Supporting native bees in your backyard!



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Bee vs Fly vs Wasp – who's who?



- Four wings
- Thick-bodied
- Often very hairy
- Eyes on sides of their head
- Long, slender antennae
- Stout legs
- Vegetarians (eat pollen and nectar)



- Four wings
- Thin, narrow waist
- Little to no hair
- Long legs with spines
- Omnivores (caterpillars, spiders..., but also nectar and fruit)



- Two wings
- Large eyes on top of head
- Short antennae
- No hair-very hairy
- Adults eat nectar and pollen, maggots more varied diet



Which of these is a bee? Yell out your answer!



- Two wings
- Eyes on top of head
- Short antennae



- Eyes on side of head
- Long, slender antennae
- Thick legs



Which of these is a wasp? Yell out your answer!



- Two wings
- Short antennae



- Thin body/waist
- Long legs w/ spines
- Hairless body



- Thick body
- Short/stout legs
- Hairy body





There are 20,000 described species of bees in the world!

What are the different kinds of bees?



Nearly all bee families found in Michigan



Social vs solitary bees

Social bee colony



Solitary bee nest



Solitary Bees

Ground nesting bees



- Andrenidae
- Colletidae
- Melittidae
- Halictidae
- Apidae

Cavity nesting bees



- Megachilidae
- Apidae
- Halictidae
- Colletidae

Photos by Jason Gibbs

Michigan is home to more than 467 species of bees!



Gibbs et al. (2017) The bees of Michigan, with notes on their distribution, taxonomy, pollination, and natural history. Zootaxa 4352, 1-160.

What is the status of Michigan's bees?

50% of bumble bee species now have much smaller ranges



Rusty patched bumblebee



American bumblebee



Common eastern bumblebee

2000-present
 1980-1999
 1960-1979
 Pre-1960



Wood, T.J., Gibbs, J., Graham, K.K., and Isaacs, R. (2019) Narrow pollen diets are associated with declining Midwestern bumble bee species. Ecology.

46% of Megachile species in decline in Michigan

Megachile relativa

Species Common Name: Relative Leafcutter bee NatureServe Global and State Ranks: G5- Secure, S2S3- Imperiled to Vulnerable Last Observed in Michigan: 2019 Estimated Spatial Increase/Decline (Historic – Current): -55% Conservation Information: Historically very common, becoming increasingly rare in contemporary samples. Stem-nesting species. Associated Plant Species in Michigan: Specialist on Asteraceae.





Megachile gemula

Species Common Name: Smallhanded Leafcutter bee NatureServe Global and State Ranks: G5- Secure, S2- Imperiled Last Observed in Michigan: 2019 Estimated Spatial Increase/Decline (Historic – Current): -54% Conservation Information: A stem nesting species that has experience declines compared to historic occurrence numbers. Associated Plant Species in Michigan: Campanula sp., Centaurea sp., Lotus sp.





Rowe et al. 2022. Assessing species diversity, distribution, and status of bee genus *Megachile* in Michigan.

Native bee declines are being reported globally



^{25%} decline in native bee diversity since 1990

Zattara and Aizen. 2021. One Earth 4, 114-123.

Causes of native bee declines



How are invasive/managed bees worsening native bee declines?

Competition for resources



"A 40-hive apiary residing on wildlands for 3 months collects the pollen equivalent of four million wild bees"

Spreading diseases



Jones et al. 2021. Jour Invert Path 185:107667

85% increase in honey bee colonies since 1961

Osterman et al. 2021. Ag, Eco, Env 322(1):107653. Cane and Tepedino. 2016. Cons Let 10(2): 205-210

How are invasive/managed bees worsening native bee declines?

Invasive Osmia species





Osmia cornifrons

It's not just honey bees – invasive Mason bees are a growing concern.

Populations of these invasive *Osmia* species has increased 800% since 2003.

At the same time, all native Osmia (six species) have showed substantial declines of 76-91% since 2003.

Declines of native Osmia species directly tied to higher invasive populations.

How can our backyards help native bees?



1. Increase the number and diversity of flowering plants

2. Provide nesting sites for bees – keep a messy yard!

3. Get involved in monitoring programs

What makes a yard bee friendly for native bees?

- Native plants that flower throughout the season (early Spring-late Fall)
- ✓ No pesticides sprayed- especially during bloom!!
- Create a muddy patch in a corner of your yard to provide water and mud to bees
- Be messy! Leave dead trees, broken or hollowed out stems, leaf piles, and bare patches of soil

Spring-blooming plants



Summer-blooming plants



Fall-blooming plants



How can our backyards help native bees?



1. Increase the number and diversity of flowering plants

2. Provide nesting sites for bees – keep a messy yard!

3. Get involved in monitoring programs

Community science projects

> iNaturalist

Bumble Bee Watch

Great Sunflower Project

Queen Quest



Michigan Native Bees





















Bombus impatiens Common Eastern Bumble Bee (native)



<u>Identification</u>: Abdomen mostly black with a thin yellow stripe close to the thorax.

<u>Range & Status</u>: One of the most widespread and abundant species in the Eastern temperate region of the US.

<u>Habitat</u>: Close to or within woodland, grassland, farmland, wetlands, urban parks and gardens.

Bombus fervidus Golden northern bumble bee (native)



<u>Identification</u>: Abdomen predominately or entirely yellow.

Range & Status: Widespread species in the eastern US but appears to be in a slow decline. Considered to be vulnerable according to IUCN 3.1.

<u>Habitat</u>: Open grassland, farmland, urban parks and gardens.

Bombus grisecollis Brown-Belted Bumble Bee (native)



<u>Identification</u>: Abdomen typically has a small brown stripe close to the thorax, but mostly black otherwise.

Range & Status: One of the most widespread and abundant species in the Eastern temperate region of the US.

<u>Habitat</u>: Open farmland and fields, urban parks and gardens, wetlands.

Bombus bimaculatus Two-Spotted Bumble Bee (native)



<u>Identification</u>: Abdomen typically has a yellow "W" shape, or two spots, near the thorax. Rest of abdomen is black.

Range & Status: One of the most widespread and abundant species in the Eastern temperate region of the US.

<u>Habitat</u>: Close to or within wooded areas, urban parks and gardens.

Bombus auricomus Black and Gold bumble bee (native)



Identification: Large bee with dark colored wings. Two yellow bands on abdomen. Body hair is short.

Range & Status: Native range is eastern US. Special concern species in MI with declining populations.

<u>Habitat</u>: Found in prairies, prairie fens, and meadows. Nests alongside forest edges.

Bombus pensylvanicus American bumble bee (native)



Identification: Large bee with dark colored wings. Two large yellow bands on abdomen.

<u>Range & Status</u>: Endangered bumble bee species in Michigan and threatened in the US. Found in eastern N. America.

<u>Habitat</u>: Found in prairies, prairie fens, and meadows. Nests alongside forest edges.

Andrena spp. Miner bees (native)



Possibly *Andrena helianthi* (Sunflower Andrena) **Identification:** Difficult to tell on "the wing". Body size slightly smaller than a honey bee and has pollen collecting hairs on the tibia.

<u>Common plant hosts</u>: Plants in the sunflower family (Asteraceae).

<u>Life History</u>: Ground nesting bee & solitary. Active from Spring-Fall.

Halictus ligatus Sweat bee (native)



Identification: Difficult to tell on "the wing". Body size considerably smaller than a honey bee. Brown-black body with white stripes across abdomen at the end of each abdominal segment.

<u>Common plant hosts</u>: Plants in the sunflower family (Asteraceae).

<u>Life History</u>: Ground nesting bee & primitively eusocial. Active from Spring-Fall.

Agapostemon virescens Bi-colored sweat bee (native)



Identification: Vibrant, metallic green thorax. Usually with a yellow-black stiped abdomen, but females sometimes have green abdomen.

<u>Life History</u>: Ground nesting bee & solitary. Sometimes nesting in aggregations. Active from Spring-Fall.

Melissodes spp. Long-horned bees (native)



Identification: Large, robust bees that are fast flying. Very hairy body and legs. Abdomen often black-and-white striped. Males have extremely long antennae; females have moderately long antennae.

<u>Life History</u>: Ground nesting bee & solitary. Sometimes nesting in aggregations. Active from Spring-Fall.

Melissodes spp. Long-horned bees (native)





Lasioglossum spp. Sweat bees (native)



<u>Identification</u>: Tiny bees. Body is shiny, typically metallic green or black.

<u>Life History</u>: Ground nesting bee. Species in this genus are variable for sociality, ranging from solitary, semisocial, and even parasitic. Active from Spring-Fall.

<u>Habitat</u>: Urban parks and gardens, prairies, farmland, woodland.

Megachile spp. Leaf cutter bees (native)



<u>Identification</u>: Medium-large sized bees. Easy to identify with the "scopa", or the hairs underneath the abdomen that carry pollen.

<u>Life History</u>: Ground and stem nesting nesting bees. Solitary. Cut pieces of leaves or flower petals to line brood cells. Active from Spring-Fall.

<u>Habitat</u>: Urban parks and gardens, prairies, farmland, woodland.

Coelioxys spp. Cleptoparastic bee (native)



<u>Identification</u>: Easy to identify- very sharp pointed abdomen. Legs typically red-ish.

<u>Life History</u>: Celptoparasitic bees (i.e., lays eggs in nests of other bees). Don't actively forage for pollen, making them poor pollinators. Active from Spring-Fall.

<u>Habitat</u>: Urban parks and gardens, prairies, farmland.

Melissodes bimaculatus Two-spotted long horn bee (native)



Identification: Robust bee with black body and white-yellow hairs on tibia. Males have yellow hairs on face (females have black faces).

<u>Life History</u>: Ground nesting bee & solitary. Females sleep in nests while males congregate and sleep together on stems. Active from Spring-Fall.

<u>Habitat</u>: Urban parks and gardens, prairies, farmland.

Melissodes bimaculatus Two-spotted long horn bee (native)





Melissodes bimaculatus Two-spotted long horn bee (native)



Peponapis pruinosa Squash bee (native)



<u>Identification</u>: Collect pollen only from squash flowers, so will be only be found on squash flowers. Fast flying and large with white stripes on abdomen.

<u>Life History</u>: Ground nesting bee & solitary. Active in late summer.

<u>Habitat</u>: Urban parks and gardens, farmland, wherever squash flowers are.

Other resources

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How to Manage

the Blue Orchard Bee



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An Identification and Native Plant Forage Guide HEATHER HOLM Author of Policystory of Network Rents

NOI BOSCH & WILLIAM STMP

in Orchard Pollinator





Questions?

Bee-friendly plants and pest management strategies – Part 1

<u>Heidi Wollaeger</u>, <u>Michigan State University Extension</u>, and Dave Smitley, <u>MSU Extension</u>, Department of Entomology - April 16, 2015

Common name	Scientific name	Bees	Natural enemies
Swamp milkweed	Asclepias incarnate	Better	Better
Culver's root	Veronicastrum virginicum	Best	Better
Yellow coneflower	Ratibida pinnata	Better	Best
Nodding wild onion	Allium cernuum	Better	Good

Native Michigan plants that attract bees and natural enemies!

Swamp Milkweed (Asclepias incarnata)





Information and distribution

- Native, perennial plant
- Grows between 2-4 ft tall
- Bloom time between June October
- Found commonly in wet areas and prairies

Growing conditions

- Requires lots of water
- Plant where there is partial shade
- Thrives in wet, mucky clay soils
- Prefers neutral to slightly acidic soil

Asclepias syriaca Common milkweed (native)



- Bombus spp.
- Halictus
- Megachile (leaf-cutter bees)
- Coelioxys (cuckoo bee)

Asclepias tuberosa Butterfly milkweed (native)



- Augochlorella (metallic green sweat bee)
- Megachile (leafcutter bee)
- Certina (small carpenter bee)
- Coelioxys (cuckoo bee)
- Lasioglossum (small sweat bee)

Swamp Milkweed (Asclepias incarnate)

Has been identified as to have "special value to native bees & bumble bees" by The Xerces Society for Invertebrate Conservation



Yellow coneflower (*Ratibida pinnata*)



Information and distribution

- Native, perennial plant
- Grows between 3-6 ft tall
- Bloom time between May September
- Found commonly in prairies & woodland edges



Growing conditions

- Requires moderate watering
- Plant where there is lots of sun
- Grows in a wide range of soils (sandy, clay)

Yellow coneflower (Ratibida pinnata)

Has been identified as to have "special value to native bees" by The Xerces Society for Invertebrate Conservation



Specialist bee- Coneflower Miner bee Andrena rudbeciae

Other bees:

- Sweat bees
- Cuckoo bees
- Small carpenter bees
- Large carpenter bees
- Bumble bees

Culver's root (Veronicastrum virginicum)



Information and distribution

- Native, perennial plant
- Grows between 3-6 ft tall
- Bloom time between July September
- Found commonly in prairies & woodland

Growing conditions

- Requires lots of watering
- Plant where there full/partial sun
- Prefers rich loamy acidic soils
- Grows well along woodland edges

Culver's root (Veronicastrum virginicum)

Has been identified as to have "special value to native bees" by The Xerces Society for Invertebrate Conservation



Nodding wild onion (Allium cernuum)



© RestoringTheLandscape.com

Information and distribution

- Native, perennial plant
- Grows between 1-3 ft tall
- Bloom time between June August
- Found commonly in prairies & stream banks

Growing conditions

- Requires lots of watering
- Plant where there full sun
- Prefers Humus-rich alkaline soils (pH>7.2)

Nodding wild onion (Allium cernuum)

Has been identified as to have "special value to native bees" by The Xerces Society for Invertebrate Conservation



Rudbeckia hirta Black eyed susan (native)



- Bombus impatiens
- Bombus bimaculatus
- Bombus fervidus
- Bombus grisecollis
- Agapostemon (green metallic sweat bee)
- Augochlora (green metallic sweat bee)
- Halictus (sweat bees)
- Certina (small carpenter bee)
- Melissodes (long-horned bees)
- Coelioxys (cuckoo bee)
- Specialist Andrena rudbeckiae

Heliopsis helianthoides Smooth Oxeye (native)



- Bombus impatiens
- Bombus bimaculatus
- Bombus fervidus
- Bombus grisecollis
- Agapostemon (green metallic sweat bee)
- Augochlora pura (green metallic sweat bee)
- Certina (small carpenter bee)
- Melissodes (long-horned bees)
- Coelioxys (cuckoo bee)

Monarda fistulosa Bee balm (native)



- Bombus impatiens
- Bombus bimaculatus
- Bombus fervidus
- Bombus grisecollis
- Anthophora (digger bees)
- Agapostemon (green metallic sweat bee)
- Certina (small carpenter bee)
- Melissodes (long-horned bees)

Echinacea purpurea Purple coneflower (native)



- Agapostemon (metallic green sweat bee)
 Bombus
- Halictus
- Certina
- Melissodes (long-horned bees)