

Prepared in cooperation with the U.S. Department of Agriculture, Farm Service Agency; U.S. Department of Agriculture, Natural Resources Conservation Service; and Honey Bee Health Coalition

Flowering Plants Preferred by Bees of the Prairie Pothole Region

Improving Pollinator Habitat

Land managers have stressed the need for improved pollinator habitat on private and public lands of the Prairie Pothole Region. Understanding flowering plant preferences of pollinators will improve the cost-effectiveness of conservation seeding mixes. The purpose of this fact sheet is to assist conservation planners and producers with developing seed mixes by highlighting flowering plants that are preferred by honey bees and wild bees across a variety of grassland cover types in the Prairie Pothole Region.



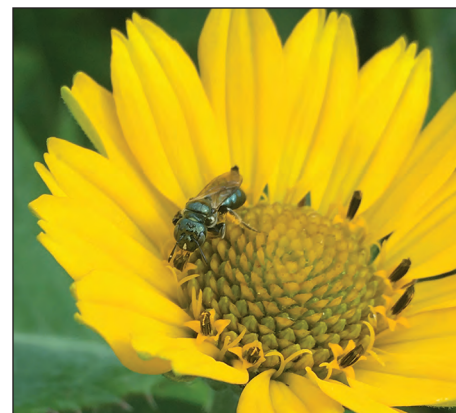
Example of flowering plants found in a pollinator seed mix planting. Photograph by U.S. Geological Survey.

Evaluating Preferences of Bees (2015–19)

Scientists at Northern Prairie Wildlife Research Center used a 5-year plant-pollinator interaction dataset to evaluate the flowering plant preferences of honey bees and wild bees. Bees and flowering plants were surveyed across 244 grassland sites in Minnesota, North Dakota, and South Dakota on conservation plantings, natural areas, and roadsides (not shown). Multiple 20- by 2-meter transects were established at each site. All flowering plants were counted along with the number of honey bees or wild bees visiting flowers. Across all transects, 1.25 million flowering plants were counted, representing more than 280 flowering plant species. Of those 280 flowering plant species, 70 species were visited by honey bees (6,317 visits), whereas 83 species were visited by wild bees (1,887 visits). Data generated during this study are available as a U.S. Geological Survey data release (Otto and others, 2020).



Honey bee (*Apis mellifera*) visiting an alfalfa flower (*Medicago sativa*). Photograph by U.S. Geological Survey.



Small carpenter bee (*Ceratina* species) visiting smooth oxeye (*Heliopsis helianthoides*). Photograph by U.S. Geological Survey.

Preferred Flowering Plants

The flowering plant species preferred by honey bees and wild bees are listed in table 1. A flowering plant is considered preferred when the number of bee visits is larger than expected based on the abundance of the flowering plant (number of flowering stems). Table 1 only includes preferred flowering plants—a plant like alfalfa may have a large number of visits by bees simply because the plant is more abundant than other flowering plants. Some preferred flowering plants may be considered “weedy” species and may not be appropriate for inclusion in conservation seed mixes. The information in table 1 can be used in conjunction with other considerations such as soils, regional growing conditions, availability of seed, and landowner goals when designing pollinator seed mixes.

Reference Cited

Otto, C.R.V., Simanonok, S., Smart, A., and Simanonok, M., 2020, Dataset—Plant and bee transects in the Northern Great Plains, USA, 2015–19: U.S. Geological Survey data release, <https://doi.org/10.5066/P9O61BCB>.



Table 1. Flowering plants preferred by honey bees and wild bees.

[P, perennial; A, annual; A–B, annual to biennial]

Common name	Scientific name	Indigenous status ^a	Life cycle ^b	Bloom period ^c	Growing conditions ^d
Honey bees—Preferred flowering plants (listed from most preferred to least preferred)					
Showy milkweed	<i>Asclepias speciosa</i>	Native	P	June–August	Well-drained soil in full or nearly full sun.
Common milkweed	<i>Asclepias syriaca</i>	Native	P	June–August	Sandy, clayey, or rocky calcareous soil.
Lacy phacelia	<i>Phacelia tanacetifolia</i>	Introduced	A	June–September	Well-drained sandy and gravelly soils.
Blue giant hyssop	<i>Agastache foeniculum</i>	Native	P	June–September	Mesic to dry soil in full or partial sun.
Charlock mustard	<i>Sinapis arvensis</i>	Introduced	A	June–September	Mesic soil in full sun; disturbed areas.
Sainfoin	<i>Onobrychis viciifolia</i>	Introduced	P	June–September	Well-drained soils; legume forage species.
Purple prairie clover	<i>Dalea purpurea</i>	Native	P	June–September	Well-drained or dry soils.
Alsike clover	<i>Trifolium hybridum</i>	Introduced	A, P	June–September	Tolerates wetter or acidic soils.
Stiff goldenrod	<i>Oligoneuron rigidum</i>	Native	P	July–September	Mesic to slightly dry soils in full sun.
Sweetclover	<i>Melilotus officinalis</i>	Introduced	A–B	June–September	Adapted to all soil types.
Wild bergamont	<i>Monarda fistulosa</i>	Native	P	July–September	Well-drained soil in sun.
Wild bees—Preferred flowering plants (listed from most preferred to least preferred)					
Lacy phacelia	<i>Phacelia tanacetifolia</i>	Introduced	A	June–September	Well-drained sandy and gravelly soils.
Stiff goldenrod	<i>Oligoneuron rigidum</i>	Native	P	July–September	Mesic to slightly dry soils in full sun.
Eastern purple coneflower	<i>Echinacea purpurea</i>	Native	P	July–September	Moist to mesic soil in full sun.
Maximilian sunflower	<i>Helianthus maximiliani</i>	Native	P	June–September	Adapted to many soil types; full sun.
Pinnate prairie coneflower	<i>Ratibida pinnata</i>	Native	P	June–September	Well-drained soils in full sun.
Blanketflower	<i>Gaillardia aristata</i>	Native	P	June–September	Variety of soils and full sun
Blue giant hyssop	<i>Agastache foeniculum</i>	Native	P	June–September	Mesic to dry soil in full or partial sun.
Wild bergamont	<i>Monarda fistulosa</i>	Native	P	July–September	Well-drained soil in sun.
Purple prairie clover	<i>Dalea purpurea</i>	Native	P	June–September	Well-drained or dry soils.
Smooth oxeye	<i>Heliopsis helianthoides</i>	Native	P	June–September	Dry to semimoist soil in full sun.

^aIndigenous status was determined from U.S. Department of Agriculture Plants Database (<https://plants.sc.egov.usda.gov/>) as being native to any of the States encompassing the Prairie Pothole Region. Bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and field sowthistle (*Sonchus arvensis*) were preferred by bees but are not included in this table because they are State-listed noxious weeds. Some native or introduced species listed in this table may be considered weedy—consult with local recommendations before seeding.

^bAccording to U.S. Department of Agriculture Plants Database (<https://plants.sc.egov.usda.gov/>).

^cBloom period is based on the first and last observations of the plant flowering in the 5-year dataset from data collected June–September each year.

^dAccording to U.S. Department of Agriculture Plants Database (<https://plants.sc.egov.usda.gov/>) and Minnesota Wildflowers (<https://www.minnesotawildflowers.info/>).



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Photographs by U.S. Geological Survey (top) and Matt Lavin, Montana State University (bottom).

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Publishing support provided by the
 Rolla Publishing Service Center

ISSN 2327-6916 (print)
 ISSN 2327-6932 (online)
<https://doi.org/10.3133/fs20203038>