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Why care about pollinators?

Pollination services to U.S.

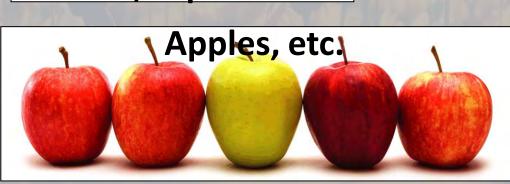
Agriculture is valued at

> \$20 billion/year





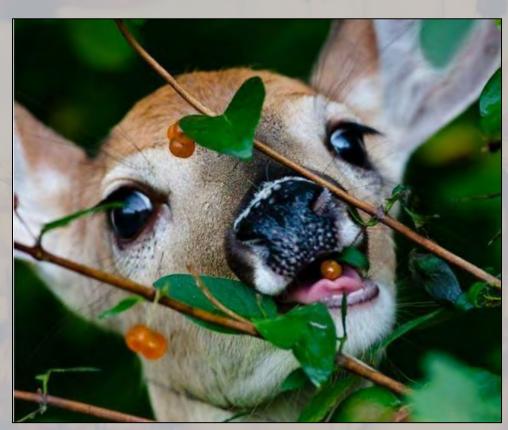






Food for Wildlife!

Pollinators support native plant communities that provide food for wildlife (birds, mammals, etc.)





Pollination is Beneficial to the Insect and the Plant!

The Insect gets food

The plant increases probability of successful reproduction

Flowers have changed their anatomy to make it easy for pollen to be picked up and moved!!





Flowers like to cater to their Pollinators

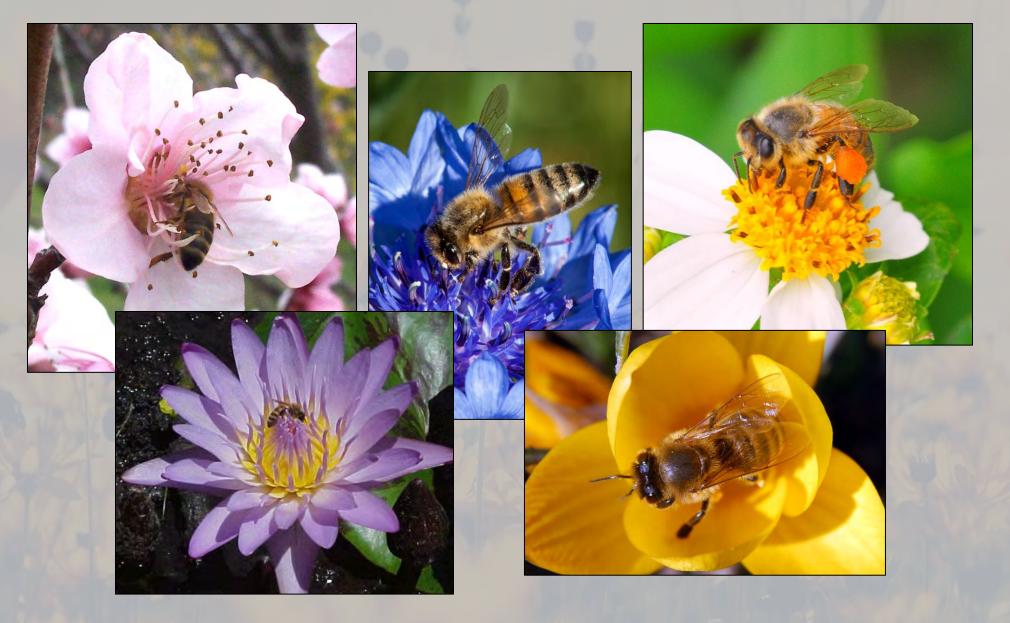
Since bees can see certain colors better than others (including UV), beepollinated flowers often have UV markings



Flowers that like to cater to beetles and flies are shallower, allowing these insects to get to the nectar/pollen more easily



Some are generalists



Some are extremely specialized!

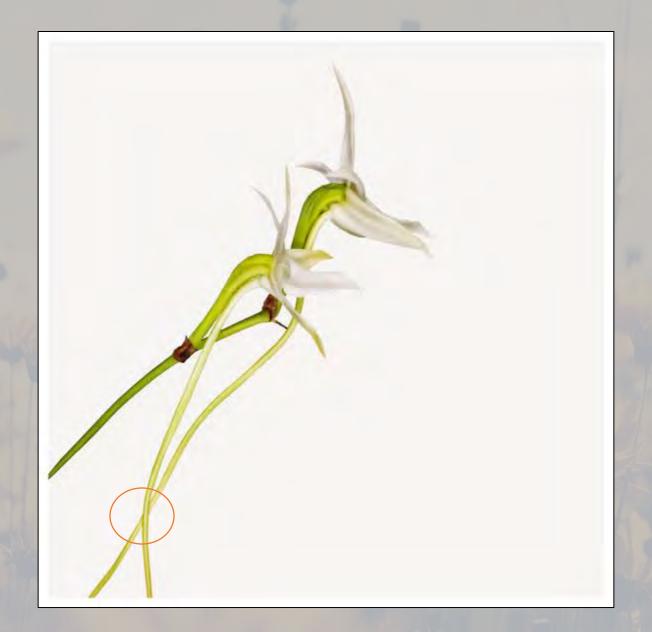
Very specific relationship between two organisms

Plants sometimes 'trick' these insects into visiting them!





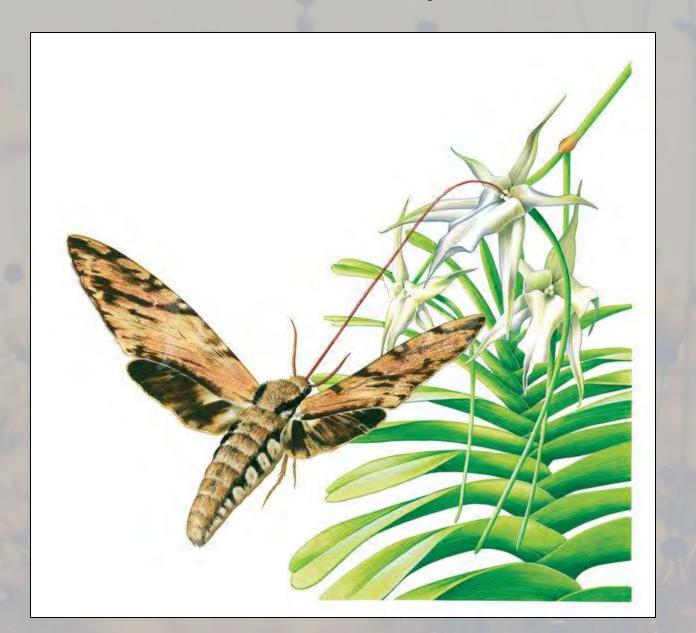
The Mystery of Darwin's Star Orchid



Darwin's Hawk Moth!



A Beautiful Partnership!

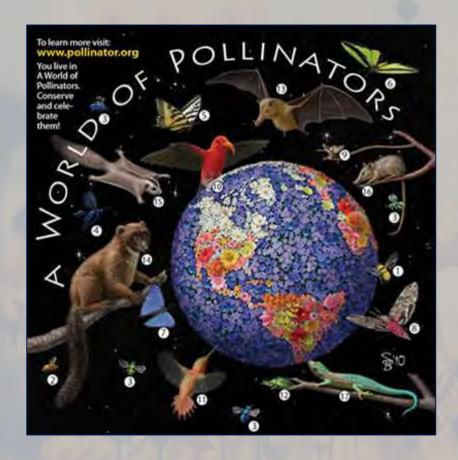


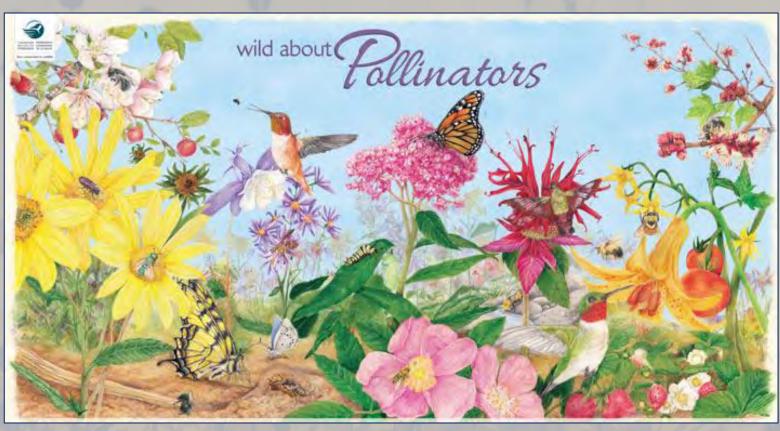
These Plant & Pollinator relationships are abundant, around the world!



We are only beginning to scratch the surface!

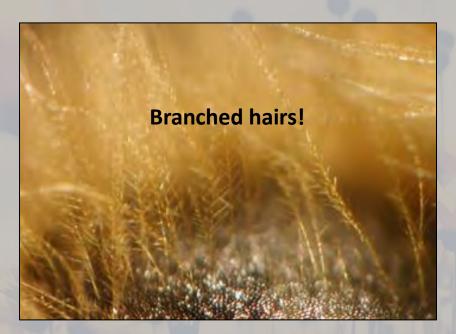
80% of Plant Species Depend on Animals for Pollination





Bees are the MOST IMPORTANT Pollinators!

Bees are Pollen Specialists!











Honey bees are of European Origin

Brought to North America by early colonists in the early 1600s



Honey bees (Apidae)













Besides honey bees...

North America is home to more than 4000 species of wild bees!



Besides honey bees...

MONTANA is home to ~450-1000 SPECIES! Including the MOST BUMBLEBEES in any state (28-32 species)



Bumble bees (Apidae)



Mason bees, leafcutter bees (Megachilidae)





Types of Wild Bees



Sweat Bees (Halictidae)





Why are ALL bees declining?

Habitat loss!











Why are **ALL** bees declining?



Management practices



What do bees need?

- Low chemical input
- Food
- Nesting Habitat







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- Food
- Nesting Habitat







70% of Pesticide use is for Aesthetic Reasons





99% of "bugs" in your garden are BENEFICIAL.



- Follow label precautions
- DON'T overspray plants in bloom
- Mow or prune off oversprayed blooms
- Choose products that are relatively non-hazardous to bees





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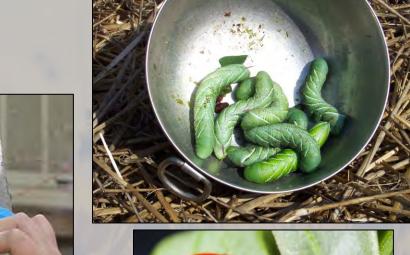
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What Can You Do to Help Pollinators?

Know WHEN to spray, and if it will be worth the risk to bees. Can the situation be managed in other ways?









What do bees need?

- Low chemical input
- Food
- Nesting Habitat







What do wild bees need?

Nest sites

Undisturbed soil

Access to that soil

Old stems

Soft leaves

Rodent burrows

Compost piles

Constructed nests

Non-toxic nest material

Floral resources

What do wild bees need?

Nest sites

Undisturbed soil

Access to that soil
Old stems
Soft leaves
Rodent burrows
Compost piles
Constructed nests
Non-toxic nest material

Floral resources

Diversity of plant species

A range of flower types

Accessible pollen & nectar

Continuous resources

Non-toxic forage

What do bees need?

- Low chemical input
- Food
- Nesting Habitat







Food for bees:

Food Proximity:

Availability of optimal food resources in close proximity to ideal nesting habitat.



Food for bees:

Food Diversity:

Diversity of plant species with succession of bloom from early spring through fall



Food for bees:

Food Succession:

Mixture of flowering plants, planning for something in bloom throughout the growing season.



What do bees need?

- Low chemical input
- Food
- Nesting Habitat







Bee Nesting Habitats

70 % of Bee Species: Ground Nesting



30 % of Bee Species: Cavity Nesting



If you were a pollinator...



If you were a pollinator...



Bee Nesting Habitats

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30 % of Bee Species: Cavity Nesting



Ground Nesting Bees

Dig out their own Nests



Utilize Existing Holes



URBAN AND SUBURBAN LANDSCAPES:



Leave Bare Soil for Bees!



"Ideal" home lawn in the USA



Dense, green, monoculture

Lawns in the USA ...









Lawns in the USA...









37 species of bees, including several rare and declining native bumble bees, foraging on lawn weeds

- Larson & Potter, Journal of Insect Conservation (2014)















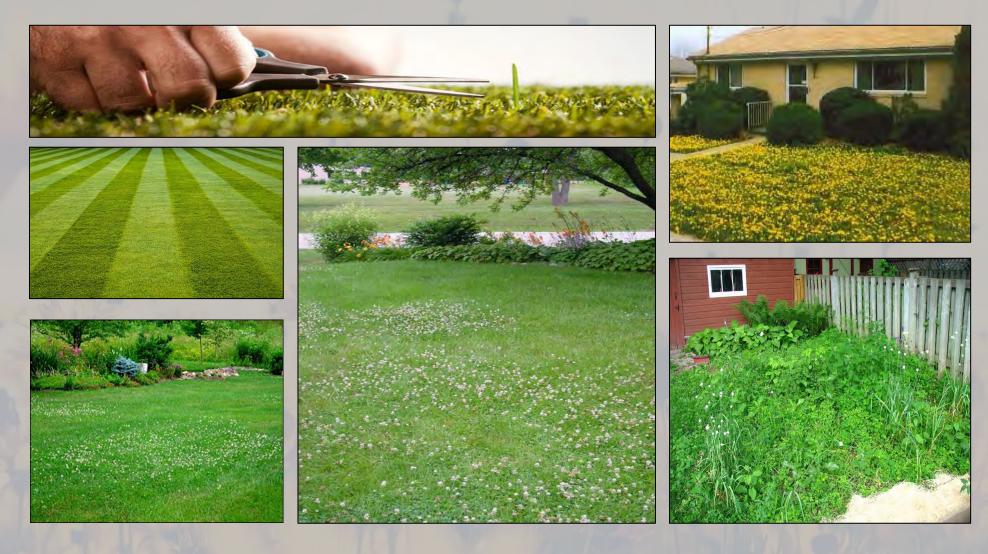


Lawn weeds help to sustain urban bee populations

These patches act as stepping stones between remnants of natural habitat



What Can You Do to Help Bees?



What level of lawn "excellence" are able to accept/maintain/overlook?

Pollinator-Friendly Lawn-Alternatives





RURAL, RANGELAND & WILD LANDSCAPES:



RURAL, RANGELAND & WILD LANDSCAPES:

Best Practices:

- → Minimal interface with:

 Herbicides, Fungicides, Miticides,
 Insecticides, and other Pesticides
- → Do not mow/graze more than 1/3 of habitat at one time
- → Keep 'buffer areas' un-mowed/un-grazed (These act as pollinator refuges, and will be a source of pollinators after mowing/grazing in the landscape)



RURAL, RANGELAND & WILD LANDSCAPES:

Reduce large scale contiguous operations:

Create pollinator strips in between sections of agricultural land.



Bee Nesting Habitats

70 % of Bee Species: Ground Nesting



30 % of Bee Species: Cavity Nesting



What Can You Do to Help Bees?







Blue orchard bee







Provide nesting structures

Mason Bees, Leafcutter Bees, Resin Bees, Chimney Bees, and Masked Bees.







Solitary Pollinators – Cavity Nesters

Essentially referred to as Mason Bees / Cavity Bees



Leaves

Resin or "Cellophane"

Mud

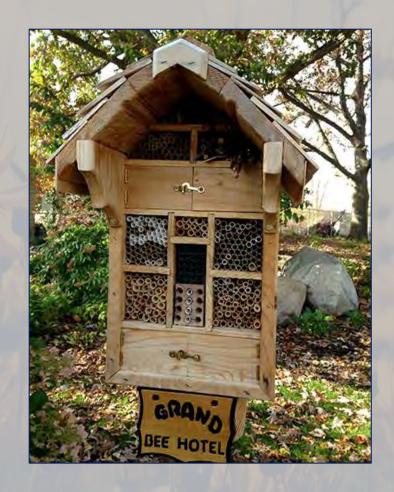
Plant hairs

beediverse.com

https://resonatingbodies.files.wordpress.com/2011/11/hylaeus-m-h-pupa-sm.jpg

Mason Bees: Solitary Cavity Nesting Bees

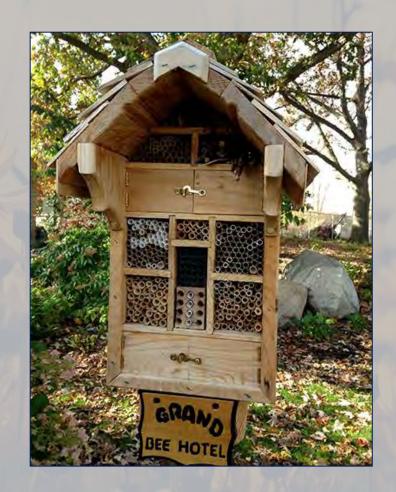
- Solitary
- Nest close together
- Not aggressive
- Easy to house
- Minimal maintenance
- Easily purchased
- A great Honey Bee alternative!



Mason Bees: Solitary Cavity Nesting Bees

Nesting Materials:

- → Hollow tubes Cardboard Bamboo
- → Drilled wooden blocks
 Untreated wood
 4 to 8 inches deep
 Varying diameters
- → Bundles of pith twigs/brambles/branches



Drilling your very own Bee Hotel!





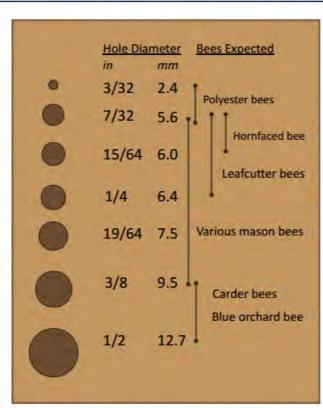


Figure 8. Hole diameter affects the type of bee that will be attracted to the nesting block. Illustration: University of Nebraska–Lincoln

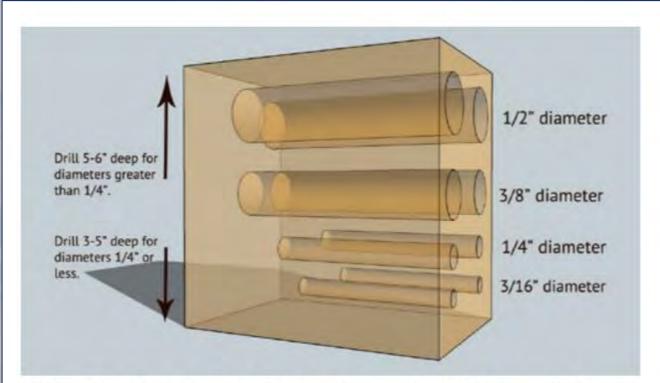


Figure 9. Depth depends on the diameter of the hole, with larger diameters requiring deeper drilling. Illustration: University of Nebraska-Lincoln

What NOT to do:

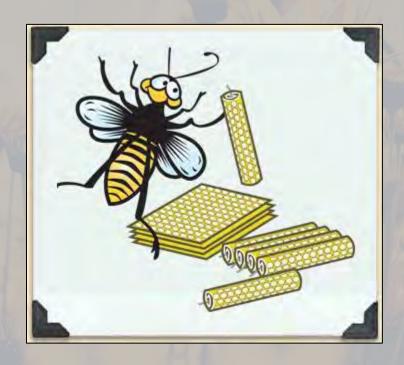






- ✓ Pay attention to entrance diameter (width) and depth
- ✓ Drill evenly: remove debris & jagged edges
- ✓ Do not use varnished or painted wood (untreated is best)

Purchasing Bee Hotel Materials!



Purchasing supplies:

Countless styles, shapes, designs, materials, etc.!

















What NOT to buy:







- ✓ Minimize use of plastic for nesting materials
- ✓ Pay attention to entrance diameter (width) and depth
- ✓ Pay attention to color and material (too hot, no ventilation, etc.)

LOCATION, LOCATION!

- Between 3-5 feet above ground level
- Bright morning sun
- Sheltered (under an overhang or waterproofed covering)
- Secure spot (not easily knocked off or moved with the wind)
 - → Walls are best
- South-Eastern direction
- Away from foot traffic and predators



Where NOT to put them:











- ✓ Avoid areas where predators can have easy access to a bee buffet
- ✓ Avoid areas with lots of water run-off, harsh winds, and too much heat
- ✓ Avoid high-traffic areas such as doorways, frequently used patios, etc.

Summary: What can you do to help Pollinators?





Do NOT spray flowers in bloom,

and avoid pesticide drift to adjacent plants



Read and follow label directions



Provide Floral Resources:

Diversity of plant species with succession of bloom from early spring through fall



Provide Nesting Habitat:

- Bare Soil
- Nesting Structures

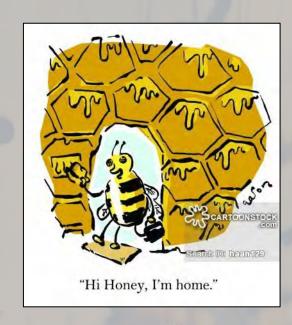




Create a Pollinator Patch!



Devote a small space in your yard as 'designated bee habitat'!





'MULLET' GARDENS

"Business in the front, Party in the Back!"







Keep Learning:



OUR WORK ~



Xerces.org



montana.edu/pollinators



limited. If you encourage pollinators to make their nests in out-of-the-way places, they are less likely to come





Fact Sheet No. 5,616

inviting and a sanctuary for bees. Native or wild bees nest

in a variety of habitat types, depending on the species. However, most are ground nesting or cavity nesting.

A majority of native bee species (approximately 70

percent) nest in the ground. Ground nesting bees,

Ground nesting: On solid ground

by H.S. Arathi, D. Davidson and L. Mason'

Pollinators are animal species that provide pollination services to plants in natural/wild landscapes, cultivated gardens and agriculture settings around the globe. They have coevolved with plants and the relationship between plants and pollinators is very intricate each relying on each other for survival. These important services help many plants complete their lifecycles, as



Flower Visitor or Pollinator?

Pollinators include bees, wasps, beetles, flies, moths, butterflies, hummingbirds, and bats (Fig. 1a, b and c). However, just because an insect or a bird is visiting a flower, it is not necessarily a pollinator (Fig. 2). Pollinators move between flowers of the same plant species in an orderly fashion, whereas flower visitors move haphazardly among flowers spending very little time within a flower. Even if it does happen that a flower visitor gathers pollen grains on its body, it will not necessarily move to the same flower species, therefore pollination

Quick Facts

soil don't need to be unsightly. They can be simple, small

"Bee" intentional about leaving patches of bare soil around raised beds and bunch-type grasses, like fescue,

behind hedges and shrubs. The best places for these

patches are in low traffic areas where soil compaction is

and tucked away from plain sight.

- Pollinator species include bees, beetles, flies, moths, butterflies, hummingbirds, and bats.
- More than 70% of the world's flowering plants rely on nollination which is essential for producing fruits and
- Just like humans and other animals, pollinators need food, water, shelter and space (collectively known as habitat)

http://extension.colostate.edu

would not occur.

Educate Others!

