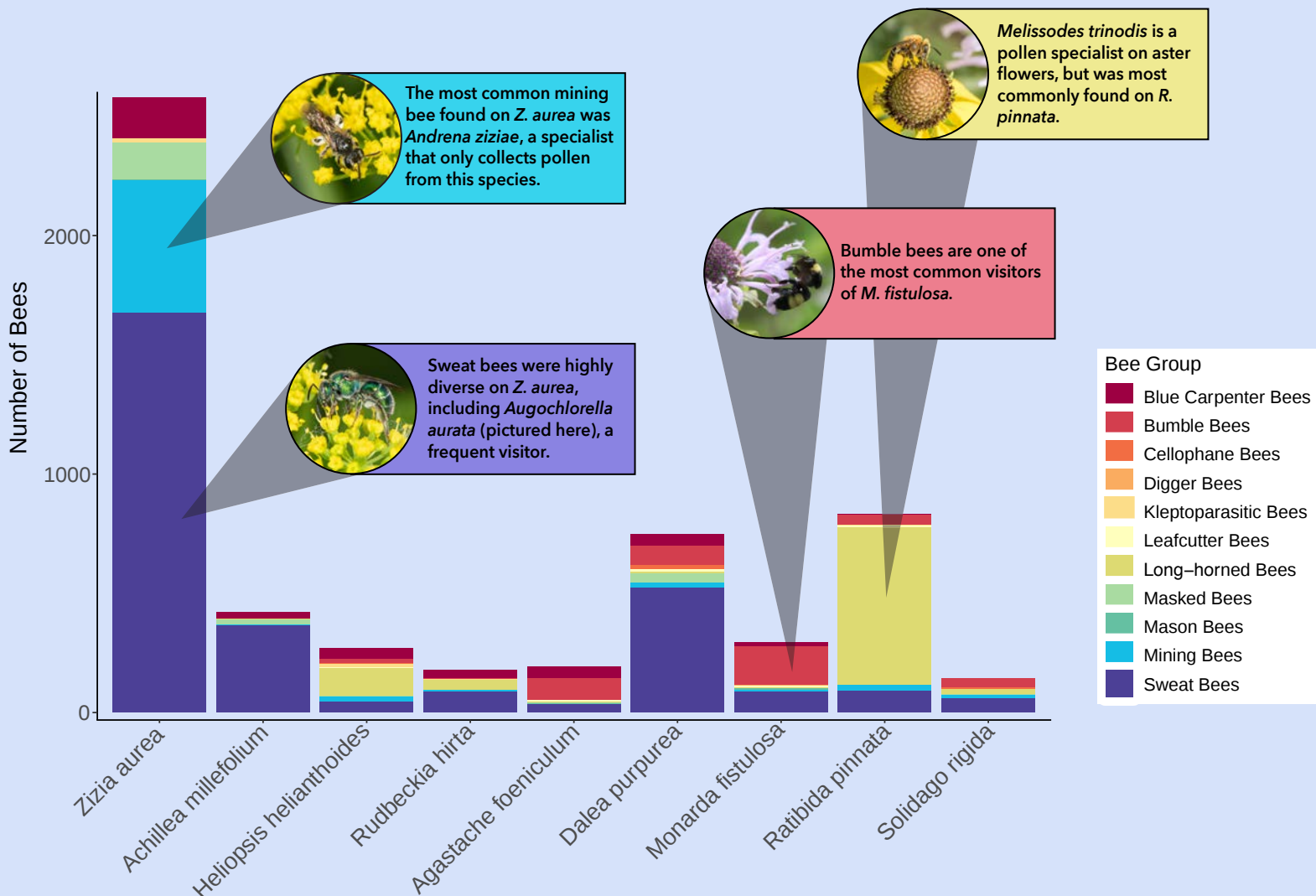
Researchers at the University of Minnesota sampled bees from 17 restorations that were between 2 and 6 years old. Between 2017 and 2018 over 18,000 bees were caught. Bees most commonly visited plants listed below. Golden alexanders (*Zizia aurea*), purple prairie clover (*Dalea purpurea*), and grey headed coneflower (*Ratibida pinnata*) all had the highest number of bees caught as well as the highest number of bee species visiting. Species listed typically established well, and were in high abundance at locations where they were planted.



Common Name	Plant Species	Bloom Time	Bees Caught	# Bee Species
golden Alexanders	<i>Zizia aurea</i>	Early	2580	71
yarrow	<i>Achillea millefolium</i>	Early to Mid	422	28
false sunflower	<i>Heliopsis helianthoides</i>	Early to Mid	269	32
black eyed Susan	<i>Rudbeckia hirta</i>	Early to Mid	177	21
anise hyssop	<i>Agastache foeniculum</i>	Mid	194	25
purple prairie clover	<i>Dalea purpurea</i>	Mid	749	49
wild bergamot	<i>Monarda fistulosa</i>	Mid	296	31
grey headed coneflower	<i>Ratibida pinnata</i>	Mid	831	29
stiff goldenrod	<i>Solidago rigida</i>	Late	144	21

Bees use different plants at different times

The graph below shows the number of each group of bees collected from that species, listed in phenological (bloom time) order. Flowers like **golden Alexanders (*Zizia aurea*)** are largely supporting sweat bees and mining bees. Flowers like **grey headed coneflower (*Ratibida pinnata*)** and **false sunflower (*Heliopsis helianthoides*)** are largely supporting long-horned bees. This can be helpful for tailoring seed mixes to benefit a variety of pollinators all season. For example, bumble bees, which can forage all season, are mostly visiting mid-season flowering **wild bergamot (*Monarda fistulosa*)** and **anise hyssop (*Agastache foeniculum*)**, but are relatively absent from early and late season flowers. If our goal is to improve bumble bee forage, seeding additional early and late flowering species may improve the conservation value of the reconstruction, while ensuring wild bergamot and anise hyssop are well represented during seeding.



Take Aways

- ✈ Different bees will use different species of flowers to varying degrees.
- ✈ Current commonly planted flower species support a wide diversity of bees, especially golden Alexanders, purple prairie clover, and grey headed coneflower.
- ✈ Bumble bees are noticeably absent from early and late season flowers.

Acknowledgements

Authored by:
Ian Lane (lanex173@umn.edu)

Edited by:
Daniel Cariveau, Megan Benage, Paul Charland, & Gina Quiram

Designed by:
Ian Lane & Anthony Auletta

Photo Credits (in order of appearance):
Megan Benage, Christina Herron-Sweet, Heather Holm, & Kiley Friedrich

