

NATIVE TREES AND SHRUBS FOR POLLINATORS

	BOTANICAL NAME	COMMON NAME	COLOR	MOISTURE	HEIGHT	APR	MAY	JUN	JUL	AUG	SEP	BEES	BUT/MOTH	WASPS	FLIES	BEETLES	OTHER
CANOPY TREES	<i>Acer rubrum</i>	Red Maple	red/yellow	m	to 95 ft							X	butterflies	X	X		sawflies
	<i>Acer saccharum</i>	Sugar Maple	yellow	m	to 100 ft							X	butterflies	X	X		sawflies
	<i>Aesculus glabra</i>	Ohio Buckeye	yellow	m	to 35 ft							X					hummingbirds
	<i>Gleditsia triacanthos</i>	Honey Locust	yellow	m, d	to 45 ft							X			X		
	<i>Gymnocladus dioicus</i>	Kentucky Coffeetree	white	w, m	to 75 ft							X	butterflies				hummingbirds
	<i>Prunus serotina</i>	Black Cherry	white	m, d	to 100 ft							X	butterflies	X	X	X	ants
	<i>Tilia americana</i>	American Basswood	white	m	to 95 ft							X	moths	X	X	X	sawflies
LARGE SHRUBS AND SMALL TREES	<i>Amelanchier</i> spp.	Serviceberries	white	w, m, d	10-25 ft							X			X	X	
	<i>Amorpha fruticosa</i>	False Indigo	purple	w	12 ft							X				X	
	<i>Cercis canadensis</i>	Redbud	pink	m	to 25 ft							X	butterflies	X	X	X	
	<i>Cornus alternifolia</i>	Pagoda Dogwood	white	m	to 25 ft							X		X	X	X	
	<i>Cornus rugosa</i>	Round-Leaved Dogwood	white	m, d	5-18 ft							X			X	X	
	<i>Crataegus crus-galli</i>	Cockspur Hawthorn	white	m	to 25 ft							X	butterflies	X	X	X	
	<i>Crataegus mollis</i>	Downy Hawthorn	white	w, m	to 40 ft							X	butterflies	X	X	X	
	<i>Prunus americana</i>	Wild Plum	white	m, d	8-20 ft							X	both	X	X		
	<i>Prunus pensylvanica</i>	Pin Cherry	white	m, d	10-35 ft							X					
	<i>Prunus virginiana</i>	Chokecherry	white	m, d	10-30 ft							X			X		
	<i>Rhus glabra</i>	Smooth Sumac	lime/yell	m, d	6-20 ft							X	butterflies	X	X	X	
	<i>Rhus hirta</i>	Staghorn Sumac	lime/yell	m, d	10-35 ft							X	butterflies	X	X	X	
	<i>Salix discolor</i>	Pussy Willow	white/yell	w	12-35 ft							X	butterflies	X	X	X	sawflies
	<i>Staphylea trifolia</i>	American Bladdernut	white	m	8-20 ft							X		X	X	X	
	<i>Viburnum lentago</i>	Nannyberry Viburnum	white	m, d	8-30 ft							X	butterflies	X	X		
	<i>Zanthoxylum americanum</i>	Prickly Ash	yellow	m, d	6-20 ft							X	moths	X	X	X	
SHRUBS	<i>Amorpha canescens</i>	Leadplant	lavender	m, d	2-4 ft							X	both	X	X	X	
	<i>Aronia melanocarpa</i>	Black Chokeberry	white	w, m	2-4 ft							X			X		
	<i>Ceanothus americanus</i>	New Jersey Tea	white	m, d	2-6 ft							X	butterflies	X	X	X	sawflies
	<i>Cephalanthus occidentalis</i>	Buttonbush	white	w, m	5-15 ft							X	both	X	X	X	
	<i>Cornus amomum</i>	Silky Dogwood	white	w	10-15 ft							X	butterflies	X	X	X	
	<i>Cornus racemosa</i>	Gray Dogwood	white	m, d	10-18 ft							X	butterflies	X	X	X	
	<i>Cornus sericea</i>	Red Osier Dogwood	white	w, m	6-15 ft							X	butterflies	X	X	X	
	<i>Diervilla lonicera</i>	Dwarf Bush Honeysuckle	yellow	m, d	2-4 ft							X	moths				
	<i>Ilex verticillata</i>	Winterberry	white	w, m	6-15 ft							X					
	<i>Physocarpus opulifolius</i>	Ninebark	white	m, d	5-10 ft							X	butterflies			X	
	<i>Ribes</i> spp.	Currant/Gooseberry	wh/yell	w, m, d	2-10 ft							X	both	X	X		
	<i>Rosa arkansana</i>	Prairie Wild Rose	pink	m, d	1-3 ft							X			X	X	
	<i>Rosa blanda</i>	Smooth Wild Rose	pink	m, d	3-7 ft							X			X	X	
	<i>Spiraea alba</i>	Meadowsweet	white	w	3-7 ft							X	butterflies		X	X	
	<i>Spiraea tomentosa</i>	Hardtack	pink	w	3-6 ft							X	butterflies				
	<i>Symphoricarpos albus</i>	Snowberry	white/pink	d	2-5 ft							X	both	X	X	X	
	<i>Symphoricarpos occidentalis</i>	Wolfberry	white/pink	d	3-6 ft							X	both	X	X	X	
	<i>Viburnum rafinesquianum</i>	Downy Arrowwood Vib.	white	d	3-10							X			X	X	



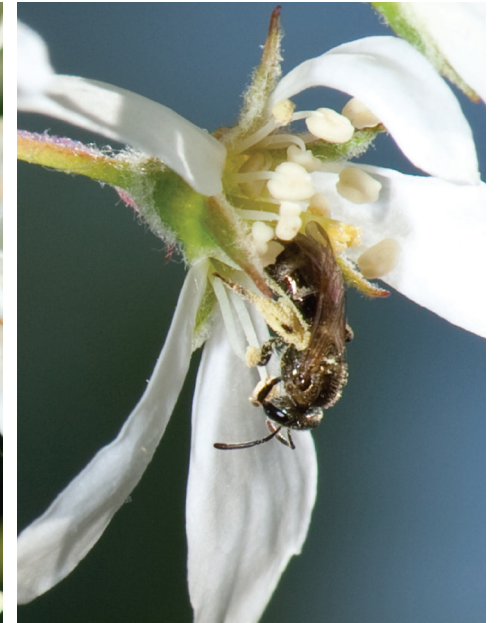
Small carpenter bee, *Ceratina* sp.
on *Rosa blanda*



Eastern bumble bee, *Bombus impatiens*
on *Diervilla lonicera*



Mining bee, *Andrena* sp.
on *Cornus sericea*



Small sweat bee, *Lasioglossum* sp.
on *Amelanchier arborea*



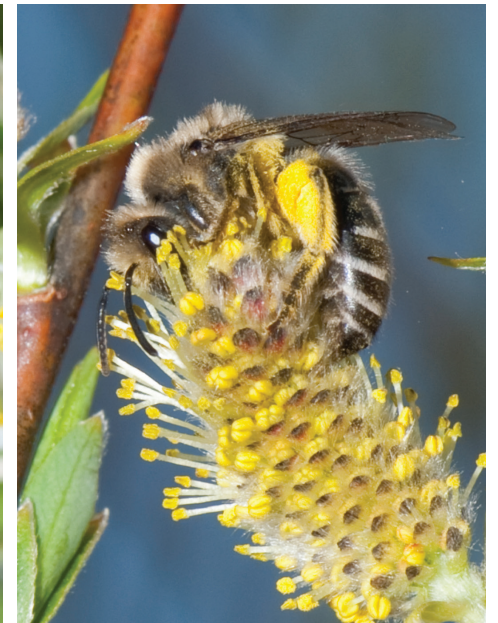
Mining bee, *Andrena* sp.
on *Prunus americana*



Small resin bee, *Heriades* sp.
on *Amorpha canescens*



Bald-faced hornet,
Dolichovespula sp. on *Staphylea trifolia*



Cellophane bee, *Colletes* sp.
on *Salix discolor*

Types of Insect Pollinators

BEES - 20,000 spp worldwide, 4000 spp NA, approximately 425 spp MN

Sociality: 90% solitary, 10% social (bumble bees, sweat bees)

Food: Pollen = protein, nectar = carbohydrates

Pollen collection - females only

Pollen basket, pollen-collecting hairs hind leg, pollen-collecting hairs on abdomen, internal pollen collection

Life cycle: adult lives 2-6 weeks, females establish, construct, and provision nests. 15-25 eggs laid
Larvae hatch in 1-3 weeks, molt 5 times, usually spin a cocoon, pupate. Entire life cycle 1 year (or less if multiple generations in one year).

Nesting sites: 70 % ground-nesting, 30% cavities
Ground-nesting: main burrow shaft with lateral tunnels and brood cells. Brood cells lined with resins, oils, salivary or glandular secretions.

Common ground-nesting species that pollinate trees and shrubs:

Mining bees, *Andrena* spp.

Majority of species active in spring, minority emerge in fall (Asteraceae specialists).

Cellophane bees, *Colletes* spp.

Vernal species important tree and shrub pollinators

Sweat bees (Halictidae family): *Lasioglossum*, *Halictus*, *Agapostemon*

Nest in large aggregations, many eusocial.

Cavity-nesting: holes in tree snags, plant stems, or rocks

Common cavity-nesting species that pollinate trees and shrubs:

Mason bees, *Osmia* spp.: most species active between April and June

Leafcutter bees, *Megachile* spp.: Active June - October

Bumble bees: colony with annual life cycle, queens overwinter under ground (rodent holes)
18 species in MN

WASPS - Carnivorous, prey on other insects

Nectar feeders

Social (colony) in paper nest

Solitary - burrows in the ground, plant stems

BUTTERFLIES, SKIPPERS, AND MOTHS

Nectar feeders, long proboscis allow access to complex flower forms

BEETLES

Pollen and nectar feeders

Long-horned beetles, soldier beetles

FLIES

Pollen and nectar feeders

Syrphidae family, syrphid flies

Bombyliidae family, bee flies

Tachinidae family, tachinid flies

Tree and Shrub Pollination

TREES - Majority wind pollinated, flowers emerge before leaves for improved pollen dispersal by wind.
Wind-pollinated trees produce millions of pollen grains, insect-pollinated trees produce smaller quantities of pollen than wind-pollinated trees

Insect-pollinated Trees: showy flowers, well developed petals, brightly colored, usually fragrant, produce nectar, bisexual flowers

SHRUBS - Majority insect-pollinated

Canopy Trees

MAPLES

Wind-Pollinated: *A. negundo*, Box Elder;

A. saccharinum, Silver Maple

Wind- and Insect-Pollinated: *A. nigrum*, Black Maple;

A. saccharum, Sugar Maple

Insect-Pollinated: *A. rubrum*, Red Maple; *A. spicatum*, Mountain Maple

Acer rubrum:

FLOWERS: early April to mid-May; unisexual on separate trees, occasionally bisexual; fragrant; UV

absorptive dark red color; open flower form, whorls of stamens

Nectar: male flowers - secreted from central disc nectary; female flowers - secreted from glandular tissue at base of ovary

POLLINATORS

Bees: Mason bees, *Osmia* spp.; Mining bees, *Andrena* spp.; Cellophane bees, *Colletes* spp.

Butterflies: Mourning Cloak, *Nymphalis antiopa*; Eastern Comma, *Polygonia comma*

Flies: Syrphid, tachinid, and muscid flies

Wasps: Braconid wasps

Sawflies

BLACK CHERRY, *Prunus serotina*

FLOWERS: mid-May to mid-June; bisexual, raceme, self-incompatible

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Small carpenter bees, *Ceratina* spp.; Cellophane bees, *Colletes* spp.; Sweat bees, *Halictus* spp.; Green sweat bees, *Agapostemon* spp.
Small sweat bees, *Lasioglossum* spp.; Mining bees, *Andrena* spp.

Butterflies: Monarch, *Danaus plexippus*; Painted Lady, *Vanessa virginiensis*

Flies: Syrphid, tachinid, and muscid flies

Wasps - Paper wasps

Beetles - Long-horned beetles

Sawflies

AMERICAN BASSWOOD, *Tilia americana*

FLOWERS: early July to early August; bisexual, self incompatible; flowers mid-summer when tree canopy fully leafed out restricting pollen dispersal by wind; protandrous; flowers typically open mid-afternoon to early evening; pollen is shed for first 24 hours, stigma receptivity follows with nectar production peaking the second day; flower fragrance intensifies in evening; Spatulate bracts are visual attractants rather than aids in seed dispersal

Selecting Trees and Shrubs for Pollinators

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Large Shrubs and Small Trees

SERVICEBERRIES, *Amelanchier* spp.

FLOWERS: late April to early June; bisexual
terminal raceme with 4-11 flowers; open flower form,
whorls of stamens

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Small carpenter bees, *Ceratina* spp.; Sweat bees, *Halictus* spp.; Small sweat bees, *Lasioglossum* spp.; Mining bees, *Andrena* spp.; Cellophane bees, *Colletes* spp.

Flies: Syrphid, bombyliid, and tachinid flies

Beetles - buprestid Sawflies

EASTERN REDBUD, *Cercis canadensis*

FLOWERS: early May to early June; flowers open
successively before leaves emerge; pea-like keel and
banner arrangement; nectar secreted from base of
stamens

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Small carpenter bees, *Ceratina* spp.; Sweat bees, *Halictus* spp.; Small sweat bees, *Lasioglossum* spp.; Mining bees, *Andrena* spp.; Cellophane bees, *Colletes* spp.

Flies: bombyliid flies Beetles: long-horned

Wasps: paper wasps

Butterflies: Painted lady, Red admiral

DOGWOODS, *Cornus* spp.

FLOWERS: late May to early July; bisexual, four-parted;
terminal cyme except *C. racemosa* (terminal panicle);
nearly self-incompatible; nectar secreted from a disc
at the top of the ovary, surrounding the style

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Sweat bees, *Halictus* spp.; Small sweat bees, *Lasioglossum* spp.; Mining bees, *Andrena* spp.

Flies - syrphid, tachinid, and muscid

Wasps - sphecids, vespids, and chalcids

Beetles - long-horned, soldier, mordellid

Butterflies - red admiral

WILD PLUM, *Prunus americana*

FLOWERS: early May to early June; fragrant, umbels;
bisexual, self-incompatible

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Small sweat bees, *Lasioglossum* spp.; Mining bees, *Andrena* spp.; Mason bees, *Osmia* spp.

Flies: syrphid, tachinid, bombyliid, myopid

Beetles - long-horned, scarab, buprestid

Butterflies - red admiral

AMERICAN BLADDERNUT, *Staphylea trifolia*

FLOWERS: May to early June; bisexual, self-incompatible;
protogynous; drooping terminal cluster

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Mining bees, *Andrena* spp.; Cuckoo bees, *Nomada* spp.

Wasps - vespids Flies - syrphid, bombyliid

Beetles - long-horned, scarab

PUSSY WILLOW, *Salix discolor*

FLOWERS: mid-April to mid-May; wind- and insect-pollinated;
flowers open before leaves emerge; unisexual, tree is entirely
male or female; male flowers typically preferred over female
flowers by pollinators (pollen feeding and collection)

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Mining bees, *Andrena* spp.; Cuckoo bees, *Nomada* spp.; Cellophane bees, *Colletes* spp.; Mason bees, *Osmia* spp.

Wasps - vespids, ichneumon Beetles: leaf, weevils

Flies - syrphid, conopid, muscid, tachinid

Shrubs

LEADPLANT, *Amorpha canescens*

FLOWERS: late June to early August; bisexual
clusters of racemes; protogynous

POLLINATORS

Bees: Honey bees, *Apis mellifera*; Bumble bees, *Bombus* spp.; Mining bees, *Andrena* spp.; Cuckoo bees, *Coelioxys* spp.; Leafcutter bees, *Megachile* spp.; Resin

bees, *Heriades* spp.; Yellow-faced bees, *Hylaeus* spp.

Wasps - sphecids, vespids, thynids

Flies - syrphid, bombyliid Butterflies and Moths

Beetles - scarab, mordellid, chrysomelid

BLACK CHOKEBERRY, *Aronia melanocarpa*

FLOWERS: mid May to early July; bisexual

compound cymes; self-compatible

POLLINATORS

Bees: Mining bees, *Andrena* spp.; Small sweat bees, *Lasioglossum* spp.; Cellophane bees, *Colletes* spp.

Flies - syrphid

BUSH HONEYSUCKLE, *Diervilla lonicera*

FLOWERS: mid June to late August; bisexual, axillary
cymes; self-incompatible; corolla changes color as
flower develops from female to male phase; nectariferous
hairs inside corolla restrict access to small bees

POLLINATORS

Bees: Bumble bees, *Bombus* spp.; Digger bees, *Anthophora* spp.; Small sweat bees, *Lasioglossum* spp.; Green sweat bees, *Agapostemon* spp.

Moths - clearwing moths, *Hemaris* spp.

SMOOTH WILD ROSE, *Rosa blanda*

FLOWERS: early June to late June; bisexual, self-compatible;
flowers form on lateral branches

POLLINATORS
Bees: Bumble bees, *Bombus* spp.; Small carpenter bees, *Ceratina* spp.; Mining bees, *Andrena* spp. Green sweat bees, *Agapostemon* spp.; Small sweat bees, *Lasioglossum* spp.; Yellow-faced bees, *Hylaeus* spp. Beetles - long-horned Flies - syrphid

DOWNY ARROWWOOD VIBURNUM

Viburnum rafinesquianum

FLOWERS: late May to early July; bisexual, terminal
cymes; nectar secreted from a disc at the top of the
ovary; low amount of nectar; slightly protandrous;
most pollinator visits are to collect or feed on pollen

POLLINATORS

Bees: Mining bees, *Andrena* spp.; Small carpenter bees, *Ceratina* spp.; Small sweat bees, *Lasioglossum* spp.

Flies - syrphid Beetles - soldier, long-horned, flower