

# Guide to Specialist Bees of Ohio

The Ohio Native Bee Collaborative



Guide to Specialist Bees of Ohio (Version 1.0.0, 2021) was developed by the Ohio Native Bee Collaborative. Lists of specialist bees were compiled from Jarrod Fowler's website on specialist bees and Discoverlife.org

**The Ohio Native Bee Collaborative.**

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Cover photograph by MaLisa Spring

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Thanks also go to the many plant and bee photographers, which also have attribution next to each image.



## Using this book

This book is meant to help people target specialist bees in their area, so that they can attempt to locate potentially rare bees. The first step is locating the correct floral resources, determining the proper bloom time, then watching said flowers for the specialist bees.

This book is broadly ordered by bloom time of the floral hosts in Ohio. That way you can try to use it as a month by month list of flowers to target. Bloom times are approximate, so a particularly cold or wet year might delay bloom times. Conversely, a really warm winter or spring might mean that bloom times are much earlier than anticipated, so take these with a grain of salt.

The fact that a bee is visiting a certain resource is a good hint that it might be a particular species, but there are sometimes several specialists for one plant (see willows, *Salix* spp.), or many generalist bees that might also be visiting the same plant. Thus, even if you find a bee visiting a particular flower with a known specialist, it is important to verify that you have seen the proper characters to determine a species level ID.



## What is a specialist bee?

For the purposes of this book, we will consider a specialist bee as a bee that predominantly forages on only one or two plant genera for a majority of its pollen resource needs. Most family level specialist bees (more accurately considered oligolectic bees) forage on many plants within a particular family. Some family level specialists are listed, but for the most part this guide is targeted towards bees that choose to only forage on one or two genera.

## Specialist bee or lack of data?

Some bees are so rare that we have only documented them a handful of times. And even fewer of those records have known floral hosts, so it is possible that some “specialists” could actually be generalists, but we just lack the data to confirm. Rare bees could be rare because of the lack of appropriate floral hosts, but they could also be rare due to a lack of appropriate nesting habitat.

## Generalist bee or the 7/11 effect?

Sometimes, we might consider a bee a generalist because it is a common bee and it has been documented foraging at a dozen different types of plants. However, documenting a bee only a single time at a plant does not necessarily mean that the bee actually prefers that plant. Or documenting a bee at only 5 different plant types, does not mean it prefers all 5 types of plants equally. Just as we might document humans grabbing a quick meal of junk food at a 7/11, that does not mean that person prefers to eat from gas station convenience stores (roughly paraphrased from a saying by Sam Droege). It could just be we are seeing humans (or bees) at their last resort food option. We might occasionally see them visiting things they are not thought to specialize on and we might just be witnessing the equivalent of a desperate junk food raid as all other resources are gone.



## Documenting bees

Many people are interested in having a species list. Unfortunately, bees are generally very hard to identify without collecting them. However, it can also be a challenge to even find bees to document them. The following points are key considerations for documenting bees.

### Time of year

Many specialist bees are only active as adults when their respective floral hosts are available. Thus, some bees can only be found in the spring vs summer vs fall.

### Time of day

Many bees are active at mid-day, but some species are only active in the early morning hours or at dusk. There are some species we just do not know when they are active, so checking flowers at a variety of times throughout the day might yield better luck.

### Weather

Very few bees fly during rainy weather. Some bees do not fly during cloudy weather. The ideal weather for bee watching is sunny, with calm winds.

### Photography

Some species can be identified from a photograph, but many of the specialist bees are only differentiated by minute characters only visible under a microscope. In fact, the genus *Andrena* is one of our most abundant and diverse genera with 100 different species expected to occur in our area. However, the average *Andrena* is about the same size as a grain of rice, so getting an image that shows all the relevant characters to differentiate the many species is nigh on impossible. But there are several larger bees like the Hibiscus Turret Bee, *Ptilothrix bombiformis*, or the Morning Glory Turret Bee, *Melitoma taurea*, which are large and have characters that are easier to view. So photography is still a viable method to document at least a subset of the species.

### Collecting specimens

The best way to verify if a species is to collect the specimen to later verify the characters under a microscope. Choosing to collect specimens comes with its own logistical issues.

As of this writing, it is legal to collect terrestrial insects on your own property in Ohio, but you need permission to collect specimens anywhere else. So if you choose to look for bees on property that is not your own, be sure to contact the property owner in advance to acquire permission. Some places can have really quick turnaround times, but many state or federally owned properties have several month permit application processes.



## Guide to Specialist Bees of Ohio

There are several ways to collect bees, with the [Handy Bee Manual](#) offering many good resources on various bee collection methods. For this book, we recommend hand or net collecting bees into small bags or vials. Then be sure to add a collection label that says when, where, and who collected it. We also highly recommend recording which plant the bee was collected from. In my case, I also photograph the plants so I can refer back to them later and double check the plant identification. Once the specimens are collected, I put them in the freezer for processing in the winter.

Most bees that are wet collected (bowl traps or similar) need to be washed and carefully dried. However, one of the major perks of hand collecting bees from flowers is that they typically remain dry and thus rarely need to be washed and fluffed. Thus, once you have time in the fall, it is easy to pull specimens out of your freezer to pin. To learn more about pinning and properly labelling bees, refer to the [Handy Bee Manual](#).



Photo of a pinned specimen (top) with a collection label (middle) and identification label (lower)

Photo: MaLisa Spring



Example collection label showing location, date, collector, and the plant the bee was collected on.

Photo: MaLisa Spring





## Gardening for specialist bees

Although gardening is not the goal of this book, it is possible to glean some useful garden knowledge to help specialist bees near you. **The best way to support specialist bees is to have both suitable floral resources AND nesting resources available.**

This book will highlight the key floral resources for many specialist bees that might occur in Ohio. There are now several native plant sellers across Ohio that have ethically sourced native plants with local genotypes. Some bigger garden stores also now sell “nativars”, which are cultivars of native species due to the increased demand for native plants. These cultivars are often selected for various traits, so be careful to choose plants that are still providing floral or nectar resources. Avoid any “double flowered” varieties of plants as this typically makes the pollen and nectar inaccessible. Ideally, choose native, locally sourced plant species that have not been selectively bred to be vastly different from the wild types.

The simplest breakdown of gardening for specialist bees is: acquire the floral host of the specialist bee. Or try for a species really similar to its preferred floral host. Do you want a Hibiscus Turret bee? Get a native Hibiscus! Do you want a Golden Alexander Mining bee? Plant Golden Alexander! Do you want a Squash bee? Plant squash and hope you don't get squash vine borers instead! Or rejoice that you got a super weird moth. You do you. Want as many specialist bees as possible? Plant as many types of plants that are hosts of specialist bees that you can. Planting the correct floral resource does not guarantee that the specialist bee will show up, but it greatly increases your likelihood of getting native specialist bees to stop by. This is of course an extremely simplistic take, as many plants have sun or moisture restrictions, so fitting everything into a backyard is unlikely. Be sure to consider sun, moisture, and soil type requirements when considering any new plants for a specific location.

Nesting resources are often overlooked in gardens, but are also very important for bees success. However, this book is not meant to go in depth about the plethora of nesting strategies of native bees found in Ohio, so only a short summary is included here. About 70% of bees nest in the ground, while the remaining 30% of bees are cavity nesters, choosing to nest in plant stems, cracks, or even snail shells. When gardening, be careful with being too neat. Try to leave plant stems standing throughout the winter and spring, or only trim them down to a height of a foot so the bees can use those stems the following year.



A small carpenter bee (*Ceratina* sp.) nesting in a pithy stem

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## Guide to Specialist Bees of Ohio

If you must remove the dead plant stems, move them to a different portion of your backyard. That way the stems can still be used by bees, or the bees in them can still have a chance at emerging next year. Other nesting resources that some bees use are cut leaves, mud, or resin to construct their nests.



A leafcutter bee (*Megachile* sp.) building nest cells with petals and leaves

© Amy Schnebelin (CC BY 4.0)

A majority of our native species are solitary, so they rarely have large ground nest aggregations. Solitary nesting makes it much harder to determine where bees are nesting, as the soil disturbance is often minimal. However, it is possible that you have many small native bees nesting in your soil without your knowledge.



## Important Botanical Terms

**Alternate** – leaves attach individually along the stem

**Anthers** – the pollen-bearing, round or oblong structure at the tip of the stamens

**Axil** – the angle (or “armpit”) between a leaf and the plant stem

**Composite** – a plant in the family Asteraceae made up of tiny upward-facing disc flowers, and/or petal-like ray flowers. The entire flowering head mimics a single large flower. For example, a daisy, where a center of little yellow disc flowers is surrounded by white petal-like ray flowers.

**Compound leaves** – leaves composed of smaller “leaflets”

**Corolla** – a collective term for all of the petals of a flower

**Cultivar** – shortened term for “cultivated variety”

**Basal leaves** – leaves that grow at the base of the stem

**Basal rosette** – the first-year expression of biennial plants: generally a ring of dense foliage along the surface of the ground

**Bracts** – A leaf-like structure associated with a flower or a flower cluster. Most bracts resemble reduced foliage leaves, but sometimes bracts are specialized, such as those that surround the flower-head of members of the composite family (Asteraceae) or the four showy, petal-like structures seen on blooming dogwood trees.

**Dioecious** – species whose plants are separately male or female

**Discoid** – refers to composite inflorescences that are made up of disc flowers only

**Entire** – with no lobes or teeth along the leaf margin

**Genera** – the plural form of “genus”

**Inflorescence** – the botanical term for “flower cluster”

**Lobed** – with deep round or angled cuts along the leaf margin

**Margin** – the leaf edge

**Monoecious** – species which have both separate male and female flowers on the same plant

**Opposite** – leaves attach in pairs along the stem

**Palmate** – palm- or hand-shaped; attached at a single point and spreading outward



## Guide to Specialist Bees of Ohio

**Pinnate** – arranged in a feather like fashion, such as a compound leaf with leaflets on opposite sides of a central axis

**Pistil** – the female reproductive organ of a flower; generally protruding from the center of the flower

**Ray flowers** – small flowers that resemble petals on a composite inflorescence

**Sepals** – the usually green, outermost whorl of a flower that functions as a protective barrier for flowers before they bloom

**Stamens** – the male reproductive organs of a flower; generally consisting of small filaments supporting pollen-containing anthers; often placed in a ring around the pistil

**Toothed** – with jagged serrations along the leaf margin

**Umbel** – a usually flat-topped cluster with the supporting flower stalks originating from a common location (like the ribs of an umbrella)

**Whorled** – leaves attach in groups of three or more along the stem



## Spring Floral Resources to Target

Plant Group		Approx. Bloom Time in Ohio	Page
Spring Beauties	<i>Claytonia</i> spp.	March - May	14
Violets	<i>Viola</i> spp.	March - May	15
Fawn Lilies or Trout Lilies	<i>Erythronium</i> spp.	April	16
Bittercresses and Toothworts	<i>Cardamine</i> spp.	April - May	17
Eastern Redbud	<i>Cercis canadensis</i>	April - May	18
Geraniums or Cranesbills	<i>Geranium</i> spp.	April - May	19
Jacob's Ladder	<i>Polemonium</i> spp.	April - May	20
Willows	<i>Salix</i> spp.	April - May	21
Ragworts	<i>Packera</i> spp.	April - June	22
Cinquefoils	<i>Potentilla</i> spp.	April - June	23
Rhododendrons and Azaleas	<i>Rhododendron</i> spp.	April - June	24
Golden Alexanders	<i>Zizia</i> spp.	April - June	25
Waterleaf	<i>Hydrophyllum</i> spp.	May	26
Phacelias	<i>Phacelia</i> spp.	May	27
Blueberries and Cranberries	<i>Vaccinium</i> spp.	May	28
Dogwoods	<i>Cornus</i> spp.	May - June	29
Alumroots	<i>Heuchera</i> spp.	May - June	30
Dwarf Dandelions & Hawkweeds	<i>Krigia</i> spp. & <i>Hieracium</i> spp.	May - June	31
Spring Flowering Parsley-Carrot Family Members	Family Apiaceae	May - June	32
Fleabanes	<i>Erigeron</i> spp.	May - August	33



## Spring Floral Resources to Target

### Spring Beauties (Genus *Claytonia*)

These small flowers can be found in many lawns in the spring. The flowers are rarely taller than 6 inches, thus making them an ideal lawn plant. The flowers have five white-ish petals with light pink-purple veins. The leaves are lance-like and can be mistaken for grass when not in bloom.

- **Plant Habitat:** Lawns, woods, clearings, roadsides. Prefer part to full shade.
- **Approximate Bloom Time in Ohio:** March - May
- **Bees that specialize on this plant:** *Andrena erigeniae*



Virginia Spring Beauty (*Claytonia virginica*)  
© The Dawes Arboretum



Virginia Spring Beauty (*Claytonia virginica*)  
© MaLisa Spring, all rights reserved



*Andrena erigeniae*  
© Bill Stitt (CC BY-NC 4.0)



## Spring Floral Resources to Target

### Violets (Genus *Viola*)

The most common violet is a short purple flower of under 6 inches tall. Leaf shape for violets is variable and depends on the species, with most violets having heart shaped leaves. Ohio has around 30 species of violets! Our native violets have either purple, lavender, yellow, or white flowers.

- **Plant Habitat:** Habitat depends on the species, with our most common blue violet being readily found in lawns across Ohio. Other species are associated with woodlands, prairies, wetlands, etc.
- **Approximate Bloom Time in Ohio:** March - May
- **Bees that specialize on this plant:** *Andrena violae*



Common Blue Violet (*Viola sororia*)  
© The Dawes Arboretum



Downy Yellow Violet (*Viola pubescens*)  
© The Dawes Arboretum



Striped Cream Violet (*Viola striata*)  
© The Dawes Arboretum



*Andrena violae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Fawn Lilies or Trout Lilies (Genus *Erythronium*)

Two species common in Ohio, distinguished by color (white and yellow). Both feature stout, mottled basal leaves (up to 7” long and 3” wide), with a nodding flower sitting atop a leafless stem. The flower’s petals become strongly recurved as it matures, leaving the reproductive parts distinctively hanging out beneath. The less common beaked trout lily (*E. rostratum*) has a yellow flower that is erect instead of nodding, and the tepals are not recurved. This less common species is restricted to southern Ohio.

- **Plant Habitat:** Moist woodlands
- **Approximate Bloom Time in Ohio:** April
- **Bees that specialize on this plant:** *Andrena erythronii* - Note that this species has been recorded foraging on several other spring ephemeral plants, but seems to prefer or at least be found most often on Fawn Lilies.



White Trout Lily (*Erythronium albidum*)  
© The Dawes Arboretum



Yellow Trout Lily (*Erythronium americanum*)  
© The Dawes Arboretum



Beaked Trout Lily (*Erythronium rostratum*)  
John Brown (Public Domain)



*Andrena erythronii*  
USGS Bee Inventory and Monitoring Lab (Public Domain)





## Bittercresses and Toothworts (Genus *Cardamine*)

Small plants (usually up to 8" tall) in the mustard family, sometimes with distinctive basal leaves or basal rosettes (rosette shape and size can vary - some compound and some entire) followed by a thin stem shooting upwards with 4-petaled white or light purple flowers. Leaves along the stem are also varied in shape and size.

- **Plant Habitat:** Native species, including cut-leaf toothwort (*C. concatenata*) are found in moist woodlands. Non-native species, such as hairy bittercress (*C. hirsuta*) are often found as weeds in lawns and landscapes.
- **Approximate Bloom Time in Ohio:** April - May
- **Lookalikes:** Flowers can be reminiscent of other small white flowers in bloom at the same time (including rue-anemone, *Thalictrum thalictroides* aka *Anemonella thalictroides*), but leaves are starkly different.
- **Bees that specialize on this plant:** *Andrena arabis*



Cut-leaved Toothwort (*Cardamine concatenata*)  
© The Dawes Arboretum



Two-leaved Toothwort (*Cardamine diphylla*)  
© Shirley Zundell (CC BY 4.0)



*Andrena arabis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Andrena arabis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Eastern Redbud (*Cercis canadensis*)

As a short tree, this plant rarely gets taller than a single story house. The small pink blooms are found along the branches and often even on the main trunk of the tree. The flowers are shaped like most other flowers in the pea family (i.e. 2 petals on the bottom, 2 on the side, and 1 on top).

- **Plant Habitat:** Woodland edges, along roads, hedgerows, commonly used in landscaping.
- **Approximate Bloom Time in Ohio:** April - May
- **Bees that specialize on this plant:** *Habropoda laboriosa* - also known to visit blueberry plants, but Redbuds are much more common in Ohio



Eastern Redbud (*Cercis canadensis*)  
© The Dawes Arboretum



Eastern Redbud (*Cercis canadensis*)  
Mike Goad (Public Domain)



*Habropoda laboriosa*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Habropoda laboriosa*  
© Blake Bringham (CC BY 4.0)



## Spring Floral Resources to Target

### Geraniums or Cranesbills (Genus *Geranium*)

Wild geraniums are very different from the common garden plants of the same name. Wild geraniums feature simple 5-petaled purple, pink, or white flowers, often with darker veins. Leaves are palmately divided and up to 6" across. Generally low-growing, up to 2.5' tall.

- **Plant Habitat:** Woodlands
- **Approximate Bloom Time in Ohio:** April - May
- **Bees that specialize on this plant:** *Andrena distans*



Wild Geranium (*Geranium maculatum*)

© The Dawes Arboretum



*Andrena distans*

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## Spring Floral Resources to Target

### Jacob's Ladder (Genus *Polemonium*)

A spring ephemeral plant with pinnate leaves. The plant typically grows between under 2 feet tall and has clusters of purple flowers.

- **Plant Habitat:** Moist woodlands in the shade
- **Approximate Bloom Time in Ohio:** April - May
- **Bees that specialize on this plant:** *Andrena polemonii*



Jacob's Ladder (*Polemonium reptans*)  
iNaturalist user Zygy (Public Domain)



Jacob's Ladder (*Polemonium reptans*)  
iNaturalist user askalotl (Public Domain)



*Andrena polemonii*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Spring Floral Resources to Target

### Willows (Genus *Salix*)

These wetland shrubs and trees have oblong tufts of flowers that bloom in the spring, either with or before leaf emergence. The leaves are generally narrow and are sometimes different colors on top and bottom.

- **Plant Habitat:** Wetland edges, drainage areas, and adjacent to wet areas
- **Approximate Bloom Time in Ohio:** April - May
- **Lookalikes:** Some willows can look like Autumn olive (*Elaeagnus umbellata*) because of the silvery sheen on the undersides of the leaves. Otherwise distinct.
- **Bees that specialize on this plant:** *Andrena mariae* (red abdomen, which is unusual for the genus), *Andrena nida*, *Andrena salictaria*, *Andrena andreoides* (red abdomen, which is unusual for the genus), *Andrena wellesleyana*, *Andrena bisalicis*, *Andrena frigida*, *Andrena macoupinensis*, *Andrena sigmundi*, *Andrena clarkella*, *Andrena erythrogaster*, *Andrena illinoiensis*, *Andrena nigrae*, *Perdita maculigera* (smaller than most bees)



Pussy Willow (*Salix discolor*)  
© Bill Stitt (CC BY-NC 4.0)



Pussy Willow (*Salix discolor*)  
© Brad Walker (CC BY-NC 4.0)



*Andrena bisalicis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Andrena mariae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Spring Floral Resources to Target

### Ragworts (Genus *Packera*)

Yellow daisy-like flower heads 1" across. Basal leaves are typically roundish, contrasting with the pinnately lobed leaves on the stem. Stem often purple. Discoid center of the inflorescence is generally the same color or slightly darker than ray flowers.

- **Plant Habitat:** Native ragworts inhabit woodlands and meadows. Non-native, invasive butterweed is extremely aggressive and is commonly found forming dense monocultures in fallow areas and agricultural fields.
- **Approximate Bloom Time in Ohio:** April - June
- **Lookalikes:** Sneezeweeds (genus *Helenium*) demonstrate a similar flowering head, but appear in late summer and fall.
- **Bees that specialize on this plant:** *Andrena gardineri*



Golden Ragwort (*Packera aurea*)  
© Bill Stitt (CC BY-NC 4.0)



*Packera aurea* basal foliage  
© Peter Dziuk



Non-native Butterweed (*P. glabella*)  
© The Dawes Arboretum



*Andrena gardineri*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Spring Floral Resources to Target

### Cinquefoils (Genus *Potentilla*)

These short plants are most commonly recognized for their 5-petaled yellow flowers. Many species have palmately divided leaves with five leaflets. In some species, petals will be spaced apart such that sepals will show through underneath.

- **Plant Habitat:** Disturbed areas, waste spaces, open fields, forest edges
- **Approximate Bloom Time in Ohio:** April - June
- **Bees that specialize on this plant:** *Panurginus potentillae*, *Andrena ziziaeformis*, *Andrena melanochoera* (also known to visit other Rosaceae)



Common Cinquefoil (*Potentilla simplex*)

© Katy Chayka



Rough Cinquefoil (*Potentilla norvegica*)

Reuven Martin (Public Domain)



*Panurginus potentilla*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Andrena melanochoera*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Spring Floral Resources to Target

### Rhododendrons and Azaleas (Genus *Rhododendron*)

Evergreen or deciduous shrubs with alternate leaves. Azaleas are generally much shorter. Flowers in clusters at the ends of stems, and may be white, pink, purple, yellow, or orange.

- **Plant Habitat:** Generally found in acidic soils away from roads or other sources of contaminants. Forest understory, wood edges, display gardens. Common in landscaping.
- **Approximate Bloom Time in Ohio:** April - June
- **Bees that specialize on this plant:** *Andrena cornelli*



Great Rhododendron (*Rhododendron maximum*)  
© The Dawes Arboretum



Great Rhododendron (*Rhododendron maximum*)  
© The Dawes Arboretum



Pinxter (*Rhododendron periclymenoides*)  
Mirko Schoenitz (Public Domain)



*Andrena cornelli*  
USGS Bee Inventory and Monitoring Lab (Public Domain)





## Spring Floral Resources to Target

### Golden Alexanders (Genus *Zizia*)

Distinguished by flat-topped clusters (umbels) of tiny yellow flowers typical of the carrot family (Apiaceae) that bloom in late spring. Stems generally grow to about 3' tall.

- **Plant Habitat:** Open woodlands, prairies
- **Approximate Bloom Time in Ohio:** April - June
- **Lookalikes:** Many carrot family members, including wild parsnip (*Pastinaca sativa*) showcase similar umbels of yellow flowers. Wild parsnip leaves have more leaflets and this coarse species is found in weedy habitats. \*\*Exercise extreme caution, as wild parsnip can cause acute phytophotodermatitis, which can cause severe burns to the skin and mucus membranes.
- **Bees that specialize on this plant:** *Andrena ziziae*, *Andrena vernalis* (associated with high quality prairie habitats) - may also forage on plants in genus *Thaspium*



Golden Alexander (*Zizia aurea*)  
© Amy Schnebelin (CC BY 4.0)



*Andrena ziziae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Zizia aurea* leaf  
© The Dawes Arboretum



Leaves of toxic invasive lookalike, wild parsnip (*Pastinaca sativa*)  
© The Dawes Arboretum



## Spring Floral Resources to Target

### Waterleaf (Genus *Hydrophyllum*)

Foliage is very distinct early in the spring, the deeply lobed and toothed leaves conspicuously mottled or spotted. Clusters of flowers stand above the leaves, and are characterized by long whiskery stamens.

- **Plant Habitat:** Wet parts of dense woodlands
- **Approximate Bloom Time in Ohio:** May
- **Bees that specialize on this plant:** *Andrena geranii*



Virginia Waterleaf (*Hydrophyllum virginianum*)  
© Bill Stitt (CC BY-NC 4.0)



Great Waterleaf (*Hydrophyllum appendiculatum*)  
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Large-leaf Waterleaf (*Hydrophyllum macrophyllum*)  
© The Dawes Arboretum



*Andrena geranii*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Spring Floral Resources to Target

### Phacelias (Genus *Phacelia*)

United 5-lobed flower, blue to purple to white, petals sometimes fringed. Generally short, leaves are deeply lobed, generally short plant (up to 3').

- **Plant Habitat:** Moist woods
- **Approximate Bloom Time in Ohio:** May
- **Bees that specialize on this plant:** *Hoplitis simplex*, *Andrena phaceliae*



*Phacelia purshii*

© Amy Schnebelin (CC BY 4.0)



*Hoplitis simplex*

USGS Bee Inventory and Monitoring Lab (Public Domain)



### Blueberries and Cranberries (Genus *Vaccinium*)

Shrubs with small white to pinkish flowers that can be urn- or bell-shaped (blueberries) or with reflexed petals (cranberries). Leaves are short, oval, pointed, and glossy. See also huckleberries (Genus *Gaylussacia*), as many visitors to blueberries will also visit huckleberries.

- **Plant Habitat:** Some primarily in forest understory, others in bogs. Generally prefer acidic soils.
- **Approximate Bloom Time in Ohio:** May
- **Bees that specialize on this plant:** *Habropoda laboriosa*, *Melitta eickworti* (rare and unlikely to be found in Ohio), *Melitta americana*, *Andrena bradleyi*, *Andrena carolina*, *Andrena kalmiae*, *Colletes validus*, *Colletes productus*, *Osmia virga*



Lowbush Blueberry (*Vaccinium angustifolium*)

© Peter Dziuk



*Osmia virga*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Dogwoods (Genus *Cornus*)

These shrubs or small trees (no taller than 30') are distinguished by oval-shaped leaves with a distinctive pattern of upwardly curving veins. Most species have opposite leaves (except pagoda dogwood, *C. alternifolia*). The four-parted flowers are small and in clusters. Flowering dogwood (*C. florida*) has four large, white or pink petal-like bracts beneath the cluster of true flowers.

- **Plant Habitat:** Open fields, wood edges, forest understory. Commonly used in landscaping.
- **Approximate Bloom Time in Ohio:** May - June
- **Bees that specialize on this plant:** *Andrena platyparia*, *Andrena fragilis*, *Andrena persimulata*, *Andrena integra*. Note: These 4 *Andrena* species have been reported foraging on several other springtime plants, but the most reports have been on dogwoods. So whether these 4 species are actually specialists on *Cornus* or we just lack reports and targeted sampling of other springtime floral resources is up for debate. There are some reports that they prefer the *Swida* subgenus (e.g., *C. alternifolia*, *C. amomum*, *C. racemosa*), so take that into consideration when hunting for the right floral host.



Silky Dogwood (*Cornus amomum*)  
© Will Sweet (CC BY-NC 4.0)



Flowering Dogwood (*Cornus florida*)  
Jon Lee (Public Domain)



Gray Dogwood (*Cornus racemosa*)  
Reuven Martin (Public Domain)



*Andrena fragilis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Alumroots (Genus *Heuchera*)

Mostly cultivated for their foliage, alumroots have bunches of palmately lobed basal leaves. Some cultivars are bred to have purple or mottled leaves. The flowers of our Ohio species are in relatively narrow clusters, with individual blooms very small and mostly white greenish. Some western species and their cultivated hybrids have larger flowers that range cream to reddish.

- **Plant Habitat:** Rocky woodlands, but also a common garden plant
- **Approximate Bloom Time in Ohio:** May - June
- **Bees that specialize on this plant:** *Colletes aestivalis*



American Alumroot (*Heuchera americana*)

© Owen Carson (CC BY-NC 4.0)



American Alumroot (*Heuchera americana*)

© Jim Keesling (CC BY-NC 4.0)



American Alumroot (*Heuchera americana*)

© Mia Yeager (CC BY-NC 4.0)



*Colletes aestivalis*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Dwarf Dandelions & Hawkweeds (Genus *Krigia* & Genus *Hieracium*)

Both genera have bright yellow (less frequently orange) composite flowering heads on sometimes leafless stems, with basal rosettes that are oftentimes leafy and conspicuous.

- **Plant Habitat:** Understory of woodlands, open fields, disturbed areas
- **Approximate Bloom Time in Ohio:** May - June
- **Lookalikes:** *Taraxacum* spp. have very similar flowers but leaves are deeply toothed and lobed.
- **Bees that specialize on this plant:** *Andrena krigiana*



Two-flower Dwarf-Dandelion (*Krigia biflora*)  
© MaLisa Spring, all rights reserved



Two-flower Dwarf-Dandelion (*Krigia biflora*)  
© MaLisa Spring, all rights reserved



Rattlesnakeweed (*Hieracium venosum*)  
Photo: Daniel Atha



*Andrena krigiana*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Spring Flowering Parsley-Carrot Family Members (Family *Apiaceae*)

Plants in this family share a similar type of flower cluster with flowers held in a compound umbel that is generally flat-topped (occasionally roundish). Individual flowers are diminutive (less than ¼" across) and can be white, greenish, or yellow. These plants can be a range of heights; some are as short as 1', while others (such as giant hogweed, *Heracleum mantegazzianum*) grow to nearly 15'. *Apiaceae* generally feature round, hollow stems with pinnately compound leaves that are often toothed. \*Please exercise extreme caution while sampling from plants in the *Apiaceae* family, as many contain a toxic sap that can cause severe phytophotodermatitis (skin burns) if it comes in contact with the body.

- **Plant Habitat:** Grow in many habitats, but this survey seeks to target those in woodlands
- **Approximate Bloom Time in Ohio:** May - June
- **Bees that specialize on this plant:** *Hylaeus sparsus* - note it is a family level specialist, meaning it has been reported from several different woodland plants in the family *Apiaceae* including *Thaspium aureum trifoliatum*, *Osmorrhiza longistylis* and *Perideridia americana*.



Aniseroot (*Osmorrhiza longistylis*)  
© MaLisa Spring, all rights reserved



*Hylaeus sparsus*  
USGS Bee Inventory and Monitoring Lab (Public Domain)





### Fleabanes (Genus *Erigeron*)

Feature multiple small ( $\frac{1}{2}$  -  $\frac{3}{4}$ " ) composite flowering heads typical of the family Asteraceae composed of yellow disc flowers in the center surrounded by a multitude of white petal-like ray flowers. Leaves are alternate, lance-shaped with a blunted or slightly angled tip (up to 4" long) and are either entire or with minute teeth along the margin.

- **Plant Habitat:** Fallow areas and waste spaces, full-sun roadsides
- **Approximate Bloom Time in Ohio:** May - August
- **Lookalikes:** Small white asters in the genus *Symphyotrichum*, but are distinguished by time of bloom, as small white asters generally begin blooming in late August or September.
- **Bees that specialize on this plant:** *Pseudopanurgus illinoiensis*



*Erigeron philadelphicus*

© Bill Stitt (CC BY-NC 4.0)



*Pseudopanurgus illinoiensis*

Image courtesy of Margarita Miklasevskaja at PCYU with funding from NSERC-CANPOLIN



## Summer Floral Resources to Target

Plant Group		Approx. Bloom Time in Ohio	Page
False Indigos-Bush	<i>Amorpha</i> spp.	June	35
New Jersey Tea	<i>Ceanothus americanus</i>	June	36
Hollies and Winterberries	<i>Ilex</i> spp.	June	37
Prickly Pear	<i>Opuntia</i> spp.	June	38
Beardtongues	<i>Penstemon</i> spp.	June	39
Goat's Rue	<i>Tephrosia virginiana</i>	June	40
Harebell	<i>Campanula rotundifolia</i>	June - July	41
Chestnuts	<i>Castanea</i> spp.	June - July	42
Prairie Clovers	<i>Dalea</i> spp.	June - July	44
Native Yellow Loosestrifes	<i>Lysimachia</i> spp.	June - July	45
Viper's-Bugloss	<i>Echium vulgare</i>	June - August	46
Bee Balm or Wild Bergamot	<i>Monarda fistulosa</i>	June - August	47
Wild Potato Vine	<i>Ipomoea pandurata</i>	June - August	48
Pickeralweed	<i>Pontederia cordata</i>	June - August	49
Squash and related kin	<i>Cucurbita</i> spp.	June - October	50
Coneflowers	<i>Ratibida &amp; Rudbeckia</i> spp.	June - October	51
Ground Cherries	<i>Physalis</i> spp.	July - August	52
Spotted Horsemint	<i>Monarda punctata</i>	July - September	53
False Foxgloves	<i>Agalinis</i> spp.	July - October	54
Sunflowers	<i>Helianthus</i> spp.	July - October	55
Mallows	<i>Hibiscus</i> spp.	July - October	56
Passionflower	<i>Passiflora</i> spp.	July - October	57
Evening Primroses	<i>Oenothera</i> spp.	Depends on species	58



### **False Indigo-Bush** (Genus *Amorpha*, not to be confused with false indigo plants in the genus *Baptisia*)

A bush with fairly large pinnately compound leaves (up to 10" long) and a large dark purple (almost brownish) flower spike (sometimes greater than 12"). The orange pollen stands in stark contrast to the dark purple flowers and is highly visible when the plant is in flower.

- **Plant Habitat:** Streamsides, edge habitats, or areas with sandy soil
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Hoplitis micheneri* and *Colletes albescens* (both are rare and probably not found in Ohio)



False Indigo Bush (*Amorpha fruticosa*)  
© Amy Schnebelin (CC BY 4.0)



*Hoplitis micheneri*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### **New Jersey Tea** (*Ceanothus americanus*)

This short shrub (usually 3-4' tall and 5' wide) features cylindrical clusters of tiny white flowers on stem ends or in upper leaf axils. Leaves are alternate, oval-shaped, and toothed (up to 4" long). Young twigs are yellow.

- **Plant Habitat:** High quality prairie or other open habitats, but may be found in shrub rows or wood edges
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Pseudopanurgus pauper*, *Pseudopanurgus virginicus*\* (species rarely collected, so unclear if it is actually a specialist)



New Jersey Tea (*Ceanothus americanus*)

© Amy Schnebelin (CC BY 4.0)



*Pseudopanurgus pauper*

Image courtesy of Margarita Miklasevskaja at PCYU with funding from NSERC-CANPOLIN



### Hollies and Winterberries (Genus *Ilex*)

Generally shrubby (up to 6' tall) but some species take the form of small trees (up to 30' tall). Plants can be evergreen. Flowers often nondescript, whitish green and small (up to ½" across) and in clusters. *Ilex* species are dioecious, with berry-like fruits produced only on female plants.

- **Plant Habitat:** Generally prefer moist acidic soils, wetland edges, wet fields. Common in landscaping.
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Colletes brimleyi*, *Colletes banksi* - Note both species are rare, so unlikely to be found.



Winterberry (*Ilex verticillata*)  
Christian Grenier (Public Domain)



*Colletes brimleyi*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Prickly Pear (Genus *Opuntia*)

*Opuntia* are Ohio's only native cactuses! Bright yellow-orange flowers appear in early summer. Plants are low-growing, generally less than 1' tall. These paddle-like cactuses are densely prickled, so please exercise caution when collecting from them!

- **Plant Habitat:** Sandy soils, only found in south and extreme northwest Ohio. Sometimes used as garden plants
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Diadasia australis*, *Lithurgopsis gibbosus* - Note that both bee species are western and southern US species, so chances of finding either *Opuntia* specialists are low, but not necessarily impossible.



*Opuntia* sp.

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*Diadasia australis*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Lithurgopsis gibbosus*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Beardtongues (Genus *Penstemon*)

A medium sized plant (usually no taller than 3') with flowers scattered along the top half of the stem. Flowers tubular with two united petals on top and three on the bottom of the corolla, white to purple (please note that red, pink, and purple variants also exist). Leaves are opposite, the upper stems leaves stalkless, the lower stem leaves generally stalked.

- **Plant Habitat:** Prairies, fields, wet meadows. Cultivars can often be found in landscaping.
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Osmia distincta*



Foxglove Beardtongue (*Penstemon digitalis*)  
© The Dawes Arboretum



Foxglove Beardtongue (*P. digitalis*)  
© The Dawes Arboretum



*Osmia distincta*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Osmia distincta*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Goat's Rue (*Tephrosia virginiana*)

A typical pea family flower structure with the top part of the flower a pale yellow and the lower half of the flower a pinkish purple. The leaves are pinnate with ~6-12 leaflet pairs. Stems are fuzzy.

- **Plant Habitat:** Open woods and sandy habitats
- **Approximate Bloom Time in Ohio:** June
- **Bees that specialize on this plant:** *Megachile addenda*



Goat's Rue (*Tephrosia virginiana*)  
Jesse Rorabaugh (Public Domain)



Goat's Rue (*Tephrosia virginiana*)  
Michael Mason (Public Domain)



*Megachile addenda*  
USGS Bee Inventory and Monitoring Lab (Public Domain)





## Harebell (*Campanula rotundifolia*)

Not a common plant in Ohio, there are a number of related species in cultivations which may be in neighborhood gardens. The flowers are typically light purple. Some species have a white ring in the center of the corolla. Balloon flower (*Platycodon grandiflorus*) is another very similar cultivated plant that is in the same plant family. See also Claspng Venus's Looking Glass (*Triodanis perfoliata*), another family member that is common throughout Ohio.

- **Plant Habitat:** Shaded woodlands, gardens
- **Approximate Bloom Time in Ohio:** June - July
- **Bees that specialize on this plant:** *Colletes brevicornis*, *Chelostoma campanularum* (invasive species), *Chelostoma rapunculi* (invasive species), *Dufourea maura*. Note also that *Megachile campanulae* might be found on this plant, though despite its species name, has been known to visit a variety of other plants and thus not technically considered a specialist.



Harebell (*Campanula rotundifolia*)  
© John Brew (CC BY 4.0)



Harebell (*C. rotundifolia*)  
© Amy Schnebelin (CC BY 4.0)



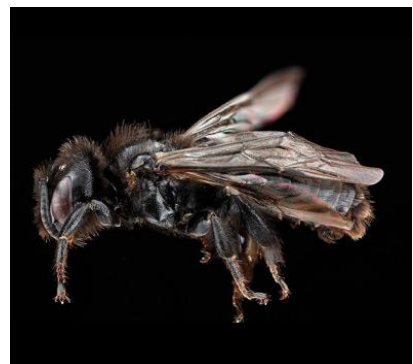
Claspng Venus's Looking Glass  
(*Triodanis perfoliata*)  
© MaLisa Spring, all rights reserved



*Colletes brevicornis*



*Chelostoma rapunculi*



*Dufourea maura*

USGS Bee Inventory and Monitoring Lab (Public Domain)



### Chestnuts (Genus *Castanea*)

The American chestnut (*Castanea dentata*) used to be one of the most common trees of the eastern deciduous forest. Most American chestnuts are now gone due to the Chestnut Blight, there are still other non-native trees in the same genus that might be host to the bees. Non-native species, including Chinese, Japanese, and European chestnuts, all grow to approximately 30' tall and have leaves that are oval-shaped and sharply toothed. The most common is Chinese Chestnut (*Castanea mollissima*), which is farmed for the large nuts. There are several chestnut farms across Ohio, so it is possible that the bee does persist on the non-native tree host instead.

Chestnuts are monoecious, meaning that there will be male and female flowers on the same tree. Male flower clusters are long, and female flowers are inconspicuous. Please note that late-season fruits sometimes look like flowers due to their almost-fuzzy appearance, but should be easily distinguishable by the round, rather than long, shape.

- **Plant Habitat:** Woodlands and tree nut farms
- **Approximate Bloom Time in Ohio:** June - July
- **Bees that specialize on this plant:** *Andrena rehni*



American Chestnut (*Castanea dentata*)  
Reuven Martin (Public Domain)



American Chestnut (*Castanea dentata*)  
Lynn Harper (Public Domain)



## Summer Floral Resources to Target



Chinese Chestnut (*Castanea mollissima*)  
© Bill Stitt (CC BY-NC 4.0)



*Andrena rehni*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Prairie Clovers (Genus *Dalea*)

Not known to grow in Ohio except where planted in gardens and managed landscapes; entirely Great Plains and western species. The flowers are oblong purple clusters at the top of the plant stem. The leaves are pinnate and oppositely branched. Unlike non-native European clovers, which have a spherical shaped flowering head, native prairie clovers' flowering heads are generally much longer (up to 2.5") and richer in color.

- **Plant Habitat:** Prairies, grasslands, and restored habitats. No known non-planted population in Ohio.
- **Approximate Bloom Time in Ohio:** June - July
- **Bees that specialize on this plant:** *Colletes robertsonii*, *Colletes wilmattae*, *Colletes aberrans*, *Colletes albescens*, *Colletes howardi*. Note: Given the uncommon nature of the plant in Ohio, we are unlikely to find these bees. However, it does not hurt to try, so if you are able to find an established population of Prairie Clovers, you might find the bee.



Purple Prairie Clover (*Dalea purpurea*)  
iNaturalist user Paloma (Public Domain)



Purple Prairie Clover (*Dalea purpurea*)  
iNaturalist user Paloma (Public Domain)



*Colletes robertsonii*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Colletes robertsonii*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Native Yellow Loosestrifes (Genus *Lysimachia*)

Most of the loosestrifes visited by the specialist bees are 1-2 feet tall with 5 petalled yellow flowers. Species like *Lysimachia terrestris* (commonly known as Swamp Candles) have large spikes of flowers that make the plant visible from a distance. *Lysimachia ciliata* (Fringed Loosestrife) and *Lysimachia quadrifolia* (Whorled Loosestrife) have smaller numbers of yellow flowers per plant. Other species of *Lysimachia* are either not known to host the specialist bees, or are rare in Ohio.

- **Plant Habitat:** Wetlands and habitat adjacent to wetlands
- **Approximate Bloom Time in Ohio:** June - July
- **Bees that specialize on this plant:** *Macropis nuda*, *Macropis patellata*, *Macropis steironematis*, *Macropis ciliata*.

\*Invasive purple loosestrifes (*Lythrum salicaria*) are not visited by these specialists



Whorled Loosestrife (*Lysimachia quadrifolia*)  
© The Dawes Arboretum



Swamp Candles (*Lysimachia terrestris*)  
© The Dawes Arboretum



*Macropis ciliata*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Macropis nuda*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Viper's-Bugloss (*Echium vulgare*)

This is an aggressive non-native species that is present in disturbed sites across Ohio. The flowers are a purple color with reddish-purple stamens. The plant forms a basal rosette of hairy lance shaped leaves the first year, followed by a spike of flowers in the second year of growth.

- **Plant Habitat:** Fields and disturbed sites, often on poor soils
- **Approximate Bloom Time in Ohio:** June - August
- **Bees that specialize on this plant:** *Hoplitis anthocopoides* (invasive species), unknown if this invasive bee forages on any native plant species here.



*Echium vulgare*  
Paul Braun (Public Domain)



*Hoplitis anthocopoides*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Bee Balm or Wild Bergamot (*Monarda fistulosa*)

This distinctive clump-forming flower has a unique flowering head composed of many light purple tubular two-lipped flowers arranged in a dense pattern. Stems generally grow to 3-4' tall with oppositely arranged tooth leaves growing along the square stem.

- **Plant Habitat:** Open fields, along roads, planted prairies, old fields
- **Approximate Bloom Time in Ohio:** June - August
- **Lookalikes:** A common close relative, *Monarda didyma* is similar but has bright red flowers. Other *Monardas* can also be found throughout the state, but are fairly uncommon.
- **Bees that specialize on this plant:** *Dufourea monardae* (small black bee that has not recently been reported in Ohio, despite the plant hosts abundance)



*Monarda fistulosa*  
© The Dawes Arboretum



*Monarda fistulosa*  
© The Dawes Arboretum



*Dufourea monardae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Dufourea monardae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Wild Potato Vine (*Ipomoea pandurata*)

This is a trailing or climbing vine with heart shaped leaves. The flowers are large and white with purple-red centers. The flowers sometimes wilt by midday. A related plant with similar flowers is false bindweed (genus *Calystegia*), which may also act as a potential host for the specialist bees.

- **Plant Habitat:** Can grow in a variety of habitats, but is often found along stream edges and disturbed fields.
- **Approximate Bloom Time in Ohio:** June - September
- **Bees that specialize on this plant:** *Melitoma taurea*, *Eucera (Cemolobus) ipomoeae* (check in the early morning hours), *Eucera (Xenoglossa) kansensis*



Wild Potato Vine (*Ipomoea pandurata*)  
Jon Mitchell (Public Domain)



*Melitoma taurea*  
© Laura Hughes (CC BY-NC 4.0)



*Eucera (Cemolobus) ipomoeae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Eucera (Cemolobus) ipomoeae*  
© K. James Hung, all rights reserved





## Pickerelweed (*Pontederia cordata*)

Dense spike of deep blue-violet flowers (up to 6" long) on a single stem with large leaves that often have heart-shaped bases (up to 5" wide). Root in muck or mud.

- **Plant Habitat:** Shallow ponds, lakes or wetland edges
- **Approximate Bloom Time in Ohio:** June - September
- **Lookalikes:** Arrow arum (*Peltandra virginica*) and arrowhead (*Sagittaria latifolia*) both have somewhat similar leaves and occupy the same habitat, but neither have blue-violet flowers.
- **Bees that specialize on this plant:** *Melissodes apicatus*, *Dufourea novaeangliae*, *Florilegus condignus*



Pickerelweed (*Pontederia cordata*)  
© The Dawes Arboretum



Pickerelweed (*Pontederia cordata*)  
Christian Grenier (Public Domain)



*Florilegus condignus*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Dufourea novaeangliae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Squash and related kin (Genus *Cucurbita*)

These are the same squash plants that we attempt to grow in our gardens. The large, face-sized leaves can obscure the large bright orange flowers hidden beneath. Squash in the species *Cucurbita moschata* are supposedly more resistant to squash vine borer and other squash pathogens, so if you are considering planting squash to get the bees, choose that species.

- **Plant Habitat:** Agricultural landscapes or edge habitats
- **Approximate Bloom Time in Ohio:** June - October
- **Bees that specialize on this plant:** *Eucera (Peponapis) pruinosa*, *Eucera (Xenoglossa) strenua*, *Eucera (Xenoglossa) kansensis*



Winter Squash (*Cucurbita maxima*)  
Christian Grenier (Public Domain)



*Eucera (Peponapis) pruinosa* female  
© MaLisa Spring, all rights reserved



*Eucera (Xenoglossa) strenua*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Eucera (Peponapis) pruinosa* male  
© Bernie Paquette (CC BY 4.0)



### Coneflowers (Genus *Ratibida* and Genus *Rudbeckia*)

Composite flowers with dark discoid centers and yellow (sometimes red) petal-like ray flowers. Heads of cutleaf coneflower (*Rudbeckia laciniata*) have hollow rays and greenish or yellowish centers; heads of the related black- and brown-eyed Susans (*R. hirta* and *R. triloba*) have dark purple-brown centers. Gray-headed coneflower (*Ratibida pinnata*) has darkish centers and drooping yellow rays.

- **Plant Habitat:** Roadsides, old fields, riparian areas, prairies, disturbed areas. Sometimes found in landscaping.
- **Approximate Bloom Time in Ohio:** June - October
- **Bees that specialize on this plant:** *Andrena rudbeckiae* (See the Asteraceae profile for a list of other bees that might visit these two plant genera plus a host of other plant genera)



Black-eyed Susan (*Rudbeckia hirta*)  
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*Andrena rudbeckiae*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Ground Cherries (Genus *Physalis*)

Ground cherries are distinctive, with their berries enclosed in an inflated papery husk. Flowers develop in the axils of upper leaves and often droop. Flowers small (less than 1" across) and usually yellow with deep brown or maroon patches toward the center. Like many tomato-family members, the anthers open by terminal pores.

- **Plant Habitat:** Agricultural fields, old fields, open woods, waste places
- **Approximate Bloom Time in Ohio:** July - August
- **Bees that specialize on this plant:** *Lasioglossum pectinatum*, *Colletes latitarsis*, *Colletes willistoni*, *Perdita halictoides*



Clammy Groundcherry (*Physalis heterophylla*)  
© Peter Dziuk



Clammy Groundcherry (*Physalis heterophylla*)  
© Katy Chayka



*Colletes latitarsis* in a *Physalis* flower  
© Amy Schnebelin (CC BY 4.0)



*Colletes latitarsis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Spotted Horsemint (*Monarda punctata*)

Inflorescences are similar to *Monarda fistulosa*, but appear in clusters along the stem, rather than only at the end of the stem. Yellowish, spotted tubular two-lipped flowers emerge from a head of whitish to pinkish to purple leaf-like bracts. Stems generally grow to 3-4' tall with oppositely arranged minutely toothed leaves growing along the square stem.

- **Plant Habitat:** Sandy habitats in NW Ohio
- **Approximate Bloom Time in Ohio:** July - September
- **Bees that specialize on this plant:** *Protandrena abdominalis* (rare and distinctly colored bee; possibly in the Toledo area), *Perdita gerhardi* (really small)



*Monarda punctata*

iNaturalist user pynklynx (Public Domain)



*Protandrena abdominalis*

USGS Bee Inventory and Monitoring Lab (Public Domain)



### False Foxgloves (Genus *Agalinis*)

Appear very similar to genus *Penstemon*. Flowers generally medium to dark purple, with similar 2-lipped tubular structure. Reddish spots often found inside the flower tube. Stems often dark purple, and typically with narrow leaves. Note that this plant is hemiparasitic on several other plant species.

- **Plant Habitat:** High-quality undisturbed meadows and prairies
- **Approximate Bloom Time in Ohio:** July - October
- **Bees that specialize on this plant:** *Anthophorula micheneri*, *Perdita gerardiae* - Note, both species of bees are really rare, so chances of finding a specimen is rather low.



Slender False Foxglove (*Agalinis tenuifolia*)  
Christian Grenier (Public Domain)



*Anthophorula micheneri*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



### Sunflowers (Genus *Helianthus*)

Sunflowers, including the common cultivated sunflower (*H. annuus*) are North American natives. Leaves are alternate or opposite (sometimes alternate above and opposite below), stalked or stalkless. Green sepal-like bracts around the flower head are pointed.

- **Plant Habitat:** Open fields, prairies, wet prairies, wetland edges, home landscapes
- **Approximate Bloom Time in Ohio:** July - October
- **Lookalikes:** False sunflower (*Heliopsis helianthoides*) has leaves all opposite, the sepal-like flower head bracts blunt-tipped. Cup plants and rosinweeds (*Silphium* spp.) have similar flowers but distinctive leaves that are either joined around the stem, basal, or in threes around the stem. Other yellow composites include grey headed coneflower (*Ratibida pinnata*) which has reflexed (downturned) petal-like ray flowers, and tickseed (Genus *Coreopsis*).
- **Bees that specialize on this plant:** *Andrena helianthi* (note that this bee is also known to visit similar yellow flowers in the aster family, but seems to prefer resources in the genus *Helianthus*), *Trachusa zebrata* (rare and unlikely to be found in Ohio)



Maximilian Sunflower (*Helianthus maximiliani*)

© The Dawes Arboretum



*Andrena helianthi*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Mallows (Genus *Hibiscus*)

This genus is distinguished by a highly visible central pistil surrounded by a tube of white to yellow stamens. Swamp rose mallow (*H. moscheutos*) flowers are large (up to 8" diameter) with several distinct color patterns, including white with a red center, deep maroon with a maroon center, or pink with a white center (variations from these have been observed and should be expected). The cultivated Rose of Sharon (*H. syriacus*) is a bushy shrub (to 15') with somewhat smaller blooms. The specialist bee has not been reported on Rose of Sharon.

- **Plant Habitat:** *H. moscheutos* is a wetland plant, while *H. syriacus* is used in garden landscapes.
- **Approximate Bloom Time in Ohio:** July - October
- **Bees that specialize on this plant:** *Ptilothrix bombiformis*



Swamp Rose Mallow (*Hibiscus moscheutos*)  
© Becky Siekkinen Donaldson, all rights reserved



Halberd-leaf Rose Mallow (*Hibiscus laevis*)  
© Amy Schnebelin (CC BY 4.0)



*Ptilothrix bombiformis*  
© MaLisa Spring, all rights reserved



*Ptilothrix bombiformis*  
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### Passionflower (Genus *Passiflora*)

Passionflowers have a very distinct appearance. The pistil and stamens are on a raised stalk, and flowers have a showy circular central fringe. The Ohio species are vines with three-lobed leaves. Flowers of *P. incarnata* are lavender, and those of *P. lutea* are yellowish-green. The specialist bee is thought to only forage on the Yellow Passionflower (*P. lutea*), but there is a slim chance that it might forage on other species.

- **Plant Habitat:** Roadsides, disturbed areas with full sun.
- **Approximate Bloom Time in Ohio:** July - October
- **Bees that specialize on this plant:** *Anthemurgus passiflorae* (known as *Pseudopanurgus passiflorae* to some sources)



Yellow Passionflower (*Passiflora lutea*)  
© The Dawes Arboretum



*Anthemurgus passiflorae*  
© Wanda Rauscher (CC BY-NC 4.0)



## Evening Primroses (Genus *Oenothera*)

Plants in this genus can vary widely, but generally feature yellow, 4-petaled flowers (up to 2" across), except *O. speciosa*, which features pink flowers with a yellow center. True to the name, flowers open in the evening and close by noon of the following day. Plants generally maintain fairly short stature (up to 3'), except *O. biennis* which can grow up to 6'. Leaves are long, lance-shaped, and dense along the stem.

- **Plant Habitat:** Fallow areas, prairies, disturbed areas and waste spaces.
- **Approximate Bloom Time in Ohio:** Bloom times depends on species. *O. laciniata* blooms in April. *O. biennis* in July to October. *O. fruticosa* and *O. speciosa* in June.
- **Bees that specialize on this plant:** Note that the following species are known to forage on *O. laciniata*, which is not in Ohio. Attempt to locate *O. laciniata* for your best chances of finding the bees. *Svastra compta*, *Lasioglossum oenotherae*, *Lasioglossum texanum*, *Megachile oenotherae*, *Melissodes fimbriatus*



*Oenothera* sp.

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Cutleaf Evening Primrose (*Oenothera laciniata*)

© Katy Chayka



*Lasioglossum oenotherae*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Lasioglossum texanum*

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## Fall Floral Resources to Target

Plant Group		Approx. Bloom Time in Ohio	Page
<a href="#">Thistles</a>	<i>Cirsium spp.</i>	August - October	60
<a href="#">Dodders</a>	<i>Cuscuta spp.</i>	August - October	62
<a href="#">Grass of Parnassus</a>	<i>Parnassia glauca</i>	August - October	63
<a href="#">Fuzzybeans</a>	<i>Strophostyles spp.</i>	August - October	64
<a href="#">Ironweeds</a>	<i>Vernonia spp.</i>	Late August - Early October	65
<a href="#">Goldenrods</a>	<i>Solidago &amp; Euthamia spp.</i>	August - November	66
<a href="#">Asters</a>	<i>Symphyotrichum spp.</i>	August - November	68



### Thistles (Genus *Cirsium*)

Often a plant that is considered a weed, there are a few species of native thistles that host a plethora of native bees. Most thistles have prickles on their leaves, which makes them not favored in gardens. In addition, the flower heads are surrounded by spine-tipped bracts. We have several native, mostly pink- to purple-flowered native species in Ohio, but there are also a few non-native and invasive species of thistles that can be problematic.

- **Plant Habitat:** Fields and marginal edge habitat.
- **Approximate Bloom Time in Ohio:** August - October (*C. discolor* and *C. muticum*)
- **Bees that specialize on this plant:** *Osmia texana*, *Osmia chalybea* (spring *Cirsium* specialist, but our *Cirsium* do not normally bloom at that time), *Melissodes desponsus*



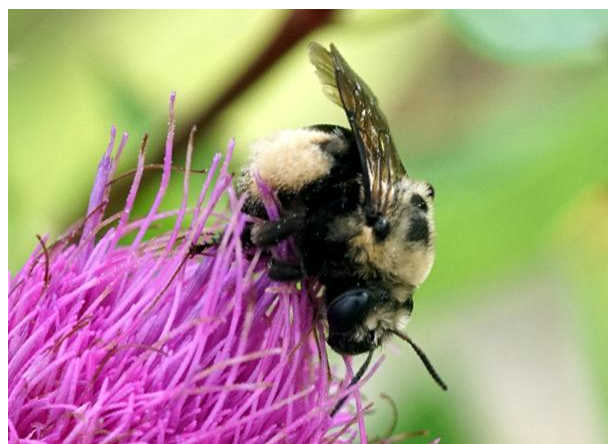
Swamp Thistle (*Cirsium muticum*)  
© Jeffery Karafa (CC BY 4.0)



Field Thistle (*Cirsium discolor*)  
© Amy Schnebelin (CC BY 4.0)



Non-native Creeping Thistle (*Cirsium arvense*)  
© The Dawes Arboretum



*Melissodes desponsus*  
© Amy Schnebelin (CC BY 4.0)



## Fall Floral Resources to Target



*Osmia texana*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Osmia chalybea*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Dodders (Genus *Cuscuta*)

Dodders are parasitic vines that often have the appearance of spaghetti draped over other vegetation. Dodders do not have the green pigment, chlorophyll, and are typically yellowish or orange. Flowers are small (1/2" across) and white in clusters along the stem. Dodders are generalist parasites, meaning that they will host upon any number of plant species.

- **Plant Habitat:** Seem to generally prefer moist areas such as wetlands, drainage areas, etc.
- **Approximate Bloom Time in Ohio:** August - October
- **Bees that specialize on this plant:** *Colletes ciliatus* - Note, really rare species of bee. It could be that it is not a specialist, but we only have limited reports of any foraging behavior.



*Cuscuta* sp.

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*Cuscuta* sp.

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*Colletes ciliatus*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Colletes ciliatus*

USGS Bee Inventory and Monitoring Lab (Public Domain)



## Grass of Parnassus (*Parnassia glauca*)

Contrary to what the common name indicates, this plant is not a relative of grasses. Flowers are solitary, on individual, mostly bare stalks. The majority of leaves are basal and somewhat heart-shaped with entire margins. Flowers have a green cone-shaped pistil and the petals are white and densely veined.

- **Plant Habitat:** Fens, shores, or wet meadows, intolerant of competition
- **Approximate Bloom Time in Ohio:** August - October
- **Lookalikes:** The much more common marsh marigold (*Caltha palustris*) has toothed leaves and yellow flowers.
- **Bees that specialize on this plant:** *Andrena parnassiae*



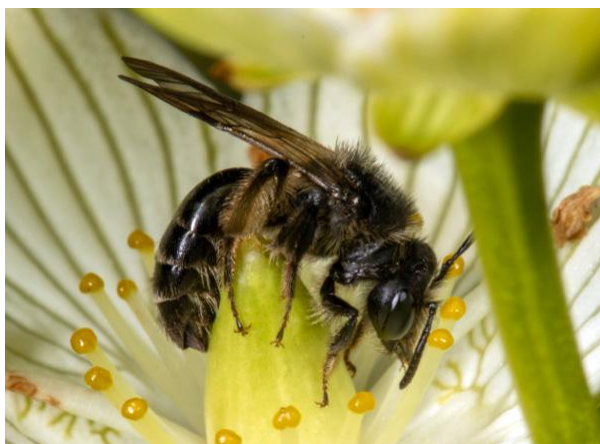
Fen Grass of Parnassus (*Parnassia glauca*)

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Fen Grass of Parnassus (*Parnassia glauca*)

© Bill Stitt (CC BY-NC 4.0)



*Andrena parnassiae*

© Kent McFarland (CC BY-NC 4.0)



*Andrena parnassiae*

© Kent McFarland (CC BY-NC 4.0)



### Fuzzybeans (Genus *Strophostyles*)

This is a vining plant with trifoliolate, soybean-like leaves. The flowers are pea-like and are typically pink with an upwardly curved beak.

- **Plant Habitat:** Sandy soils and some amount of habitat disturbance
- **Approximate Bloom Time in Ohio:** August - October
- **Bees that specialize on this plant:** *Trachusa dorsalis* - Note only reported from coastal areas of the US, so we might not find it in Ohio or it could be restricted to only sandy habitats; *Megachile integra*



Trailing Fuzzy-Bean (*Strophostyles helvola*)  
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Trailing Fuzzy-Bean (*Strophostyles helvola*)  
© Becky Siekkinen Donaldson, all rights reserved



*Trachusa dorsalis*  
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*Megachile integra*  
USGS Bee Inventory and Monitoring Lab (Public Domain)





## Ironweeds (Genus *Vernonia*)

These tall alternate-leaved “weeds” in the Composite family feature vibrant blue-violet flower clusters at the top of their tall (up to 6’) stems.

- **Plant Habitat:** Plant easily naturalizes in old fields, fallow areas, grasslands, and prairies.
- **Approximate Bloom Time in Ohio:** Late August - Early October
- **Lookalikes:** Mistflower (*Conoclinium coelestinum*) blooms at a similar time and features violet flower clusters, but has opposite leaves and is a lower-growing plant.
- **Bees that specialize on this plant:** *Melissodes denticulatus*, though several other species listed in the Asteraceae profile will also forage on this species



Tall Ironweed (*Vernonia gigantea*)  
© The Dawes Arboretum



*Vernonia* sp.  
© Bill Stitt (CC BY-NC 4.0)



*Melissodes denticulatus*  
© Doug Berube (CC BY-NC 4.0)



*Melissodes denticulatus*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Goldenrods (Genus *Solidago* and Genus *Euthamia*)

These tall plants are the epitome of a fall flower, with bright yellow clusters of blooms starting in August in most parts of Ohio. There are over 20 species of Goldenrods across Ohio, several of which are hard to identify. Thankfully, there are not many other bright yellow flowers late in the fall that are nearly as abundant, so if you see a plant with numerous tiny-rayed yellow composite flowers, it is likely a goldenrod.

- **Plant Habitat:** Varies by species, but is common in old fields and at margins of open areas
- **Approximate Bloom Time in Ohio:** August - November
- **Bees that specialize on this plant:** *Colletes solidaginis*, *Colletes simulans*, *Andrena simplex*, *Andrena braccata*, *Andrena hirticincta*, *Andrena nubecula*, *Andrena asteris*, *Dianthidium simile* - Note that many of the above species are also thought to visit asters in the genus *Symphotrichum* and could possibly be found on other similar plants in the family Asteraceae in the fall. To see more potential Asteraceae specialist bees, refer to the profile for the family Asteraceae.



Canada Goldenrod (*Solidago canadensis*)  
© MaLisa Spring, all rights reserved



Tall Goldenrod (*Solidago altissima*)  
© Peter Dziuk



*Colletes solidaginis*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Dianthidium simile*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



## Fall Floral Resources to Target



*Andrena asteris*

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*Andrena hirticincta*

© Amy Schnebelin (CC BY 4.0)



*Andrena nubecula*

© Amy Schnebelin (CC BY 4.0)



*Colletes simulans*

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### Asters (Genus *Symphyotrichum*)

This common fall composite generally comes in two forms: small white inflorescences (up to  $\frac{3}{4}$ " across) with a yellow or purple discoid center, or much larger inflorescences (up to 2" across) with purple to purple-pink ray flowers and yellow discoid centers. All generally remain short in stature, between 2" and 3" tall, but some species will grow up to 5". There are over 20 Ohio species in this genus, many of which are challenging to definitively identify.

- **Plant Habitat:** Different species have different soil requirements, but all prefer open sun. Some in old fields and waste spaces, others in prairies, others in moist areas or along wetland edges.
- **Approximate Bloom Time in Ohio:** August - November
- **Bees that specialize on this plant:** *Andrena simplex*, *Andrena hirticincta*, *Andrena nubecula*, *Andrena asteris*, *Anthophorula asteris*, *Andrena asteroides*, *Colletes simulans*, *Dianthidium simile* - Note that many of the above species are also thought to visit goldenrods in the genus *Solidago* and could possibly be found on other similar plants in the family Asteraceae in the fall. To see more potential Asteraceae specialist bees, refer to the profile for the family Asteraceae.



New England Aster (*Symphyotrichum novae-angliae*)  
Yann Kemper (Public Domain)



Panicked Aster (*Symphyotrichum lanceolatum*)  
Christian Grenier (Public Domain)



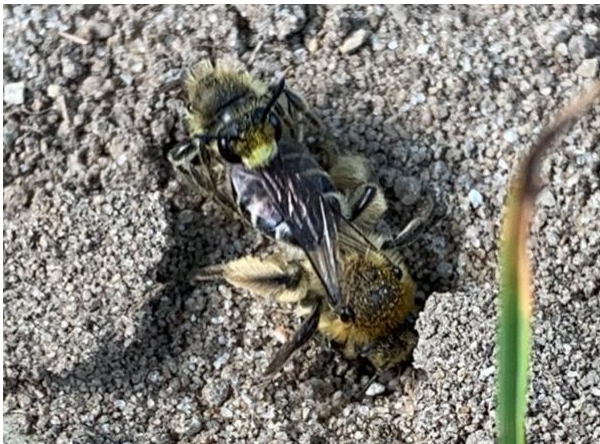
*Andrena asteroides*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Andrena simplex*

USGS Bee Inventory and Monitoring Lab (Public Domain)



*Andrena asteris*

© Bill Stitt (CC BY-NC 4.0)



*Andrena hirticincta*

© Bill Stitt (CC BY-NC 4.0)



## Composites (Family Asteraceae)

Composites have a characteristic flower form. What appears to be a single flower is actually a cluster of many smaller flowers: those in the center are called “disc” flowers, and those around the outside (looking like petals) are called “ray” flowers. A straightforward example is a sunflower (*Helianthus*), which features a cluster of yellow-to-brown disc flowers in the center surrounded by yellow, outward-reaching ray flowers. One could even call a single sunflower a bouquet!

Innumerable species and genera belong in the aster family, including, but not limited to goldenrods, sunflowers, thistles, coneflowers, coreopsis, ironweeds, dandelions, rosinweeds, bonesets, joe pye weeds, yarrows, and many others.

- **Plant Habitat:** Most composites can be found in open fields, fallow areas, prairies, and even in lawns, but several species prefer semi-shaded woodlands (such as woodland sunflower, *Helianthus divaricatus*).
- **Approximate Bloom Time in Ohio:** Depends on the genus: a few bloom in spring, but most bloom in the late summer and fall
- **Bees that specialize on this plant family:** For some reason, there are a lot of bees across 14 genera that only forage on plants in the composite family. Many of these composites specialist bees are willing to visit several genera of plants in the family Asteraceae.

- |                                  |                                  |                                       |
|----------------------------------|----------------------------------|---------------------------------------|
| ○ <i>Andrena accepta</i>         | ○ <i>Megachile parallela</i>     | ○ <i>Perdita bishoppi</i>             |
| ○ <i>Andrena aliciae</i>         | ○ <i>Megachile pugnata</i>       | ○ <i>Perdita boltoniae</i>            |
| ○ <i>Andrena canadensis</i>      | ○ <i>Megachile xylocopoides</i>  | ○ <i>Perdita consobrina</i>           |
| ○ <i>Andrena chromotricha</i>    | ○ <i>Melissodes agilis</i>       | ○ <i>Perdita discreta</i>             |
| ○ <i>Andrena duplicata</i>       | ○ <i>Melissodes bidentis</i>     | ○ <i>Perdita graenicheri</i>          |
| ○ <i>Andrena fulvipennis</i>     | ○ <i>Melissodes boltoniae</i>    | ○ <i>Perdita ignota</i>               |
| ○ <i>Andrena placata</i>         | ○ <i>Melissodes coloradensis</i> | ○ <i>Perdita octomaculata</i>         |
| ○ <i>Andrena runcinatae</i>      | ○ <i>Melissodes dentiventris</i> | ○ <i>Perdita swenki</i>               |
| ○ <i>Ashmeadiella buconis</i>    | ○ <i>Melissodes druriellus</i>   | ○ <i>Pseudopanurgus aestivalis</i>    |
| ○ <i>Calliopsis coloradensis</i> | ○ <i>Melissodes fumosus</i>      | ○ <i>Pseudopanurgus albitarsis</i>    |
| ○ <i>Colletes americanus</i>     | ○ <i>Melissodes illatus</i>      | ○ <i>Pseudopanurgus andreoides</i>    |
| ○ <i>Colletes compactus</i>      | ○ <i>Melissodes manipularis</i>  | ○ <i>Pseudopanurgus compositarum</i>  |
| ○ <i>Colletes speculariferus</i> | ○ <i>Melissodes niveus</i>       | ○ <i>Pseudopanurgus helianthi</i>     |
| ○ <i>Colletes thysanellae</i>    | ○ <i>Melissodes pileatus</i>     | ○ <i>Pseudopanurgus labrosiformis</i> |
| ○ <i>Dianthidium curvatum</i>    | ○ <i>Melissodes subillatus</i>   | ○ <i>Pseudopanurgus labrosus</i>      |
| ○ <i>Dianthidium simile</i>      | ○ <i>Melissodes trinodis</i>     | ○ <i>Pseudopanurgus rugosus</i>       |
| ○ <i>Dieunomia heteropoda</i>    | ○ <i>Melissodes tinctus</i>      | ○ <i>Pseudopanurgus solidaginis</i>   |
| ○ <i>Dieunomia nevadensis</i>    | ○ <i>Melissodes wheeleri</i>     | ○ <i>Svastra aegis</i>                |
| ○ <i>Dufourea marginata</i>      | ○ <i>Paranthidium jugatorium</i> | ○ <i>Svastra obliqua</i>              |
| ○ <i>Hesperapis oraria</i>       | ○ <i>Perdita albipennis</i>      | ○ <i>Svastra petulca</i>              |
| ○ <i>Megachile inimica</i>       | ○ <i>Perdita bequaerti</i>       |                                       |



# Floral Resources to Target All Year



Lance-leaved Coreopsis (*Coreopsis lanceolata*)  
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Purple Coneflower (*Echinacea purpurea*)  
© Bill Stitt (CC BY-NC 4.0)



Hollow Joe-Pye Weed (*Eutrochium fistulosum*)  
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Sawtooth Sunflower (*Helianthus grosseserratus*)  
© Amy Schnebelin (CC BY 4.0)



*Dianthidium curvatum*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



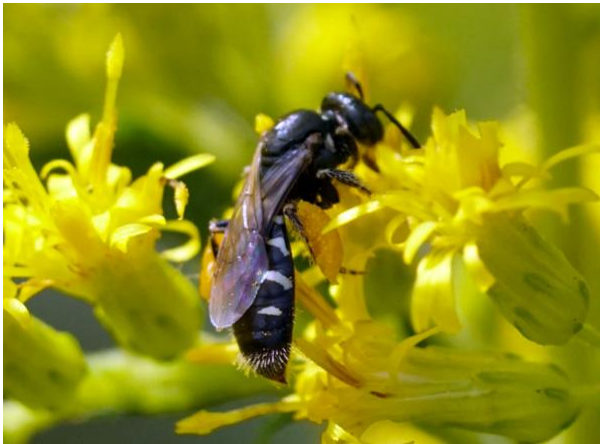
*Dieunomia heteropoda*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Paranthidium jugatorium*  
© Bill Stitt (CC BY-NC 4.0)



*Perdita bishoppi*  
USGS Bee Inventory and Monitoring Lab (Public Domain)



*Perdita octomaculata*  
© Amy Schnebelin (CC BY 4.0)



*Pseudopanurgus compositarum*  
© Amy Schnebelin (CC BY 4.0)





## Resources

**The Bees in Your Backyard: A Guide to North America's Bees** - Joseph S. Wilson & Olivia

Messinger Carril

<http://press.princeton.edu/titles/10593.html>

**Bees of Ohio: A Field Guide** - North American Native Bee Collaborative w/Schnebelin and Spring

<http://go.osu.edu/ohiobees>

**iNaturalist**

<https://www.inaturalist.org>

**Ohio Bee Atlas** - iNaturalist Project

<https://www.inaturalist.org/projects/ohio-bee-atlas>

**Pollen Specialist Bees of the Central United States** - Jarrod Fowler

[https://jarrodflower.com/bees\\_pollen.html](https://jarrodflower.com/bees_pollen.html)

**The Very Handy Manual: How to Catch and Identify Bees and Manage a Collection** - Sam Droege

<http://bio2.elmira.edu/fieldbio/handybeemanual.html>