2019 Spring Webinar Series
2 p.m. CST
EXTENDING KNOWLEDGE ➔ CHANGING LIVES
NDSU EXTENSION
Upcoming Webinars

• April 10 – Getting Started With Herb Gardening
  – Yolanda Schmidt, NDSU Extension Agent, Ag and Natural Resources, Pierce County

• April 17 – Best Practices on Health and Hygiene When Handling Foods for the Public
  – Julie Wagendorf, Director, North Dakota Department of Health’s Division of Food and Lodging
Zoom Controls

Meeting Topic: Field2Fork - Tom Kalb Growing Vegetables
Host: Extension FCW
Invitation URL: https://zoom.us/j/609371435
Participant ID: 22

Question/Answer Controls

Chat box

Mute/unmute
Open chat box
Please Complete the Survey

• Please complete the short online survey that will be emailed to you after today’s webinar. It will take just a couple minutes!

• Be sure to sign up for an opportunity to win a prize in the drawing. After submitting the survey, a form to fill out with your name/address will appear.

• Acknowledgement: This project was supported by the U.S. Department of Agriculture’s (USDA) Agricultural Marketing Service through grant 14-SCBGP-ND-0038.
Bee-utiful Landscapes: Building a Pollinator Garden

Janet Knodel, Extension Entomologist
Esther E. McGinnis, Extension Horticulturist
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
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!
What Makes a Bee a Bee?

• Most species have areas of pollen-collecting hairs
• Or, baskets
Bee Family Identification
4,000 species in North America

Short-tongued bees
Andrenidae, Colletidae

Long-tongued bees
Apidae, Halictidae, Megachilidae
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**, 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
Bumble Bees
Family Apidae

- *Bombus* spp.
- Large, robust, hairy black and yellow bees
- Hind tibia with pollen basket
- Buzz pollination
- Approximately 19-20 spp. in our area
Bombus impariens
Common eastern bumble bee
Western yellow banded bumble bee
*Bombus terricola*

In decline
Bumble Bees

• Can forage in cooler weather than honey bees

• 50°F most bumble bees stop foraging versus 61°F for honey bees
Bumble Bee Life Cycle

- Overwintering queens emerge in April/May
- Need early flowering plants
- See female workers by June
- Males produced for fall mating
- Feed on asters and goldenrod
- Whole colony dies in fall except mated queens
Bumble Bees in Trouble

- Can’t fly as far as honey bees
- Need succession of flowers from early spring through late fall
- Fewer wildflowers in the countryside
- Large expanses of lawn
- Disease issues
- Pesticides
SOLITARY BEES
90% of native bees
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

*Agapostemon virescens* 12 mm

*Agapostemon texanus* 12 mm

*Lasioglossum sp.* 4-10 mm
# Bee Mimics – Hover Flies

Family Syrphidae

<table>
<thead>
<tr>
<th>Bee</th>
<th>Fly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two pairs of wings</td>
<td>One pair of wings + halteres</td>
</tr>
<tr>
<td>Long, segmented antennae</td>
<td>Short, 3-segmented antennae</td>
</tr>
<tr>
<td>Narrow eyes, on side of head</td>
<td>Huge eyes, take up most of head</td>
</tr>
<tr>
<td>Hover – rarely</td>
<td>Hover - often</td>
</tr>
</tbody>
</table>

Veronica Calles-Torrez, NDSU
# Bee Mimics – Wasps

**Family Vespidae**

<table>
<thead>
<tr>
<th>Bee</th>
<th>Wasp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many hairs</td>
<td>Few hairs</td>
</tr>
<tr>
<td>Robust waist (hard to see)</td>
<td>Narrow waist</td>
</tr>
<tr>
<td>Pollen collecting hairs or baskets</td>
<td>No pollen hairs or baskets</td>
</tr>
<tr>
<td>Robust body with yellow &amp; black,</td>
<td>Elongated body with bright colors (yellow &amp; black or brown)</td>
</tr>
<tr>
<td>metallic (green), black</td>
<td></td>
</tr>
</tbody>
</table>

Veronica Calles, NDSU

Jon Yuschock, Bugwood.org
Butterfly Gardening in North Dakota

Do you enjoy watching beautiful butterflies fluttering from one colorful flower to the next? If you do, you’ll enjoy attracting butterflies to your backyard or garden.

Many people enjoy the delight and wonder of butterflies. Butterflies bring a sense of encloiment to a flower garden and are relaxing and uplifting at the same time.

Butterfly gardens are a simple and easy way to improve people’s quality of life and beautify a community or backyard. This publication describes how to get started on creating your special butterfly garden and attract the species of butterflies found in North Dakota.

What is a butterfly garden?
A butterfly garden (Figure 1) is a flower garden designed to attract and retain butterflies. A successful butterfly garden must have nectar sources and host food plants. Flowers provide food and water for adult butterflies in the form of nectar, and host plants provide food for growing caterpillars.

The garden should contain a variety of flowers that will bloom throughout the season. Remember, the greater the variety of flower colors and plants, the greater the variety of butterflies that will visit your garden.

Helpful Hints in Planning a Butterfly Garden
First and foremost: Location, location, location. What kinds of native and exotic flowers do well at your location? Also, knowing what butterfly species are found in your geographical location will help you decide what kind of flowers and host plants to select. Finally, pick a sheltered but sunny location.

Second: Create a habitat that will attract butterflies. A sunny, south-facing butterfly garden will attract more butterflies, and cause their eggs to hatch sooner and caterpillars to develop more quickly, resulting in more butterflies.

Bee-utiful Landscapes: Building a Pollinator Garden

Bees are in trouble in the U.S. Native bee species are declining in numbers due to habitat loss and other factors. Approximately one-fourth to one-third of European honey bee colonies in the U.S. also die each year despite the best efforts of their辛勤 beekeepers.

A continued decline in pollinator numbers will affect our food supply because insect pollination is necessary or beneficial for many fruit, nut and vegetable crops. However, the news need not be dreary.

You can have a major impact by providing suitable habitat and nutrition for bees. By planting a pollinator garden, you can turn your yard or farm into an oasis for bees.

This publication will help you identify major pollinators, choose plants that will provide a continuous source of nectar and pollen during the growing season, and safety use pesticides.
New Extension Publication

Pollination in Vegetable Gardens and Backyard Fruits

Bees are important insect pollinators for bountiful home vegetable gardens and backyard fruits. European honey bees and native bees, such as bumble bees, help ensure fruit set and higher yields. Learning about the process of pollination can help smart gardeners attract and safeguard these important insects.

What is Pollination?
Pollination is the deposit of pollen grains from the stamen (male part) of a plant onto the stigma (female part) of another flower or the same flower. Successful pollination results in the production of viable seeds and a fruit. Most crop plants are pollinated by insects or wind. Many ornamental crops, such as wheat and corn, rely on wind pollination. In contrast, many fruits and vegetables require or benefit from insect pollination.

Role of Pollinators in the Vegetable Garden
Common plants in the crucifer family include garden favorites such as cucumbers, squash, cucumbers, pumpkin, watermelons, and melons. Most cucumbers depend on honey pollinators because each plant produces separate male and female flowers rather than having both sets of reproductive parts in each flower. Cucumbers are called "imperical" bees are essential to cross-pollinate, or carry pollen from the male flower to the receptive female flower.

Figure 1. Anatomy of an open flower, Ecobase.com

Insects That Look Like Bees

Everyone knows that bees love to visit flowers, but not everything you see visiting flowers or buzzing around the garden is a bee. In fact, many insects mimic bees to avoid unwanted attention from predators such as birds. Whether you call them "honey bees," "honeybees," or "yellow stinky things," most of them are beneficial to your yard and garden. Learning how to identify the insects in your backyard will help smart gardeners know and protect these allies.

Flies
Some flies look like honey bees and can be mistaken for bees. They have compound eyes and a proboscis that is folded back, similar to a bee's. The common housefly has two large wings on its back.

Some flies, especially bee flies, have quite hairy bodies. They are often seen on blue or yellow flowers. Bee flies do not have a stinger and are not a threat to humans.

Hover flies (Fam. Syrphidae) Figure 2: Hover flies are often seen on flowers. They have a slender body with two large wings on each side. Hover flies feed on nectar and pollen and are beneficial because they are predators of small insects and other pests. Hover flies are also known as "jumper flies" because they can jump up to 3 feet in a single leap.

Figure 3. Hover fly with hair on body, Flowers.com. "Honey bee" with hairy wings on flower, Flowers.com, NDSU

Figure 4. Hover fly, NDSU. Hover fly with hairy wings on flower, Flowers.com, NDSU

Figure 5. Hover fly with hairy wings, Flowers.com, NDSU

Moths
Hummingbird moths or hummingbirds (Family: Sphingidae, hawk moths) Figure 5 are about 2 to 6 inches in length, with a wingspan of 1 to 2 inches. They have long, slender bodies and a wingspan of 2 to 3 inches. These moths look more like hummingbirds than bees. They feed using a long proboscis to sip nectar from flowers. At night, hummingbird moth flowers will open to reveal flowers to the nectar. The flowers are visited by hummingbird moths at night with a bright yellow color, with a white spot, such as garden phlox.

NDSU Extension
August 2018

NDSU Extension
March 2019
Protect Bees & Pollinators!

Thank you!

Veronica Galles-Torrez, NDSU
What Can You Do to Preserve Bee Habitat

- Provide nectar and pollen sources
- Provide water
- Provide shelter
- Wise pesticide use
Provide Nectar and Pollen

- Choose a variety of plants that bloom in succession from early spring through fall
- Incorporate native species into your garden
- Some non-native species are beneficial
- Plant in drifts of 3 or more per species
April/May/June Blooming Perennials
Spring Bulbs (Non-Native)

Crocus

Grape hyacinth
Spring-Flowering Natives

*Pulsatilla patens*  
(fka *Anemone patens*)  
Eastern pasqueflower

*Aquilegia canadensis*  
Canada columbine

By USFWS Mountain-Prairie - Pasqueflower (Crocus), CC BY 2.0,  
https://commons.wikimedia.org/w/index.php?curid=74753145

By Ōđđmáŋŋyuŋiŋi $- I created this work entirely by myself., CC BY-SA 3.0,  
https://commons.wikimedia.org/w/index.php?curid=4216200
June Blooming Perennials

- *Baptisia australis* (false indigo)
- Not native to ND
- *Baptisia alba* native to MN

Geranium maculatum

CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=172901

https://commons.wikimedia.org/wiki/File:Geranium_maculatum_0001.JPG
June Blooming Perennials

- Golden Alexander—*Zizia aurea*
- Prairie native
- Important plant for black swallowtail larvae
Non-Native June Blooming Perennials

- Chives
- Ornamental alliums
June-Blooming Perennials

- *Asclepias tuberosa* (Butterfly weed)
- MN, SD
- Nectar for bees and butterflies
- Not well-adapted for clay soils
A word on milkweeds

- Common milkweed
- *(Asclepias syriaca)*
- Noxious weed in Cavalier, Renville, Sheridan, Traill, Wells Counties
- Not on the state noxious weed list
- Not the best choice for a garden

*Swamp milkweed—a better choice*
# Milkweeds for ND

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Native or Not</th>
<th>Soils</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butterfly weed</td>
<td><em>Asclepias tuberosa</em></td>
<td>Not</td>
<td>Medium to dry soils</td>
<td>Attractive orange flowers; does not tolerate clay soils</td>
</tr>
<tr>
<td>Common milkweed</td>
<td><em>Asclepias syriaca</em></td>
<td>Native to eastern 2/3 of ND</td>
<td>Adaptable to wide range of soils</td>
<td>Pink or lavender flowers; rhizomes may spread aggressively in home gardens</td>
</tr>
<tr>
<td>Prairie milkweed</td>
<td><em>Asclepias sullivantii</em></td>
<td>Native to Cass and Richland Counties</td>
<td>Adapted to heavier soils</td>
<td>Pink flowers; spreads slower than common milkweed</td>
</tr>
<tr>
<td>Showy milkweed</td>
<td><em>Asclepias speciosa</em></td>
<td>Native to most of ND</td>
<td>Best in medium to dry soils</td>
<td>Has longer pink petals</td>
</tr>
<tr>
<td>Swamp milkweed</td>
<td><em>Asclepias incarnata</em></td>
<td>Native to eastern ND</td>
<td>Best in moist soils</td>
<td>Rosy pink flowers; doesn’t tolerate drought</td>
</tr>
<tr>
<td>Whorled milkweed</td>
<td><em>Asclepias verticillata</em></td>
<td>Native to most of ND</td>
<td>Medium to dry soils</td>
<td>White flowers</td>
</tr>
</tbody>
</table>
Swamp Milkweed
JULY/AUGUST PERENNIALS
Monarda fistulosa
Wild bergamot

Spreads very vigorously
Dalea purpurea
Purple prairie clover
*Liatris ligulistylis*
Northern plains blazing star
‘Kobold’

Not as good as the native species
Culver’s Root
Veronicastrum virginicum
Echinacea

- *Echinacea angustifolia* is native
- Other *Echinacea* species and hybrids seem to attract pollinators

Williston Trial

*Echinacea angustifolia*
Avoid Doubles
Close to the Native Species
September

Aster
September
Sources

• Local ND Nurseries
• Native Plant Nurseries
  – Prairie Moon—Winona, MN
  – Prairie Restorations—Princeton, MN
  – Glacial Ridge Growers, Glenwood, MN
  – Morning Sky, Morris, MN
  – Ion Exchange, Harper’s Ferry, IA
Provide Water Sources

- Bird bath
- Fountain
- Butterfly puddling area
- Water garden
- Pond
Provide Habitat

- Bee houses
- Bare ground
- Dead trees
- Don’t cut down perennials in fall
Native Grasses
Pesticide Friendly Practices

• Reduce spraying
• Use less toxic pesticides
• Don’t spray blooming plants
• Spray evening
Extension Master Gardener Pollinator Gardens

• Built 19 model pollinator gardens in 2016 and 2017
• 7 more in 2018
• 19 counties
• Will build 2 or 3 more in 2019
Be Certified as a NDSU Extension Home Pollinator Garden

- Application
- Limited number will receive a free sign
- https://www.ag.ndsu.edu/mastergardener/pollinator
Questions?
www.ag.ndsu.edu/fieldtofork