

## WHO ARE POLLINATORS AND WHY SHOULD YOU CARE?

Most pollinators in North Dakota are insects, such as native bees, non-native honey bees, beetles, flies, moths, butterflies, and bats. Through the process of foraging, both native and non-native pollinators provide pollination services to flowering plants and crops.

**Perennial** flowering shrubs, legumes, forbs, and wildflowers provide consistent foraging habitat during the spring, summer, and fall. **Annual** plant species, including many commodity, hay, and produce crops, provide seasonal bee foraging opportunities. Bees, both native species and non-native honeybees, are considered the most important animal pollinators.



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 blooming period. Pollen is usually moistened with nectar to feed larvae, and nectar primarily fuels the adults.

Most native bees nest underground as solitary individuals, preferring undisturbed areas with suitable ground and/or nest structure and nearby forage. Forage near nesting sites is important for energy conservation. Bees travelling 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.

## WHERE DO YOU START?

The Natural Resources Conservation Service (NRCS), in cooperation with its partners, have 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 [www.xerces.org](http://www.xerces.org).

These publications recommend three initial landowner actions:

- Recognize the pollinators and pollinator habitats already on your property.
- Adapt production and land management practices to avoid causing undue harm to existing pollinators.
- Provide new habitat for pollinators on and around the farm.

## 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. They range from simple, low-cost measures to more complex methods:

- Provide undisturbed habitat by focusing on areas that are not farmed, including:
  - Unused land around fields, buildings, and service yards.
  - Difficult areas to farm, like edges of ditches, ponds, riparian areas, hills, or field corners.
- Manage irrigation to preserve ground-nesting pollinators. By using drip or spray irrigation instead of flooding, producers can avoid drowning ground-nesting pollinators and larvae. Irrigation can also be performed at night to minimize interference with bee activity.
- Minimize tillage to protect existing pollinator nests. By tilling shallow or using a no-till planting system, disturbance of nest sites can be avoided. For example, researchers found three times more pollinators on squash and pumpkin farms that practice no-till agriculture than that of conventional tillage farms.

- Provide nesting sites for pollinators using active land management techniques, such as:
  - Plant bunch grasses to create patches of bare ground for nesting.
  - Provide perennial forbs with differing bloom periods for spring, summer, and fall.
  - Leave dead wood and standing snags, drill holes in dead wood, and put out trap nests for twig nesting pollinators.
  - Provide habitat for ground-nesting pollinators. Sandy loam soil matrices are ideal.
  - 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, depending on the active ingredients, mode of action, and formulation. Concentration of the formulation (dust, powder, liquid), as well as behavioral and physiological response of the insect, determine lethality. Some pollinator species might not be killed outright by pesticide applications, but they could suffer sub-lethal effects, including reduced mobility and foraging ability that ultimately hampers their productivity.

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

- Choose appropriate pesticides. Some insecticides have active ingredients that are 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 because they become trapped in a bee's transporting hairs and carried back to the nest.
- Apply pesticides selectively. Producers can:
  - Apply pesticides at night while pollinators are in nests.
  - Apply pesticides on the ground rather than in aerial spray.
  - Avoid using pesticides during a crop's bloom period.
- Convert some or all fields to organic production.
- Keep in mind that some organic insecticides can be harmful to pollinators.

### **PLANTINGS FOR POLLINATORS**



Plantings discussed in this fact sheet are not specific to a particular NRCS practice but encompass many practices that benefit pollinators. Plantings of native species are preferred. Native grasses and flowering forb species provide foraging sites for native pollinators and honey bees. Design plantings to benefit pollinators with season-long blossoms. Herbaceous plantings shall include a minimum of two forb species from each bloom period. However, there are times when plantings can be entirely forbs, such as alfalfa or perennial food plots, or forbs can be seeded with grasses for livestock forage as well as pollinator forage. The following table lists bloom periods for native and introduced forbs. For woody pollinator species,

please see the Tree and Shrub Characteristics reference 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 in the planned seeding mix.

#### **Seeding rates for forbs**

Seeding rates for the forb species are listed below and are referenced in the HVEG document. Seeding rates for most species are based upon approximately 25 seed/ft<sup>2</sup>. To ensure an effective forb population, pollinator plantings designed for NRCS programs will use forb seeding rates up to 150% of the listed rate.

## North Dakota Pollinator Plants<sup>1</sup>

**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**
<b>LIST A. Pollinator species in this list have demonstrated consistent establishment on various sites, based on state-wide field reviews of pollinator plantings. Use List A species to create a pollinator seed mix, selecting 3 species from each bloom period.</b>					
Butterfly milkweed (ASTU)	16.2	Black samson (ECAN2)	9.0	Black samson (ECAN2)	9.0
Lewis flax (blue) (LILE3)	3.8	Black-eyed Susan (RUHI2)	0.8	Black-eyed Susan (RUHI2)	0.8
Plains coreopsis (COTI3)	0.7	Blanket flower (GAAR)	7.0	Butterfly milkweed (ASTU)	16.2
Shell-leaf penstemon (PEGR7)	4.0	Butterfly milkweed (ASTU)	16.2	Dotted gayfeather (LIPU)	8.0
Stiff goldenrod (SORI2)	1.4	Canada milkvetch (ASCAC6)	4.0	False boneset (EUPE3)	0.4
Western yarrow (ACMIO)	0.4	Dotted gayfeather (LIPU)	8.0	False sunflower (HEHES)	18.0
		False boneset (EUPE3)	0.4	Giant blue hyssop (AGFO)	0.8
		False sunflower (HEHES)	18.0	Illinois bundleflower (DEIL)	18.0
		Giant blue hyssop (AGFO)	0.8	Leadplant* (AMCA6)	6.5 / 5.4 <sup>2</sup>
		Illinois bundleflower (DEIL)	18.0	Maximilian sunflower (HEMA2)	1.0
		Leadplant* (AMCA6)	6.5 / 5.4 <sup>2</sup>	Stiff goldenrod (SORI2)	1.4
		Maximilian sunflower (HEMA2)	1.0	Wild bergamot (MOFI)	0.9
		Plains coreopsis (COTI3)	0.7		
		Prairie (yellow) coneflower (RACO3)	1.5		
		Purple prairieclover (DAPU5)	3.8		
		Scarlet globemallow (SPCO)	2.0		
		Stiff goldenrod (SORI2)	1.4		
		Western yarrow (ACMIO)	0.4		
		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.**

American vetch (VIAM)	36.0	American vetch (VIAM)	36.0	Blue aster (SYLAL3)	1.5
Canada anemone (ANCA8)	10.0	Blue aster (SYLAL3)	1.5	Blue vervain (VEHA2)	1.0
Columbine (AQCA)	3.0	Blue vervain (VEHA2)	1.0	Canada goldenrod (SOCA6)	0.2
Golden Alexander (ZIAU)	6.2	Canada anemone (ANCA8)	10.0	Cudweed sagewort (ARLU)	0.3
Long bract spiderwort (TRBR)	7.0	Canada goldenrod (SOCA6)	0.2	Cup plant (SIPE2)	9.0 / NR <sup>2</sup>
Prairie spiderwort (TROC)	7.0	Canada tickclover (DECA7)	12.3	Evening primrose (OEBI)	0.8
Rocky Mountain Bee plant (CLSE)	20.0	Columbine (AQCA)	3.0	Grayhead Coneflower (RAPI)	1.7 / NR <sup>2</sup>
Showy milkweed (ASSP)	13.0	Culver's root (VEVI4)	0.1 / NR <sup>2</sup>	Heath aster (SYER)	0.4
Silvery lupine (LUAR3)	NR / 8.0 <sup>2</sup>	Evening primrose (OEBI)	0.8	Hoary vervain (VEST)	2.4
		Heath aster (SYER)	0.4	Ironweed (VEFA2)	2.8
		Hoary vervain (VEST)	2.4	Joe Pye weed (EUMAB)	0.7
		Ironweed (VEFA2)	2.8	Missouri goldenrod (SOMI2)	0.5
		Joe Pye weed (EUMAB)	0.7	New England aster (SYNO2)	0.8 / NR <sup>2</sup>
		Long bract spiderwort (TRBR)	7.0	Partridge pea (CHFAF)	10.0
		Missouri goldenrod (SOMI2)	0.5	Prairie spiderwort (TROC)	7.0
		New England aster (SYNO2)	0.8 / NR <sup>2</sup>	Sawtooth sunflower (HEGR)	1.7 / NR <sup>2</sup>
		Prairie onion (ALST)	6.2	Sneezeweed (HEAU)	0.4
		Prairie phlox (PHAN4)	4.0	Stiff sunflower (HEPAS)	2.5
		Prairie spiderwort (TROC)	7.0	Swamp milkweed (ASIN)	15.0
		Purple meadow rue (THDA)	6.2	Tall smooth goldenrod (SOGI)	0.5
		Sawtooth sunflower (HEGR)	1.7 / NR <sup>2</sup>	Thickspike gayfeather (LIPY)	8.0 / NR <sup>2</sup>
		Showy milkweed (ASSP)	13.0		
		Silvery lupine (LUAR3)	NR / 8.0 <sup>2</sup>		
		Stiff sunflower (HEPAS)	2.5		
		Swamp milkweed (ASIN)	15.0		
		Thickspike gayfeather (LIPY)	8.0 / NR <sup>2</sup>		
		White prairieclover (DAAL)	3.9		

**North Dakota Pollinator Plants<sup>1</sup>**

**Introduced Forbs**

<i>Early Bloom (Er)</i>	<i>Full Seed PLS lb/ac**</i>	<i>Middle Bloom (Mi)</i>	<i>Full Seed PLS lb/ac**</i>	<i>Late Bloom (L)</i>	<i>Full Seed PLS lb/ac**</i>
Alfalfa	6.5 / 5.5 <sup>2</sup>	Alfalfa	6.5 / 5.5 <sup>2</sup>	Alfalfa	6.5 / 5.5 <sup>2</sup>
Birdsfoot trefoil (LOCO6)	5.0 / NR <sup>2</sup>	Alsike clover (TRHY)	3.0	White / Ladino clover (TRRE3)	1.5
Red clover (TRPR2)	5.0 / NR <sup>2</sup>	Cicer milkvetch (ASCI4)	10.0 / 8.0 <sup>2</sup>		
Sanfoin (ONVI)	35 (hull)	Red clover (TRPR2)	5.0 / NR <sup>2</sup>		
Strawberry clover (TRFR2)	3.5	Strawberry clover (TRFR2)	3.5		
White / Ladino clover (TRRE3)	1.5	Sweet clover (MEOF)	4.0 / 3.0 <sup>2</sup>		
		White / Ladino clover (TRRE3)	1.5		

<sup>1</sup>Species information taken from North Dakota NRCS Herbaceous Vegetation Establishment Guide

<sup>2</sup>MLRA 55A, 55B & 56 / MLRA 53A, 53B, 54, 58C & 58D; NR – not recommended in MLRAs as stated

\*Subshrub

\*\*Seeding rates for most species are based upon approximately 25 seed/ft<sup>2</sup>