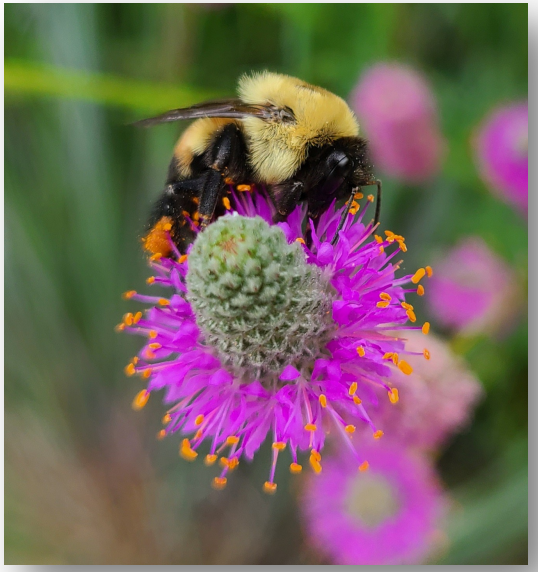
Pollinator Pathway Project

Creating your pollinator garden



Julie Weisenhorn
Extension horticulture educator
jweisenhorn@umn.edu

*Special thanks to Dr. Elaine Evans, UMN Extension

Global importance of pollinators

- 80% of flowering plants rely on bees and other animals for pollination.
- Bees support flowering plants that support other insects, birds, mammals, etc.

Insects that contribute to pollination

- Bees**
- Flies*
- Wasps
- Beetles
- Butterflies and Moths
- Miscellaneous insects

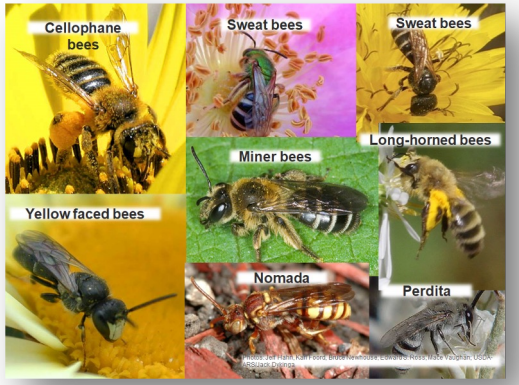
** Bees are the most effective and efficient pollinators.
* Flies are the second most effective pollinators.

Bees are effective pollinators

- Gather pollen to feed young
- Ability to fly long distances and return to nest
- Constancy:
  - Staying with one flower species per pollinating trip
- Branched hairs

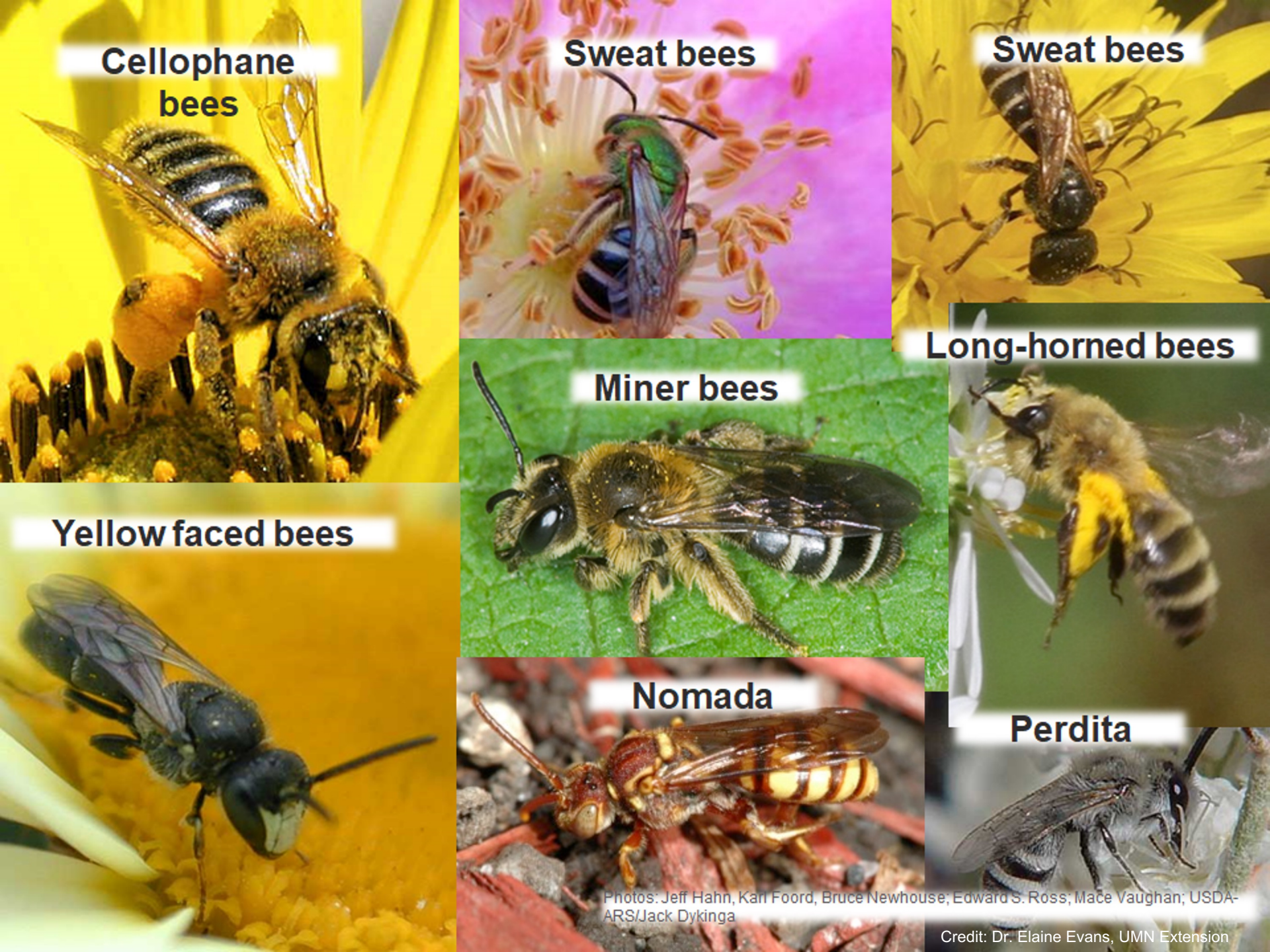
How many species of bees …

- In Minnesota?
  - 20 bumble bees
  - ~450 other native bees
- In North America?
  - 4,000 native bees
- Globally?
  - 20,000 native bees



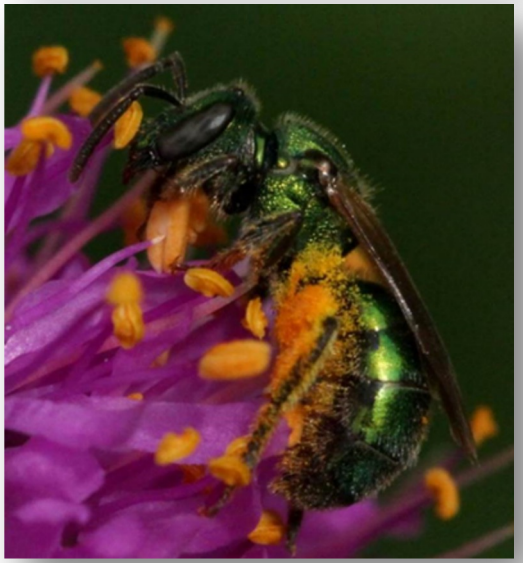
Credit: Dr. Elaine Evans, UMN Extension


Digger bees
Mason bees
>470 bee species in MN
Bumble bees
Leafcutter bees
Carpenter bees
Credit: Dr. Elaine Evans, UMN Extension
Photos: James Cane; Robert Parks Karl Foord, Edward S. Ross


Cellophane bees
Sweat bees
Sweat bees
Long-horned bees
Miner bees
Yellow faced bees
Nomada
Perdita
Photos: Jeff Hahn, Karl Foord, Bruce Newhouse; Edward S. Ross; Mace Vaughan; USDA-ARS/Jack Dykinga
Credit: Dr. Elaine Evans, UMN Extension

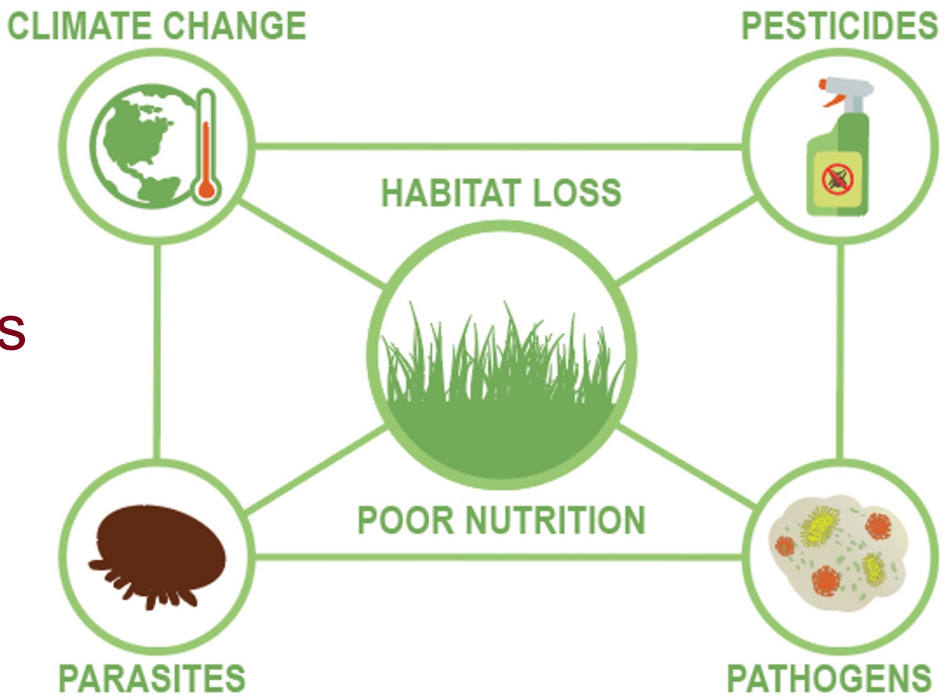
Some native bees are declining

- Several native bee species are threatened with extinction
  - Honeybees are native to Europe and **not** threatened with extinction
- Status of most native bee species is unknown



What is causing bee decline?

- Pollinator challenges
  - Fewer flowers
  - More pesticides
  - Parasites and diseases
  - Global climate change

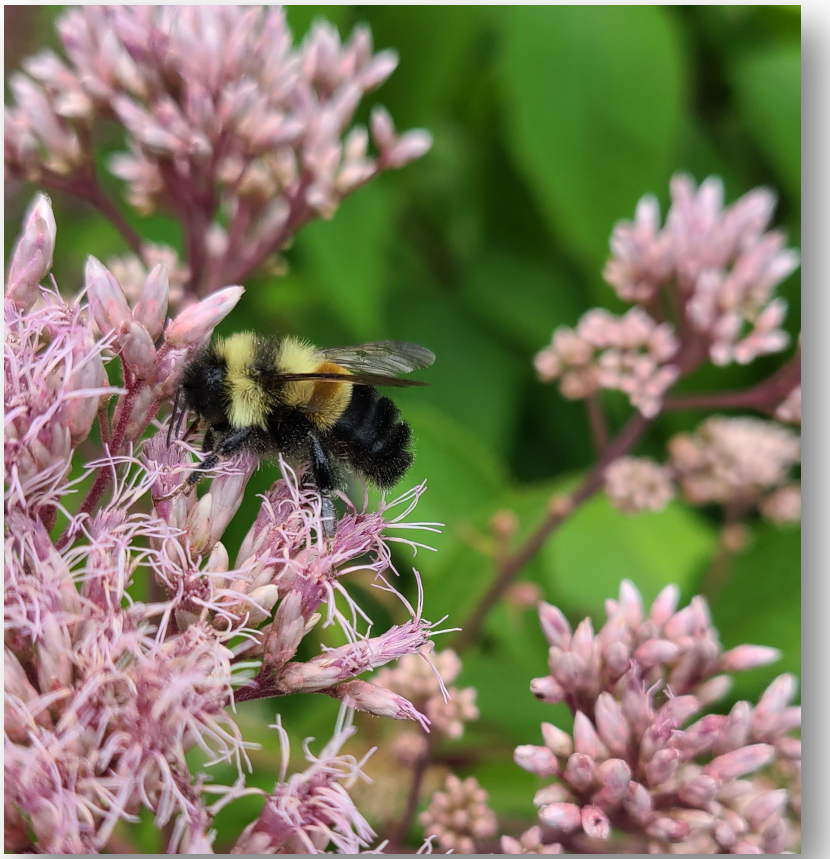


Many of these problems interact in ways that compound the damage done.

Credit: Dr. Elaine Evans, UMN Extension

Rusty patched bumble bee

- Endangered
- Formerly common
- Federally protected
- Illegal to harm
- Still found in MN!



Rusty patched bumble bee

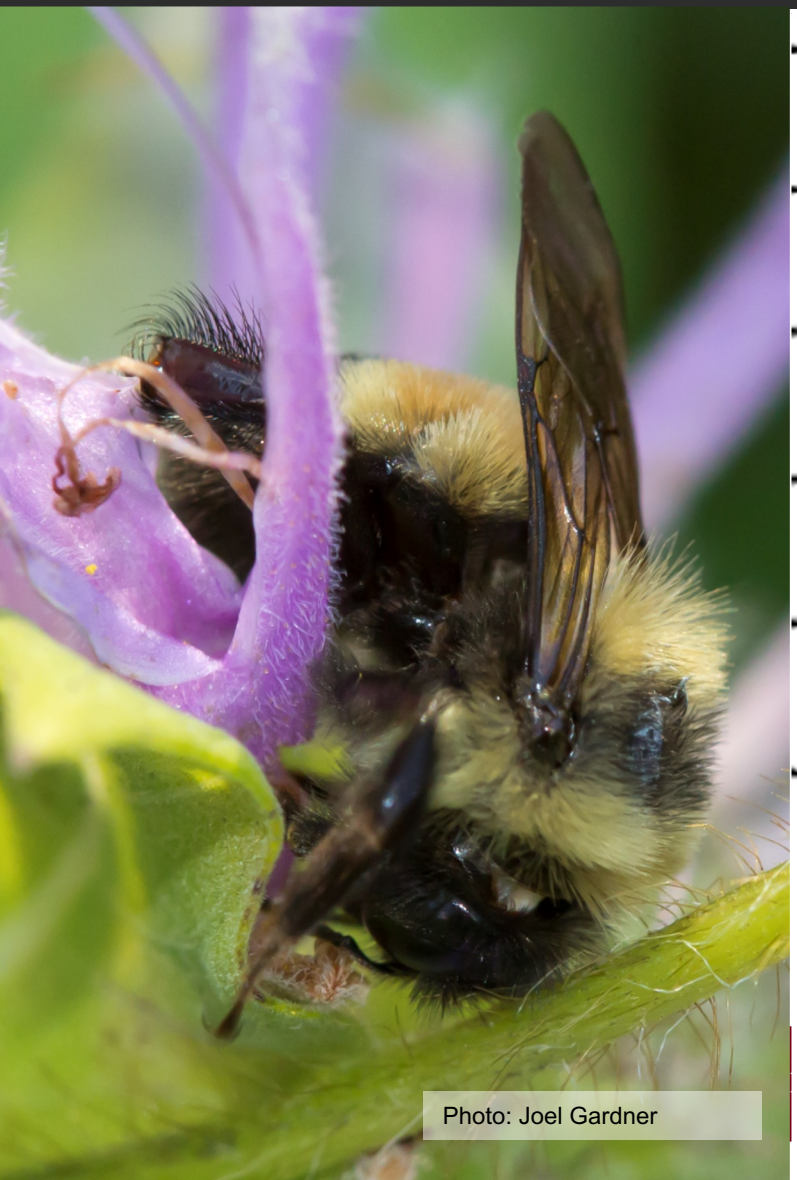
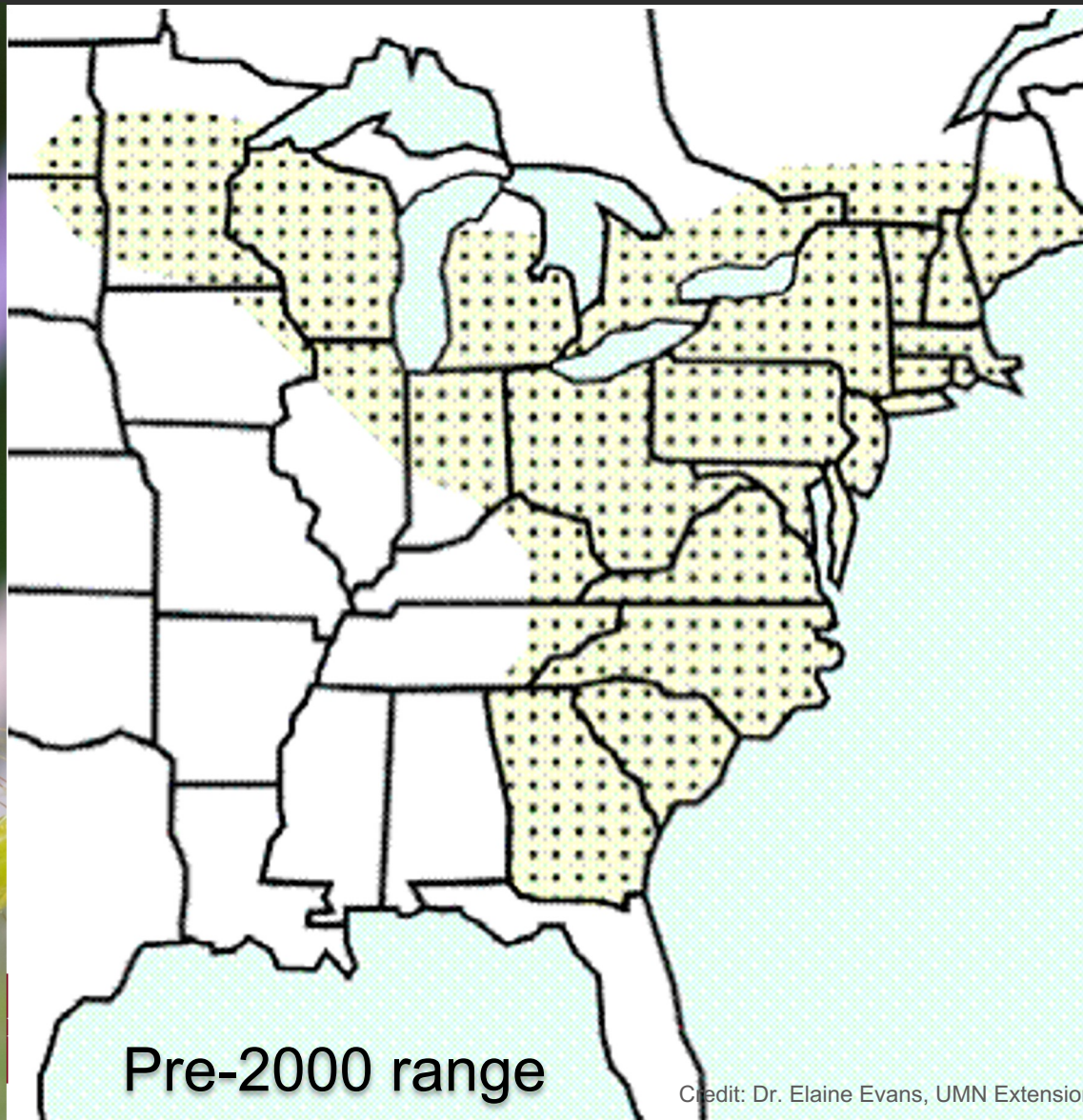
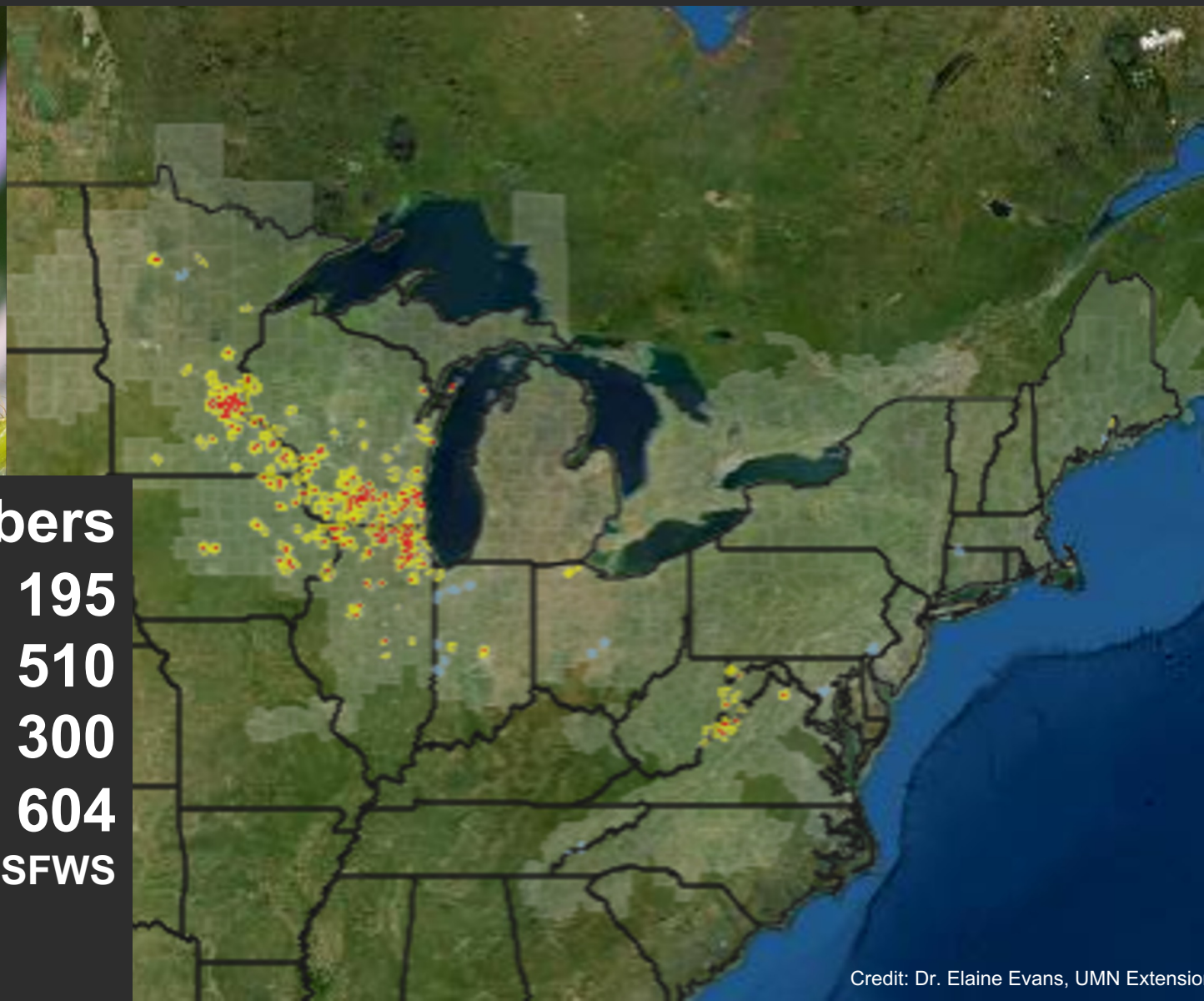


Photo: Joel Gardner



Credit: Dr. Elaine Evans, UMN Extensio

Rusty patched bumble bee



Total numbers

2017 = 195

2018 = 510

2019 = 300

2020 = 604

As reported by USFWS

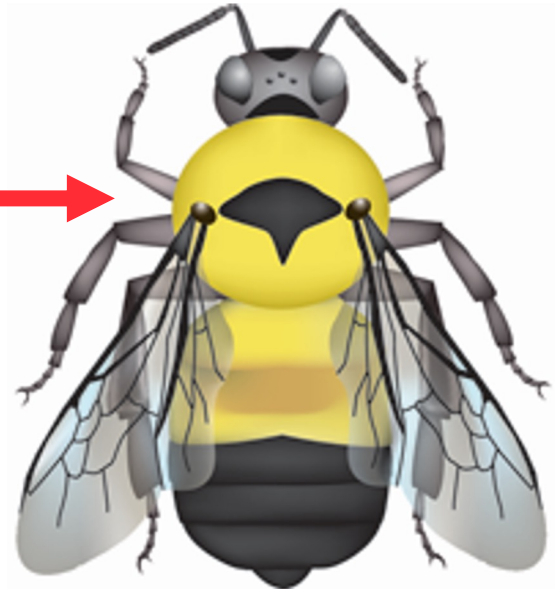
Credit: Dr. Elaine Evans, UMN Extensio

Bombus affinis (Rusty patched bumble bee)

Credit: Dr. Elaine Evans, UMN Extensio

Key characteristics

- Black t-shape on thorax
- Rusty patch on 2nd abdominal segment, yellow at edge
- Mistaken identity: brown belted, tri-colored



Bombus affinis
Rusty patched bumble bee

Credit: Dr. Elaine Evans, UMN Extension

rusty patched

brown belted

tri-colored

half black

common eastern

two-spotted

z.umn.edu/bumblebeesofmn

Credit: Dr. Elaine Evans, UMN Extension

Bumble bee nests

- Started each spring by solitary queen
- In cavity with insulation
  - mouse nest / bird nest
  - compost pile / air conditioner
  - pile of grass
- Undisturbed areas

Credit: Dr. Elaine Evans, UMN Extension

Credit: Dr. Elaine Evans, UMN Extension

Ground nests

- Solitary native bees
- Entrance holes in undisturbed areas with exposed soil
- Bee entering, leaving or guarding the nest entrance

Ground nest entrances

Stem or wood tunnels

- Stem nesting bees
- Hollow out stems
- Sometime remnants of stem centers (pith) on leaves below stem nest
- Tunnels from wood boring beetles

Pollinator Pathway Project

Creating your pollinator garden

4 steps to pollinator friendly yards and gardens

1. Use good gardening practices
2. Select pollinator friendly plants
3. Create pollinator habitat
4. Use alternative lawns, ground covers




1. Good gardening practices, healthier plants

- Good soil health
  - Drainage, organic matter
- Water plant root zone
  - Reduces splashing soil
- Space plants by mature size
  - Improved air circulation
  - More light
  - Fewer pest issues
  - Best form, size

Plant for less stressed plants

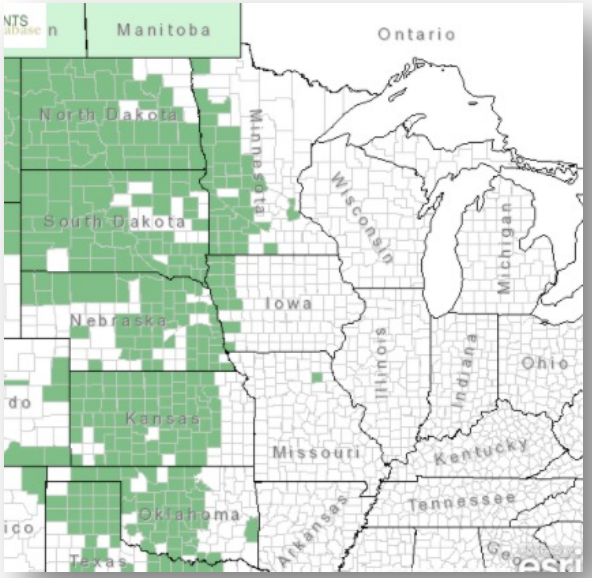
- Choose plants with growing needs that match your growing conditions
  - Soil, light, space, zone
  - Less plant stress means better pest resistance
- Buy healthy plants
  - Resistant cultivars, varieties
  - Fewer pest issues

2. Choose plants for pollinators

- Wide plant diversity
  - Fragrance, shape, sizes, colors
- Provide nectar, pollen, habitat resources
- Continuous bloom April – October
- Plant in masses

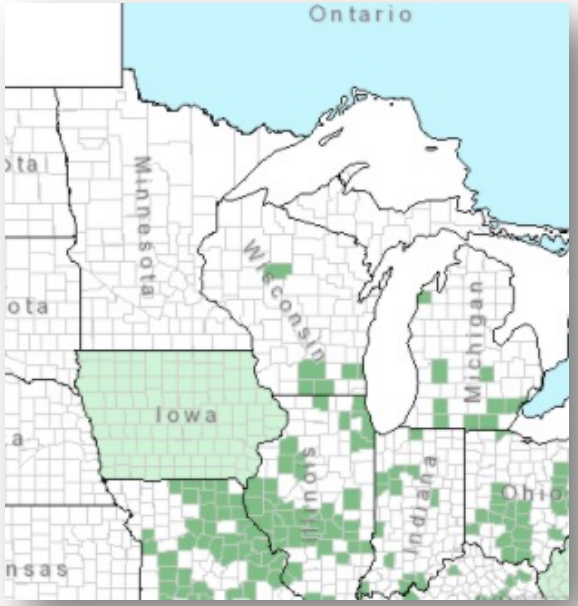
Avoid a “bee sterile” landscape

Native vs. non-native spp. / cultivars

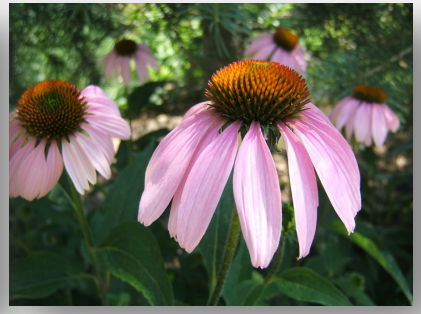


Select non-natives and native cultivars that retain similar characteristics and benefits for pollinators.

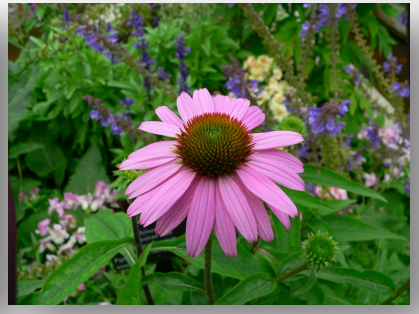
https://plants.usda.gov/core/profile



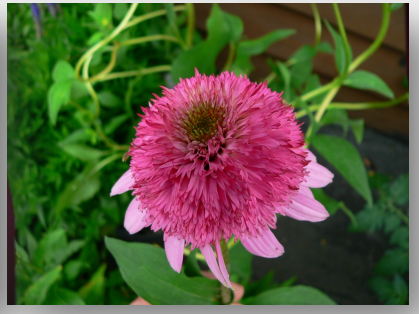
Echinacea angustifolia
MN native



E. purpurea
Native, E. N. America



E. purpurea
'Bright star'



E. 'Razzmatazz'

Replacing plants? Go pollinator friendly

- Increase plant diversity
- Retain look with similar form, texture, size, color
- Choose for specific insects
  - Rusty patched bumble bees:
    - Bee balm, turtlehead, blueberry, joe pye weed, ironweed
  - Other rare, specialist bees:
    - Native fringed loosestrife, sunflowers, bellflowers

Native bloodroot (*Sanguinaria canadensis*)

Double-petal bloodroot (*Sanguinaria canadensis* 'Multiplex')

Source:

http://beelab.umn.edu

This list is not inclusive of all plants that bees will visit in Minnesota. These are flowers that are particularly attractive to bees and can be easily integrated into most landscapes.

= Tree = Herbaceous plant = Shrub ○ = Full sun ◑ = Part-shade ● = Shade

Early=March to May Mid=June to July Late=August to September

Scientific name	Common name	Habit	Sun	Native	Bloom time	Honey bees	Other bees
Crataegus crus-galli	Hawthorn		○	X	Early	X	X
Geranium maculatum	Wild geranium		◑ ●	X	Early		X
Penstemon grandiflorus	Large beardtounge		○	X	Early		X
Salix discolor	Pussy willow		○	X	Early	X	X
Coreopsis lanceolata	Lanceleaf coreopsis		○ ◑ ●	X	Early to Mid	X	X
Hydrophyllum virginianum	Virginia waterleaf		○ ◑ ●	X	Early to Mid	X	X
Lupinus perennis	Wild lupine		○ ◑	X	Early to Mid		X
Aruncus dioecus	Goatsbeard		○ ◑ ●	X	Mid	X	X
Echinacea angustifolia	Purple coneflower		○	X	Mid	X	X
Lobelia siphilitica	Blue lobelia		○ ◑	X	Mid		X
Pycnanthemum tenuifolium	Slender mountain mint		○	X	Mid	X	X
Agastache foeniculum	Anise hyssop		○ ◑	X	Mid to Late	X	X
Asclepias incarnata	Swamp milkweed		○ ◑	X	Mid to Late	X	X
Borago officinalis	Borage		○ ◑		Mid to Late	X	X
Chamaecrista fasciculata	Partridge pea		○	X	Mid to Late	X	X
Cirsium discolor	Bicolor thistle		○	X	Mid to Late	X	X
Dalea purpurea	Purple prairie clover		○	X	Mid to Late	X	X
Eupatorium maculatum	Joe-pye weed		○ ◑	X	Mid to Late	X	X
Eupatorium perfoliatum	Common boneset		○ ◑	X	Mid to Late	X	X
Helianthus spp.	Sunflowers		○ ◑ ●	X	Mid to Late	X	X
Hylotelephium telephium	Autumn joy sedum		◑ ●		Mid to Late	X	X
Impatiens capensis	Jewelweed		○	X	Mid to Late	X	X
Liatris aspera	Rough blazingstar		○ ◑	X	Mid to Late	X	X
Monarda fistulosa	Beebalm		○	X	Mid to Late	X	X
Nepeta x faassenii	Catmint		○ ◑		Mid to Late	X	X
Origanum vulgare	Oregano		○ ◑		Mid to Late	X	X
Ratibida pinnata	Yellow coneflower		○	X	Mid to Late		X
Silphium perfoliatum	Cup plant		○	X	Mid to Late	X	X
Trifolium hybridum	Alsike clover		○ ◑		Mid to Late	X	X
Vernonia fasiculata	Ironweed		○	X	Mid to Late	X	X
Veronicastrum virginicum	Culver's root		○ ◑	X	Mid to Late		X
Solidago rigida	Stiff goldenrod		○ ◑	X	Late	X	X
Symphyotrichum lateriflorum	Calico aster		○	X	Late	X	X

Content and design by Elaine Evans

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More about pollinator plants

- UMN Extension Flowers for Pollinators
  - Plant Elements of Design plant selection database
  - Native plants webpage
  - Trees and shrubs for pollinators
  - Coming soon: Non-native plants for RPBB
- The Xerxes Society
  - Great Lakes Region plant list
- MN Department of Natural Resources




Leave the leaves!

3. Creating pollinator habitat

Leave the leaves: Less tidy is better for bees

- Mulch selectively
  - Leave open soil for ground nesting bees
- Leaf mulch creates overwintering habitat

Leave / create habitat

- Bees may nest in out-of-the-way places
- Rock piles, grasses, dead trees, logs and stick piles

Leave hollow and pithy stems from flowers, grasses for stem nesting bees

- Spring: cut stems of varying diameters and heights 8 – 24”
- Leave through next summer
- Don’t clump or bundle stems (parasites)
- Avoid using pesticides / drift

https://www.beelab.umn.edu/wild-bees/wild-bees-and-houses

Wild bee nests

Wild Bee Nests and Building Wild Bee Houses
Nesting Habitat

Wild bees are important pollinators of many fruits and wild flowers. The best
nests for native bees is to provide undisturbed areas where they can make t
Some key elements to provide are standing, dead stems, downed logs, brus
importantly, undisturbed ground (both bare and covered with thatch).

Most bees (between 60 and 70%) dig burrows in the **ground**. These bees pr
soil bare of vegetation, often on hillsides. You can attract ground-nesting bee
making sure to leave some spots of exposed, undisturbed soil in your yard.

The other 30-40%, the **cavity**-nesting bees, require a bit more effort. These
plant stems or holes in wood left by wood-boring beetles, instead of digging
in the ground. A nesting bee will use mud, leaves, or another material to build walls and

- Propolis

How to create habitat for stem-nesting bees

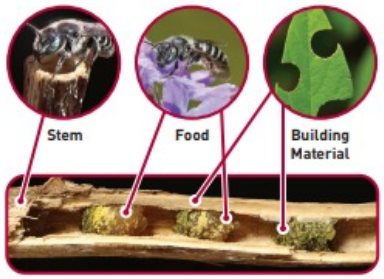
Help wild bees find places to live by providing essential nesting habitat. Around 90 out of 470 bee species in Minnesota nest in cavities made in stems or wood. Removing dead flower stalks is a common gardening practice, but these bees need stems to survive the winter. Bees also need a variety of other resources such as leaves, mud, plant hairs, and resin to build successful nests.

How can you manage stems to provide natural habitat for a wide diversity of stem-nesting bees?

Steps to create stem-nesting bee habitat

- Provide hollow and pithy stems from flowers and grasses.
- Cut stems in spring.
- Provide a variety of stem heights from 8 to 24+ inches.
- Provide a variety of stem diameters from 1/8 to 5/16 inch.
- Leave stems through summer, winter, and at least the first half of second summer.
- To deter parasites, don't clump or bundle stems.
- Bees will use vertical, horizontal, or angled stems.
- Protect the plants from pesticide exposure.
- Provide diverse plants nearby to provide other nesting needs such as leaves, plant hairs, and resin.
- Provide open water for mud-building bees.

Nest necessities



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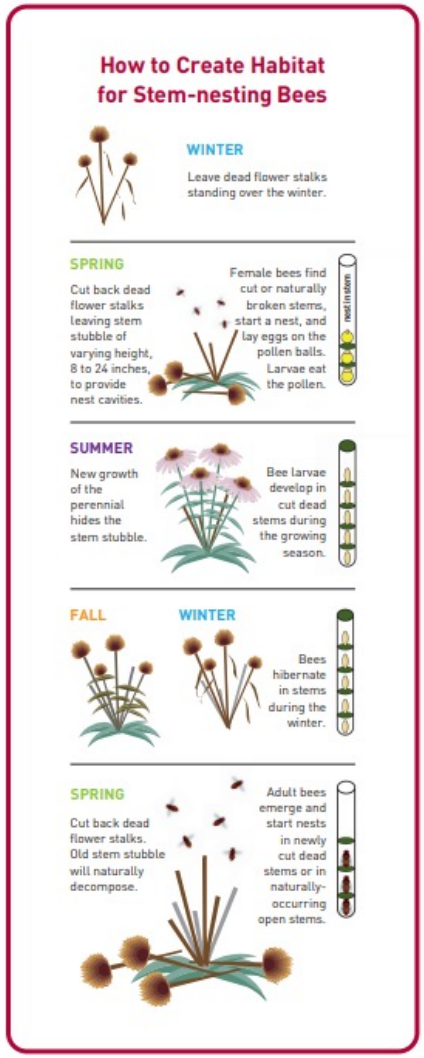


4. Alternative lawns, plant slopes

Consider using alternative lawns and plantings that benefit bees

- Improve landscape aesthetics, care
  - Color, texture, form
  - Reduce maintenance, inputs
  - Pollinator habitat, nutrition
- Bee lawns
- Shrubs, perennials on slopes, hillsides

Planting and maintaining a bee lawn

Quick facts

- Bee lawns have flowers mixed in with turfgrasses such as fine fescues and Kentucky bluegrass.
- The flowers of a bee lawn provide food (nectar and pollen) for pollinators.
- Bee lawns are environmentally friendly because they are managed using low-input methods that generally use less fertilizer and pesticides.
- Bee lawns can still be used recreationally by your household like a regular lawn.
- A bee lawn can attract over 50 species of native bees.

Are you interested in doing more to help our native pollinators? You can make your lawn do double duty! A bee lawn can not only provide a recreational space for you, your family and your pets, it can also provide much-needed food resources for bees and other beneficial pollinators.

While **turfgrasses can provide some environmental benefits**, they don't provide much food for pollinators.

One way to provide resources for pollinators while keeping the function of a lawn is to incorporate other plants such as dutch white clover, self-heal and creeping thyme. These plants have the right type of flowers for bees.

A bumble bee foraging on white clover

Once established, bee lawns take a similar (or even less) amount of work to maintain as a traditional lawn, making them an accessible addition to almost any home landscape.

< Yard and garden

Lawns and landscapes >

Landscape design >

Lawn care >

Growing plants to help bees and other pollinators >

Resources for professionals >

Water Wisely: Start in your own backyard >

Find plants >

Bee la

- Sunny
- Redu
- Near

Pollinator plants on slopes, hillsides

- Trees, shrubs, flowers, grasses for food, nesting habitat
- Eliminates mowing - difficult, dangerous
- Reduces erosion and minimize run-off

Pollinator Pathway Project

Pollinator gardens


Liatris Spicata
'Kobold'
Spike Gayfeather
Geranium
'Gerwat' Rozanne
Cranesbill

Eutrochium maculatum 'Gateway' Joe Pye weed

- Living blockade, winter interest
- Bees, wasps

Rusty patched bumble bee on Gateway joe pye weed (2021)

Dalea purpurea, purple prairie clover

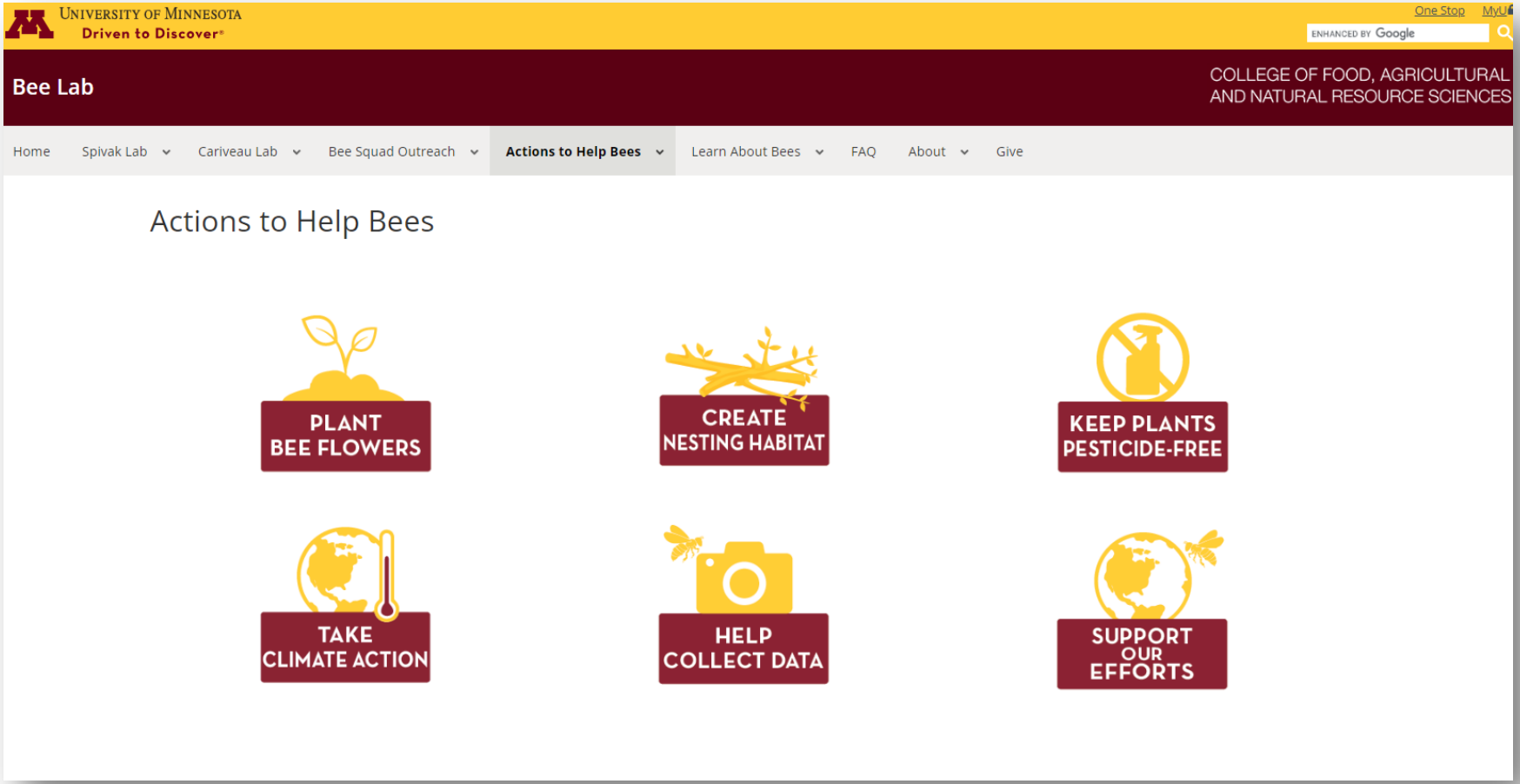
- Native plant
- High quality nectar, pollen
- Summer bloom
- Re-seeds
- Rabbits

Gentiana andrewsii, bottle gentian

- Bumble bee resource
- True blue flower

Actions to help bees from UMN Bee Lab

https://beelab.umn.edu/help-bees/actions-help-bees



Pollinator gardening from UMN Extension

https://extension.umn.edu/yard-and-garden

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Yard and garden

Home > Yard and garden

The best plants and gardening practices for Min
gardeners, homeowners and hobbyists to grow
landscapes and gardens.

- Listen to the Smart Gardens and What's Ki
Kale? podcasts.

On this page

- Solve a problem
- Find plants
- How-to
- Lawns and landscapes
- Master Gardeners
- News
- Events

Plant dise
Recognize and
plants

What inse
Identify insect

Growing plants to help bees and other pollinators

Home > Yard and garden > Lawns and landscapes > Landscape design > Flowers for pollinators

How to create a pollinator-friendly landscape

- Focus on a "healthy" environment, not a perfect landscape.
- Choose plants that provide food and habitat for pollinators.
- Plant a bee lawn. Replace lawn areas that are difficult to mow with shrubs and flowers.
- Adopt best practices in landscape maintenance to improve plant health and eliminate the need for pesticides.
- See our list of recommended trees and shrubs for pollinators.

How pollinator-friendly is your yard and garden right now?

It only takes 5 minutes to complete this survey to find out how your backyard measures up on plants, habitat and gardening practices that help bees and other beneficial insects.

Pollinators help plants that bring us food and other resources. By carrying pollen from one plant to another, pollinators fertilize plants and allow them to make fruit or seeds. Pollinator health is critical to our food system and the diversity of life across the world.

Bees are one of the most well-known pollinators, but there are a variety of other pollinators including ants, flies, beetles, birds and more!

Each of us can contribute to pollinator friendly environments.

- Plant flowers with pollen and nectar.
- Create habitat and nesting sites for pollinators.
- Eliminate the use of pesticides that are dangerous to pollinators.

< Insects

Pollinators >

- UMN Twin Cities Bee Campus >
- Honey bees, bumble bees and native bees >
- How pollinator friendly is your yard and garden? >
- Flowers for Minnesota bees >

< Yard and garden

Lawns and landscapes >

- Landscape design >
- Lawn care >
- Resources for professionals >
- Water Wisely: Start in your own backyard >
- Find plants >

Stay up to date

- Read Yard and Garden News
- Listen to the Smart Gardens and What's Killin
My Kale? podcasts.

Videos: Fall clean up for pollinators, pollinators in action!

Resources to help pollinators

Make your yard friendly for pollinators year round

Is your garden and yard pollinator friendly ALL year 'round? Extension Educator Julie Weisenhorn shows you how to adjust your fall cleanup routine to help pollinators through the fall and winter. Make your landscape home to native pollinators. It's smart gardening!

- + Create a pollinator friendly landscape
- + Pollinator biology and identification
- + Pollinator conservation
- + Volunteer to be a citizen scientist

Pollinator videos

- + Newborn bumble bee
- + Planting bee lawns
- + Andrena bee
- + Colletes nesting
- + Colletes foraging

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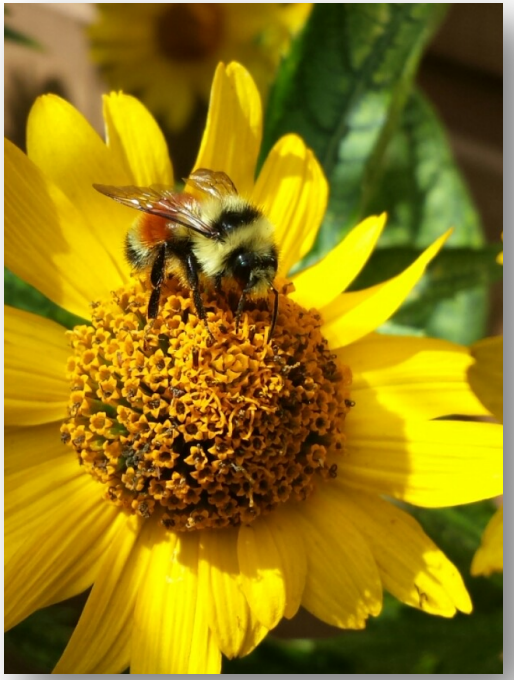

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