USDA United States Department of Agriculture

Pollinators Fact Sheet

What Are Pollinators?

Most North Dakota pollinators are insects, such as native bees, wasps, beetles, flies, moths, butterflies, and non-native honeybees. There are also numerous non-insect pollinators, such as some birds and bats.

Over 85% of terrestrial plants rely on pollinators for reproduction. They attract pollinators to their elaborately colored or aromatic flowers with the promise of nourishing pollen and nectar. As foraging pollinators visit flowers, the pollen (male flower parts) sticks to their hairy bodies. Then, as they continue to forage and visit other flowers, they transfer the pollen to the pistil (female flower parts) of those flowers. This fertilizes the plant and enables the plant to produce a seed. For many farmers, this means big business, by forming the seeds of their commodity crops. The entire life cycle of pollinators and the results of their work provides food to all forms of life.

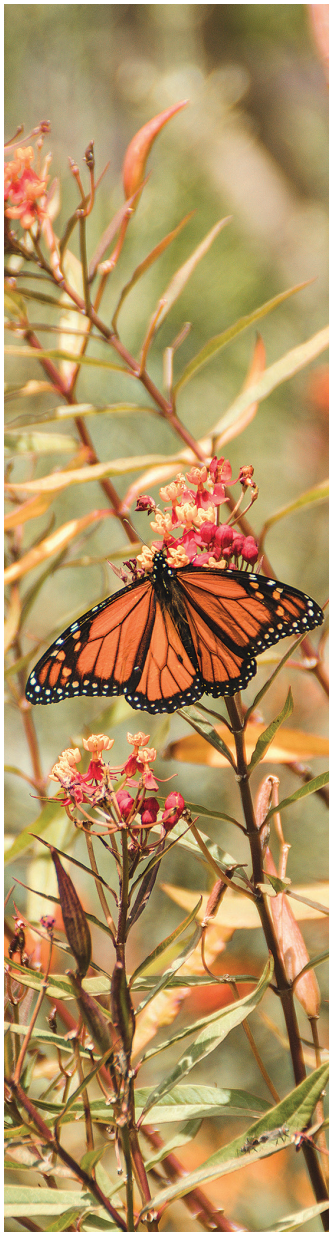
Some plant species have very specific pollinating hosts, such as sphinx moths with specialized mouthparts to fit orchid flowers or hummingbirds with very long tongues to dip deep into tubular flowers for nectar. Some plants with particular flower structures rely on strong bumblebees to pry open the flower petals for access to their pollen and nectar. It is important to note that not all plants utilize pollinators for reproduction. Some rely on wind to transport pollen from one plant to the next.

Diverse plant communities of perennial shrubs, legumes, and wildflowers provide contiguous foraging habitat with different species blossoming early in spring, through the summer, and late into fall. Annual plants, including many commodity crops such as sunflowers, fruits and vegetables provide seasonal bee foraging opportunities. Haylands of alfalfa or various clovers provide significant summer bloom and foraging opportunities; however, they may not provide early or late season blossoms.

Adult bees are active above ground during our normal growing season. All bee species require reliable pollen sources for protein and nectar for carbohydrates during their active period, generally late April through early October. Quality bee forage ensures a healthy population through the winter to the next growing season. Pollen is usually moistened with nectar to feed larvae, and nectar primarily fuels the adults. Bees are considered the most important animal pollinators.

Jennifer Hopwood/Xerces Society

Most native bees nest underground as solitary individuals, preferring patches of bare soil. Bumble bees are social bees that form annual colonies and nest in insulated cavities above or below ground. For example, some bumblebee species nest on the ground's surface, requiring bunchgrasses for nesting sites. Additionally, forage near nesting sites is an important habitat requirement for energy conservation. Bees traveling long distances to poor quality food sources become stressed. Stressed bees are more susceptible to other environmental stressors, such as parasites and diseases, resulting in reproductive decline, starvation, or possibly death. The foraging distance for native bees is up to one-half mile. Non-native honey bees may travel several miles from the apiary to find suitable forage.



North Dakota

Natural Resources Conservation Service

nrcs.usda.gov/

Why Should You Care About Pollinators?

Much of the food we eat relies on pollinators, and many of the vitamins and minerals that are essential to our health come from foods that require pollinators. Pollinators have been decreasing in recent years for many reasons. Because so much of the food web originates with pollinators, it is very important to stop the continued decline. It isn't fully understood why pollinators are decreasing, but loss of habitat to agricultural conversion and urbanization, pesticide exposure, and disease are several contributing factors.

Sarah Foltz Jordan/Xerces Society

Where Do You Start?

The Natural Resources Conservation Service (NRCS), in cooperation with its partners, has developed numerous publications to assist landowners. Among them are, "Farming for Pollinators" and "Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms", available at your local United States Department of Agriculture (USDA) Service Center NRCS office or to download at https://xerces.org/publications/brochures/farming-for-pollinators and https://www.xerces.org/publications/guidelines/farming-for-bees, respectively. These publications recommend three initial landowner actions:

- Recognize the pollinators and properly manage your existing pollinator habitats.
- Adapt production and land management practices to avoid undue harm to pollinators.
- Provide new pollinator habitat on the farm or ranch.

What Can You Do?

Methods are available for providing or protecting nest site habitats for bees in the agricultural landscape; many of them do not interfere with farming.

Provide undisturbed habitat, including:

- Unfarmed land around fields, buildings, and yards.
- Difficult areas to farm, like edges of ditches, ponds, riparian areas, hills, and/or field corners.

Manage irrigation to preserve ground-nesting pollinators.

- Drip or spray irrigation reduces drowning of pollinators compared to flood irrigation.
- Irrigate at night to minimize interference with bee activity and reduce evaporative water loss.

Minimize tillage to protect pollinator nests. Research shows three times more pollinators on squash and pumpkin farms practicing no-till agriculture than conventional tillage.

Provide nesting sites for pollinators using active land management techniques, such as:

- Plant bunch grasses to:
  - Provide nesting structure for pollinators that nest above ground.
  - Create patches of bare ground for pollinators that nest below-ground.
  - Sandy loam soil matrices are ideal.
- Provide perennial forbs with differing bloom periods for spring, summer, and fall.
- Leave dead trees, standing snags, woody debris, and leaf litter.
- Drill holes in dead logs.
- Put out bumble bee nest boxes above ground or buried below ground.

How Do Pesticides Affect Pollinators?

Most insecticides are toxic to non-target species. Some insects may not be killed by pesticides, but could suffer sub-lethal effects, including reduced mobility and foraging ability, ultimately hampering productivity.

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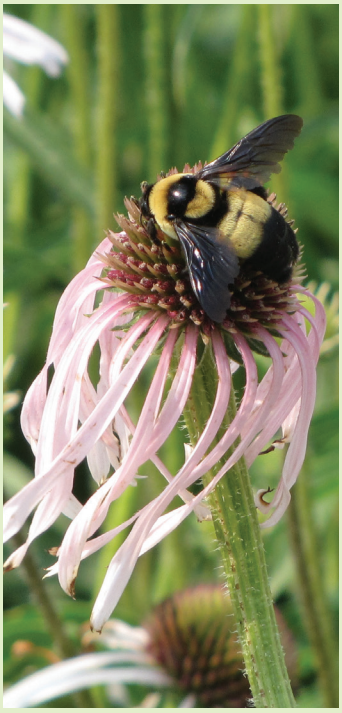
Matthew Shepherd/Xerces Society



Jennifer Hopwood/Xerces Society

North Dakota Pollinator Plants[1]

Native Forbs

Early Bloom (Er)	*Full Seed PLS lb/ac***	*Middle Bloom (Mi)*	*Full Seed PLS lb/ac****	*Late Bloom (L)*	*Full Seed PLS lb/ac****
LIST A. Pollinator species listed as "A" have demonstrated consistent establishment and persistence on various sites state-wide, based on field reviews of pollinator plantings. At least 75% of native forbs in a mix must come from List A.					
American vetch (VIAM)	36.0	American vetch (VIAM)	36.0	Black samson (ECAN2)	9.0
Butterfly milkweed (ASTU)	16.2	Black samson (ECAN2)	9.0	Black-eyed Susan* (RUHI2)	0.8
Canada anemone* (ANCA8)	10.0	Black-eyed Susan* (RUHI2)	0.8	Blue aster (SYLAL3)	1.5
Lewis flax (blue) (LILE3)	3.8	Blanket flower (GAAR)	7.0	Butterfly milkweed (ASTU)	16.2
Plains coreopsis (COTI3)	0.7	Butterfly milkweed (ASTU)	16.2	Cup plant (SIPE2)	9.0 / NR [2]
Rocky Mountain Bee plant (CLSE)	20.0	Canada anemone* (ANCA8)	10.0	Dotted gayfeather (LIPU)	8.0
Shell-leaf penstemon (PEGR7)	4.0	Canada milkvetch (ASCAC6)	4.0	False boneset (EUPE3)	0.4
Western yarrow* (ACMIO)	0.4	Canada tickclover (DECA7)	12.3	False sunflower* (HEHES)	18.0
		Cup plant (SIPE2)	9.0 / NR [2]	Giant blue hyssop (AGFO)	0.8
		Dotted gayfeather (LIPU)	8.0	Grayhead coneflower (RAPI)	1.7 / NR [2]
		False boneset (EUPE3)	0.4	Hoary vervain (VEST)	2.4
		False sunflower* (HEHES)	18.0	Illinois bundleflower (DEIL)	18.0
		Giant blue hyssop (AGFO)	0.8	Ironweed (VEFA2)	2.8
		Grayhead coneflower (RAPI)	1.7 / NR [2]	Leadplant** (AMCA6)	6.5 / 5.4 [2]
		Hoary vervain (VEST)	2.4	Maximilian sunflower (HEMA2)	1.0
		Illinois bundleflower (DEIL)	18.0	Missouri goldenrod (SOMI2)	0.5
		Ironweed (VEFA2)	2.8	New England aster (SYNO2)	0.8 / NR [2]
		Leadplant** (AMCA6)	6.5 / 5.4 [2]	Silky prairieclover (DAVI)	3.8
		Maximilian sunflower (HEMA2)	1.0	Stiff goldenrod (SORI2)	1.4
		Missouri goldenrod (SOMI2)	0.5	Stiff sunflower* (HEPAS)	2.5
		New England aster (SYNO2)	0.8 / NR [2]	Swamp milkweed (ASIN)	15.0
		Plains coreopsis (COTI3)	0.7	White prairieclover (DAAL)	3.9
		Prairie (yellow) coneflower* (RACO3)	1.5	Wild bergamot (MOFI)	0.9
		Purple prairieclover (DAPU5)	3.8		
		Scarlet globemallow (SPCO)	2.0		
		Silky prairieclover (DAVI)	3.8		
		Stiff goldenrod (SORI2)	1.4		
		Stiff sunflower* (HEPAS)	2.5		
		Swamp milkweed (ASIN)	15.0		
		Western yarrow* (ACMIO)	0.4		
		White prairieclover (DAAL)	3.9		
		Wild bergamot (MOFI)	0.9		
LIST B. Additional species to consider for pollinator plantings, when List A species are not available or when increased plant diversity is required.					
Columbine (AQCA)	3.0	Blue vervain (VEHA2)	1.0	Blue vervain (VEHA2)	1.0
Golden Alexander (ZIAU)	6.2	Canada goldenrod (SOCA6)	0.2	Canada goldenrod (SOCA6)	0.2
Groundplum milkvetch (ASCR2)	13.1	Columbine (AQCA)	3.0	Cudweed sagewort* (ARLU)	0.3
Heart-leaved alexander (ZIAP)	6.1	Culver's root (VEVI4)	0.1 / NR [2]	Evening primrose (OEBI)	0.8
Indian breadroot (PEES)	24.8	Evening primrose (OEBI)	0.8	Harebell (CARO2)	0.03
Long bract spiderwort (TRBR)	7.0	Groundplum milkvetch (ASCR2)	13.1	Heath aster (SYER)	0.4
Pasque flower (PUPA5)	2.3	Harebell (CARO2)	0.03	Joe Pye weed (EUMAB)	0.7
Prairie smoke (GETR)	1.0	Heath aster (SYER)	0.4	Meadow gayfeather (LILI)	6.8
Prairie spiderwort (TROC)	7.0	Heart-leaved alexander (ZIAP)	6.1	Partridge pea (CHFAF)	10.0
Showy milkweed (ASSP)	13.0	Indian breadroot (PEES)	24.8	Prairie spiderwort (TROC)	7.0
Silvery lupine (LUAR3)	NR / 8.0 [2]	Joe Pye weed (EUMAB)	0.7	Sawtooth sunflower (HEGR)	1.7 / NR [2]
		Long bract spiderwort (TRBR)	7.0	Sneezeweed (HEAU)	0.4
		Meadow gayfeather (LILI)	6.8	Tall smooth goldenrod (SOGI)	0.5
		Prairie onion (ALST)	6.2	Thickspike gayfeather (LIPY)	8.0 / NR [2]

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North Dakota Pollinator Plants[1]

Early Bloom (Er)	*Full Seed PLS lb/ac***	*Middle Bloom (Mi)*	*Full Seed PLS lb/ac***	*Late Bloom (L)*	*Full Seed PLS lb/ac****
		Prairie phlox (PHAN4)	4.0		
		Prairie spiderwort (TROC)	7.0		
		Purple meadow rue (THDA)	6.2		
		Sawtooth sunflower (HEGR)	1.7 / NR [2]		
		Showy milkweed (ASSP)	13.0		
		Silvery lupine (LUAR3)	NR / 8.0 [2]		
		Thickspike gayfeather (LIPY)	8.0 / NR [2]		
LIST C. Introduced Forbs					
Alfalfa	6.5 / 5.5 [2]	Alfalfa	6.5 / 5.5 [2]	Alfalfa	6.5 / 5.5 [2]
Birdsfoot trefoil (LOCO6)	5.0 / NR [2]	Alsike clover (TRHY)	3.0	White / Ladino clover (TRRE3)	1.5
Red clover (TRPR2)	5.0 / NR [2]	Cicer milkvetch (ASCI4)	10.0 / 8.0 [2]		
Sanfoin (ONVI)	35 (hull)	Red clover (TRPR2)	5.0 / NR [2]		
Strawberry clover (TRFR2)	3.5	Strawberry clover (TRFR2)	3.5		
White / Ladino clover (TRRE3)	1.5	Sweet clover (MEOF)	4.0 / 3.0 [2]		
		White / Ladino clover (TRRE3)	1.5		

[1]Species information taken from North Dakota NRCS Herbaceous Vegetation Establishment Guide
[2]MLRA 55A, 55B & 56 / MLRA 53A, 53B, 54, 58C & 58D; NR – not recommended in MLRAs as stated
*These species will be limited to no more than 2% of the mixture.
**Subshrub
***Seeding rates for most species are based upon approximately 25 seed/ft^2

Short of eliminating insecticide use, producers can reduce risks to pollinators in several ways:

- Some insecticides have active ingredients less likely to cause mortality or sub-lethal effects in pollinators (for example, granular powders are less noxious than dust) and break down more rapidly. Micro-encapsulated formulations should be avoided as they become trapped in a bee's transporting hairs and are carried back to the nest.
- Apply pesticides selectively.
- Apply pesticides at night while pollinators are in nests.
- Apply pesticides on the ground rather than aerial spray.
- Avoid using pesticides during a crop's bloom period.

Plantings For Pollinators.

Plantings of native species are preferred. Native grasses and forbs provide foraging sites for native pollinators and honeybees. Design plantings with season-long blossoms. Diverse herbaceous plantings shall include a minimum of two forb species from each bloom period. Less diverse plantings, such as livestock forage including alfalfa or perennial food plots, may provide significant benefit but not in each season. The preceding table lists bloom periods for native and introduced forbs. Woody pollinator plantings should reference the Tree and Shrub Characteristics in Section I of the Field Office Technical Guide.

- **Seeding dates for pollinator mixes with grasses.** Follow seeding date guidance in the Herbaceous Vegetation Establishment Guide (HVEG) for the cool, warm, or mixed grass species.

- **Seeding rates for forbs.** Some species are limited to 2% of a seed mix (noted above and in the 550 Range Planting Specification.) Seeding rates for the forb species are listed above and are referenced in the HVEG document. Seeding rates for most species are based upon approximately 25 seed/ft^2. To ensure an effective forb population, pollinator plantings designed for NRCS programs can use forb seeding rates up to 150% of the listed rate.