

Bees and Bee Mimics in Gardens




Janet Knodel
Professor and Extension Entomologist


EXTENSION

Bee Family Identification


4,000 species in North American, >250 species in North Dakota

Short-tongued bees
Andrenidae, Colletidae




Patrick Beauzay, NDSU

Long-tongued bees
Apidae, Halictidae, Megachilidae




Patrick Beauzay, NDSU


EXTENSION

Perennial Flower Examples for Short- / Long-tongued Bees

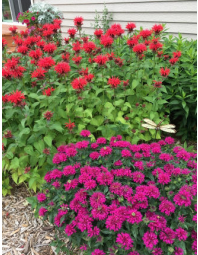
Short-tongued bees
Andrenidae, Colletidae


- Catnip
- Gaillardia
- Hyssop
- Scabious
- Sedum
- Veronica
- Yarrow



Long-tongued bees
Apidae, Halictidae, Megachilidae

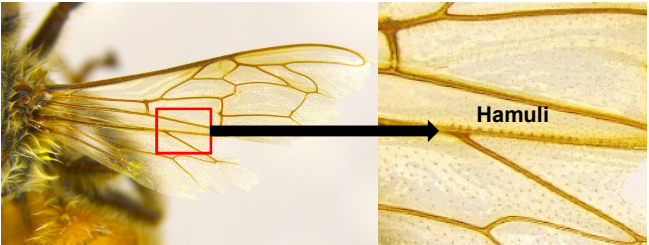
- Echinacea
- Heuchera
- Hosta
- Monarda
- Penstemon
- Salvia
- Snapdragon





EXTENSION

What Makes a Bee a Bee?

- Two pairs of wings
- Hind wing smaller
- Wings can connect via small hooks called **hamuli** on the leading edge of the hind wing




EXTENSION

What Makes a Bee a Bee?

- Usually hairy, but not always!
- At least some body hairs branched, but you will need a microscope to see this!



NDSU | EXTENSION

Patrick Beauzay, NDSU

What Makes a Bee a Bee?

- Pollen-collecting hairs called scopae
- Baskets called corbicula on hind legs



Honey bee



Aphidae
Melissodes bimaculata
Patrick Beauzay, NDSU



Megachilidae
Megachile sp.
Patrick Beauzay, NDSU

NDSU | EXTENSION

Bee Eyes

- 5 eyes
 - 2 compound eyes
 - Complex images
 - 100s of tiny lens
 - 3 ocelli
 - Single len
 - Detect movements
 - Orientation of sun
- See Ultraviolet patterns

HOW MANY EYES DOES A BEE HAVE?

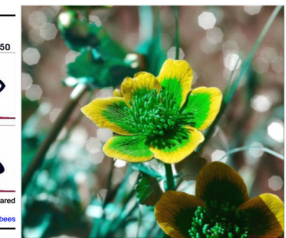
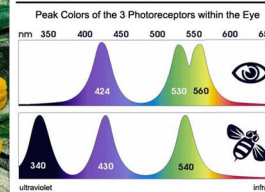


OUR WILD YARD.COM

NDSU | EXTENSION

What Do Bees See?

- Perceive light in the 300-650 nm range
- Prefer light that is between 300-420 nm (UV light)
 - White, yellow, purple, violet or blue



NDSU | EXTENSION

European Honey Bees: Family Apidae

- *Apis mellifera*
 - Medium size (12-15 mm)
 - Hairy, golden-brown with dark brown legs, hairy eyes
 - Hind tibia with **pollen basket or corbicula**, a bare area surrounded with long hairs to collect pollen
 - Nest in man-made colonies and in open cavities



David Cappaert, Michigan State University, Bugwood.org UGA2116051



Bumble Bees: Family Apidae



- *Bombus* spp. - Approximately 19-20 spp. in our area
- Large, robust, hairy black and yellow bees
- Hind tibia with pollen basket
- Buzz pollination



© 2006 Patrick Beauzay



Patrick Beauzay, NDSU

Common eastern bumble bee *Bombus impatiens*

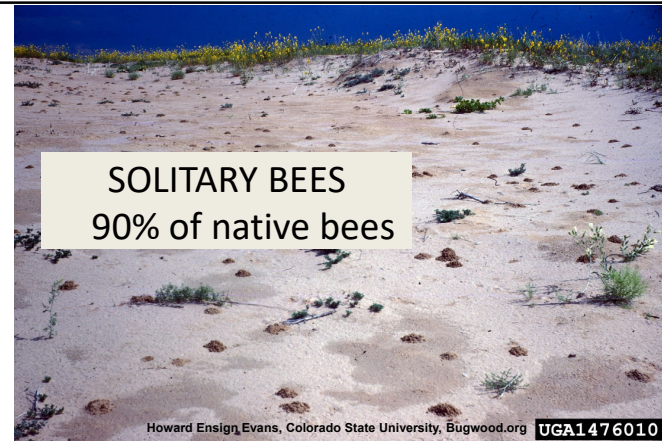
Western yellow banded bumble bee *Bombus terricola*



David Cappaert, Michigan State University, Bugwood.org UGA5381038



David Cappaert, Michigan State University, Bugwood.org UGA5381041



Howard Ensign Evans, Colorado State University, Bugwood.org UGA1476010

Long-horned Bees, Digger Bees Family Apidae

- Several genera and spp.
 - Males have long antennae
 - Medium 8-16 mm
 - Black body with dense pale or dark hairs
 - Most species are solitary to communal ground nesters
 - The ‘Digger Bees’ sometimes nest gregariously in lawns (prefer dry, sandy soil)



Leafcutter Bees Family Megachilidae

- Collect pollen on hairs located on ventral surface of abdomen
- Cut round pieces of leaves to line nests
- Hole or cavity nesters (natural or man-made)
- 30% of our bees nest in cavities



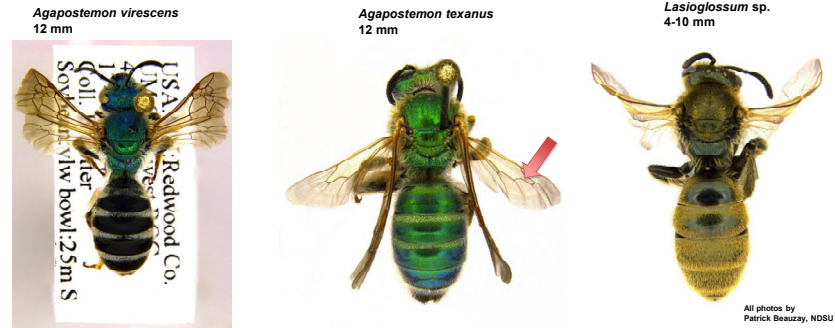
Mason Bees Family Megachilidae

- *Osmia* spp.
 - Small-medium (7-16 mm)
 - Robust body, metallic green-blue with less hairs
 - Some species used commercially
 - Efficient pollinators of many crops
 - Solitary or nest in groups in artificial nesting structures (widely available or build your own)
 - Collect mud to line their nests



Sweat Bees Family Halictidae

- Several genera and MANY species, difficult to identify
- Small to medium (3.5-11 mm), Metallic color or black



Attracted to the salt in your sweat!

Bee Mimics – Hover Flies (Family Syrphidae)

Bee	Fly
Two pairs of wings	One pair of wings + halteres
Long, segmented antennae	Short, 3-segmented antennae
Narrow eyes, on side of head	Huge eyes, take up most of head
Hover – rarely	Hover - often



NDSU

Bee Mimics – Wasps (Family Vespidae)

Bee	Wasp
Many hairs	Few hairs
Robust waist (hard to see)	Narrow waist
Pollen collecting hairs or baskets	No pollen hairs or baskets
Robust body with yellow & black, metallic (green), black	Elongated body with bright colors (yellow & black or brown)



NDSU EXTENSION

Monarda spp., bee balm



Common Name	Species	Origin	Flower Icons	Bee Icons	Butterfly Icons
Wild bergamot	<i>Monarda fistulosa</i>	Native	4 flower icons	2 bee icons	1 butterfly icon
Spotted bee balm	<i>Monarda punctata</i>	Native	4 flower icons	2 bee icons	1 butterfly icon
Grand Parade bee balm	<i>Monarda didyma</i> 'Grand Parade'	Cultivar	4 flower icons	2 bee icons	1 butterfly icon
Jacob Cline bee balm	<i>Monarda didyma</i> 'Jacob Cline'	Cultivar	4 flower icons	2 bee icons	...
Marshall's Delight bee balm	<i>Monarda didyma</i> 'Marshall's Delight'	Cultivar	4 flower icons	2 bee icons	2 butterfly icons
Purple Mildew Resistant bee balm	<i>Monarda didyma</i> 'Purple Mildew Resistant'	Cultivar	4 flower icons	2 bee icons	1 butterfly icon
Raspberry Wine bee balm	<i>Monarda didyma</i> 'Raspberry Wine'	Cultivar	4 flower icons	2 bee icons	1 butterfly icon

Great for attracting bumble bees and wild bees! No icon = no visits; one icon = few; two icons = moderate; three icons = heavy; four icons = very heavy

NDSU EXTENSION

Ornamental Tall Sedums



































































































Common Name	Species	Origin	Flower Icons	Bee Icons	Butterfly Icons
Autumn Fire sedum	<i>Hylotelephium</i> 'Autumn Fire'	Cultivar	4 flower icons	2 bee icons	2 butterfly icons
Autumn Joy sedum	<i>Hylotelephium</i> 'Autumn Joy'	Cultivar	4 flower icons	2 bee icons	2 butterfly icons
Cherry Truffle sedum	<i>Hylotelephium</i> 'Cherry Truffle'	Cultivar	4 flower icons	2 bee icons	1 butterfly icon
Mr. Goodbud sedum	<i>Hylotelephium</i> 'Mr. Goodbud'	Cultivar	4 flower icons	2 bee icons	...
Neon sedum	<i>Hylotelephium</i> 'Neon'	Cultivar	4 flower icons	2 bee icons	2 butterfly icons
Night Embers sedum	<i>Hylotelephium</i> 'Night Embers'	Cultivar	4 flower icons	2 bee icons	2 butterfly icons

Great for a late season flowering food source! No icon = no visits; one icon = few; two icons = moderate; three icons = heavy; four icons = very heavy

NDSU EXTENSION

Symphyotrichum - Aster

New England aster	<i>Symphotrichum novae-angliae</i>	Native	  	  	  	  
Alma Potschke aster	<i>Symphotrichum novae-angliae</i> 'Alma Potschke'	Cultivar	  	  	  	  
Purple Dome aster ★	<i>Symphotrichum novae-angliae</i> 'Purple Dome'	Cultivar	  	  	  	  
Aromatic aster ★	<i>Symphotrichum oblongifolium</i>	Native	  	  	  	  
Dream of Beauty aster	<i>Symphotrichum oblongifolium</i> 'Dream of Beauty'	Cultivar	  	  	  	  
October Skies aster	<i>Symphotrichum oblongifolium</i> 'October Skies'	Cultivar	  	  	  	  
Raydon's Favorite aster ★	<i>Symphotrichum oblongifolium</i> 'Raydon's Favorite'	Cultivar	  	  	  	  
Smooth blue aster	<i>Symphotrichum laeve</i>	Native	  	  	  	  

★Did not bloom before the first hard frost

Great for a late season flowering food source!

ALL Bees in Trouble! Help save BEES!



- Bumble bees can't fly as far as honey bees
- No food:
 - Need succession of flowers from early spring through late fall
 - Fewer wildflowers in the countryside
 - Large expanses of lawn
- Disease issues
- Pesticides




NDSU | EXTENSION

NDSU Extension Publications

<https://www.ndsu.edu/agriculture/extension/extension-topics/gardening-and-horticulture/pollinators>





Pollinator Preferences for Selected Aster, False Indigo, Bee Balm and Sedum Flowers in North Dakota

Pollinators are crucial for food production, and more than two-thirds of our leading global food crops rely upon or benefit from pollinators. While pollinators tend to visit flowers and feed on pollen and nectar, flowers also add beauty to our yards, farms and natural areas.

The recent dramatic decline of pollinator is a worldwide concern. Some of the major causes of pollinator decline are habitat loss, pesticide use, diseases and climate change. However, homeowners can make a difference in pollinator health by planting perennial flowers in their landscapes, providing nesting habitat for bees, and using less toxic pesticides when needed.

Helping Pollinators in North Dakota

North Dakotans want to support pollinators by providing nectar and pollen through planting healthy flowers in their backyards and farms. Despite the wide availability of many native and ornamental cultivars of perennial flowers, little scientific information is available on whether a flower will be beneficial to pollinators.

Many homeowners are reluctant to plant native species because they are perceived to be less attractive, weedy and more likely to lodge. Consequently, they can have a difficult time selecting perennial flowers to plant that attract and reward pollinators such as wild bees, bumble bees, honey bees, syrphid flies and butterflies. Having different perennial flowers that bloom throughout the pollination life cycle is important, especially when food is scarce for pollinators, such as early spring and early fall.

This Extension publication will help determine which ornamental flowers to plant that attract and reward pollinators. Eight perennial native species and 30 perennial ornamental cultivars (Table 1 and Figure 1) were observed for their ability to attract pollinators at two locations in northwestern North Dakota.

The genera of perennial flowers tested were *Eragrostis* (wild indigo), *Salvia* (sage), *Hydrastyrax* (false indigo), *Monarda* (bee balm) and *Symphotrichum* (aster). Plant hardiness and ornamental landscape potential of these perennials also are discussed.

NDSU | EXTENSION
North Dakota State University
Fargo, North Dakota
June 2020

NDSU Extension Publications









NDSU | EXTENSION