

Native Places for Native Pollinators

Meet the Bugs That Keep
Our Landscapes (and Yards)
Thriving and Beautiful

David Woolley. Manitou Seed Library.



Megachile sp.

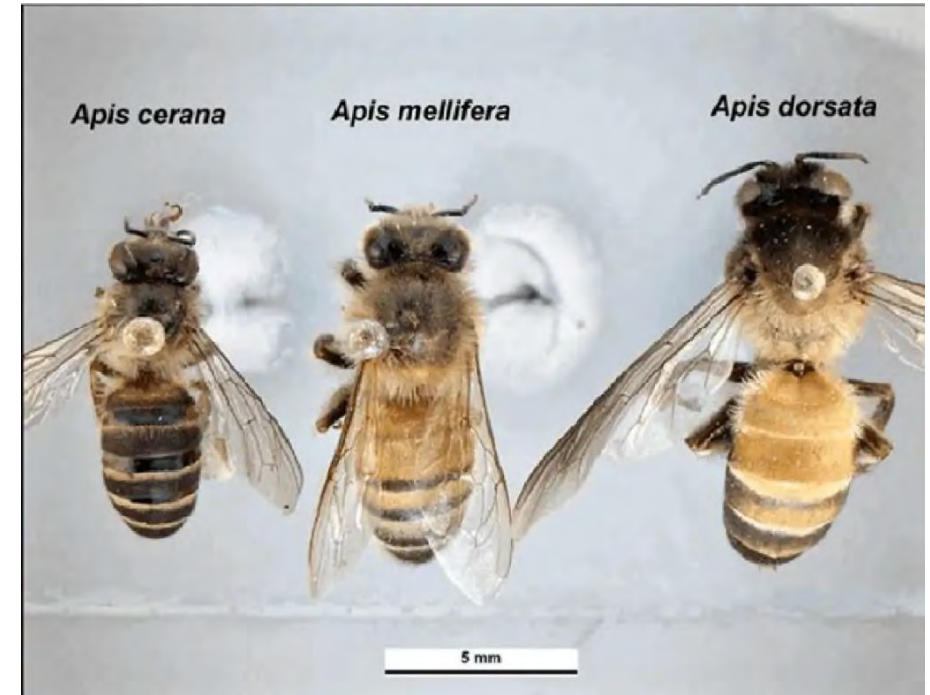
“In the past, we have asked one thing of our gardens: that they be pretty. Now they have to support life, sequester carbon, feed pollinators and manage water.”

– Doug Tallamy

First, let's talk about honeybees.

There are 8 species worldwide. The biggest is the Asian Giant honeybee, roughly twice the size of *Apis mellifera*, the European honeybee we all know.

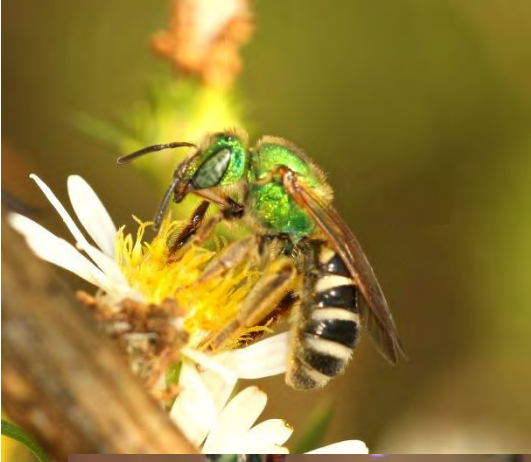
The European honeybee was brought here in the 1600's and is not part of **anything** native in North America.



“Protecting pollinators by getting a honeybee hive is like trying to protect birds by getting chickens”.
-Scott Hoffman Black, Executive Director Xerces Society for Invertebrate Conservation.

Meet Your Watershed Pollinators - the insects

Bees & Wasps - 260 sp.



Beetles - 354 sp.



Moths & Butterflies - 930 sp.



Flies - 162 sp.



*Source: iNaturalist. Accessed 14 May 2024.

Bees

- Bees are a monophyletic lineage within the superfamily Apoidea. They are presently considered a clade, called **Anthophila**.
- More than 20,000 species worldwide.
 - About 4,000 in North America
 - 956 in Colorado. More than the entire eastern half of the United States.
- Bees descended from wasps about 125 million years ago when flowering plants, and hence pollen, began to emerge.
- 90% of all bees are solitary.
- All bees are pollinators, with specialized structures to collect and transport pollen
 - Except cuckoo bees.
- 75% in Colorado nest in the ground.
- 14 species of bumble in the watershed
 - South America only has 22 in total.



U.S.'s smallest bee (*Perdita minima*) face to face with a female large carpenter bee (*Xylocopa varipuncta*).



Hunt's Bumblebee (*Bombus huntii*).
Photo: R. Moehring, USFWS. Public domain.

Wasps

- A **wasp** is any insect of the narrow-waisted suborder Apocrita of the order Hymenoptera which is neither a bee nor an ant; this excludes the broad-waisted sawflies (Symphyta)
- How many species? Depends on who you ask. Estimates range from 30-100K.
- Wasps have been around for about 240 million years.
- Wasps are astonishingly diverse. Many are tightly evolved with a specific plant group, many more are pollinators, and a large number are efficient insect predators and parasites.
- We could spend the rest of the month talking about wasps.
- They are not, in fact, jerks.



Tarantula Hawk. *Pepsis thisbe*



Mud Dauber Wasp
Sceliphron sp.



Mymaridae sp.

“Just lie down and scream”
– Justin Schmidt

Flies

- Flies are the only group of insects with just one set of wings.
- More than 110,000 species worldwide.
- Amazing mimics of bees, wasps, and others.
- Hugely important as pollinators but roles only starting to be understood. Hoverflies migrate by the billions, often outnumber bees, and appear to be extremely efficient pollinators.
 - In North America they pollinate goldenrod, wild carrot, and pawpaw, among others.
- Far more tolerant of variable conditions- heat, cold, and light levels- than bees which is vital for a changing climate.



Syrphid sp.



Bee-fly *Bombylius sp.*

[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)



Beetles

- The Coleoptera. > 350K species worldwide.
- Abundant and varied as early as 200 million years ago. Pollinate plant species that have been around for a similarly long time- magnolia and spicebush for example.
- Yarrow, sunflower, and goldenrod also take advantage of beetle pollination.
- Beetle pollinated plants often have strong scents and large, cup-like leaves. Beetles tend to make a mess when they pollinate so the flowers have evolved to be thicker to resist the damage.
- More common as pollinators in tropical areas but still plenty of them in Colorado.

Colorado Soldier Beetle *Chauliognathus basalis*



This Photo by Unknown Author is licensed under [CC BY-NC](#)



Cottonwood Stag Beetle *Lucanus mazama*

David Woolley, Manitou Seed Library.

Butterflies and Moths

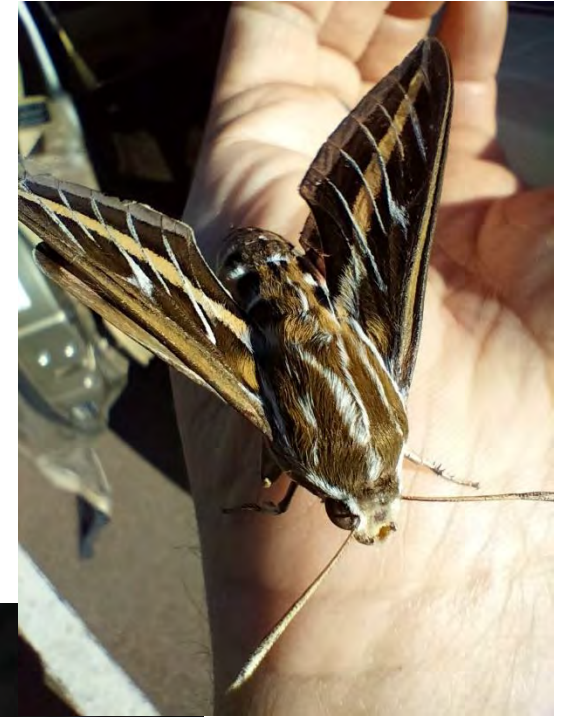
- The Lepidopterans. We've identified about 180,000 species worldwide so far.
- Butterflies are nectar feeders and taste with their feet. Pollen transport is incidental.
- They prefer large, flat, day-blooming flowers that provide easy landing pads.
- Moths are mainly nocturnal and have a strong sense of smell-though some moths don't have any mouthparts as adults and therefore never visit a single flower.
- Super popular but not as effective as bees at pollination, for the most part.
 - Butterflies and moths also do not have specialized structures to carry pollen.



Painted Lady. *Vanessa cardui*

This Photo by Unknown Author is licensed under CC BY-SA

White-lined Sphinx. *Hyles lineata*



Polyphemus Moth. *Antheraea polyphemus*



UGA5008015

This Photo by Unknown Author is licensed under CC BY-NC

Meet Your Watershed Pollinators - not insects

Hummingbirds



Bats- not many bat pollinated plants in this area



Lemurs.

Ok. Maybe not lemurs.



Audubon Rockies

5 principles for Wildscaping

1. Create diverse layers and shelter
2. Grow natural food
3. Provide water for drinking and bathing
4. Control invasive species
5. Conserve: water, energy and chemicals

Plan(t) for the Layers.

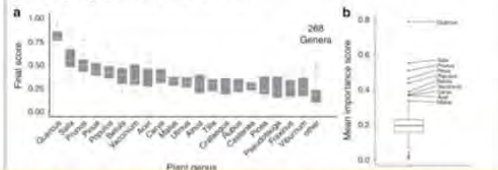
Physical layers, seasonal layers, food chain layers.



This Photo by Unknown Author is licensed under CC BY-SA-N

KEYSTONE PLANTS THAT SUPPORT THE MAJORITY OF BUTTERFLIES AND MOTHS

Fig. 2: Some plant genera are disproportionately important for supporting host plant-Lepidoptera interaction networks.



LISTED IN ORDER OF POWER TO HOST THE MOST CATERPILLARS SPECIES

- Quercus - Oak Native To Your Area
- Salix - Willow Native To Your Area
- Prunus - Cherry Native To Your Area
- Pinus - Pine Native To Your Area
- Populus - Poplar Native To Your Area
- Betula - Birch Native To Your Area
- Vaccinium - Blueberry Native To Your Area
- Acer - Maple Native To Your Area
- Carya - Hickory Native To Your Area
- Malus - Crabapple Native To Your Area
- Ulmus - Elm Native To Your Area
- Alnus - Alder Native To Your Area
- Tilia - Basswood Native To Your Area
- Crataegous - Hawthorn Native To Your Area
- Rubus - Blackberry Native To Your Area
- Castanea - Chinkapin Native To Your Area
- Picea - Spruce Native To Your Area
- Pseudotsuga - Fir Native To Your Area
- Fraxinus - Ash Native To Your Area
- Viburnum - Viburnum Native To Your Area



This Photo by Unknown Author is licensed under CC BY-NC-ND

Rank	plant genus		supported species	
			specialist bees	lepidopteran caterpillars
1	Goldenrod	<i>Solidago</i>	11	115
2	Aster	<i>Symphotrichum</i>	7	112
3	Sunflower	<i>Helianthus</i>	7	73

From The Work Of Dr. Doug Tallamy
learn more on pollinator friendly yards on facebook

A single pair of chickadees has to catch 7,500 caterpillars to raise ONE brood of chicks.

Food and Water

- We like to eat all year round.
 - So do pollinators. If you can, plant something for spring, summer, and fall.
 - If you can't, aim for early spring blooms or late fall. Climate change is extending our seasons and pollinators that hatch earlier or stay active later, need food.
- Appropriate floral resources for foraging adults. This means native plants.
 - Preferably straight species, not cultivars and definitely nothing with double flowers.
- Appropriate woody or herbaceous resources for larval young. This **also** means native plants.
 - But not always the same ones as the adults use.



Water- a shallow bowl or birdbath with rocks and gravel is ideal & fits anywhere.

Change it every 2-3 days.

Bringing Up Baby

- 70% of our native bees are ground nesters.
- Most solitary wasps are as well.
 - Many pollinating wasps are also specialist hunters that rely on specific prey items to feed their larvae.
- Females dig burrows and lay a single egg on a ball of pollen (or a paralyzed prey item) in a brood chamber as far as a foot down.
- Leaving areas of bare sand and gravel is key.
 - Even small areas can be used.
 - Underground nesters often use bare patches near the base of native plants. It's the bee equivalent of having your apartment next to the grocery.
 - Make sure there's no landscape paper or plastic below.
- Most Sphinx (hummingbird) moths pupate underground in a few inches of damp soil.

Velvet Ant. *Dasymutilla* sp.



Sphinx moth cocoon.



This Photo by Unknown Author is licensed under CC BY

Bumblebee Nests

- Queen bumbles emerge in early spring and scout for cavities in the ground, often current or former mouse nests.
 - There's conjecture that young queens use scent to locate good nesting sites.
- Providing secure nest sites may be helpful to declining numbers. The science isn't clear yet.
- Bumbles form colonies of 50-1500 and even make honey.
- Queens can generate their own heat to warm eggs in the early spring.

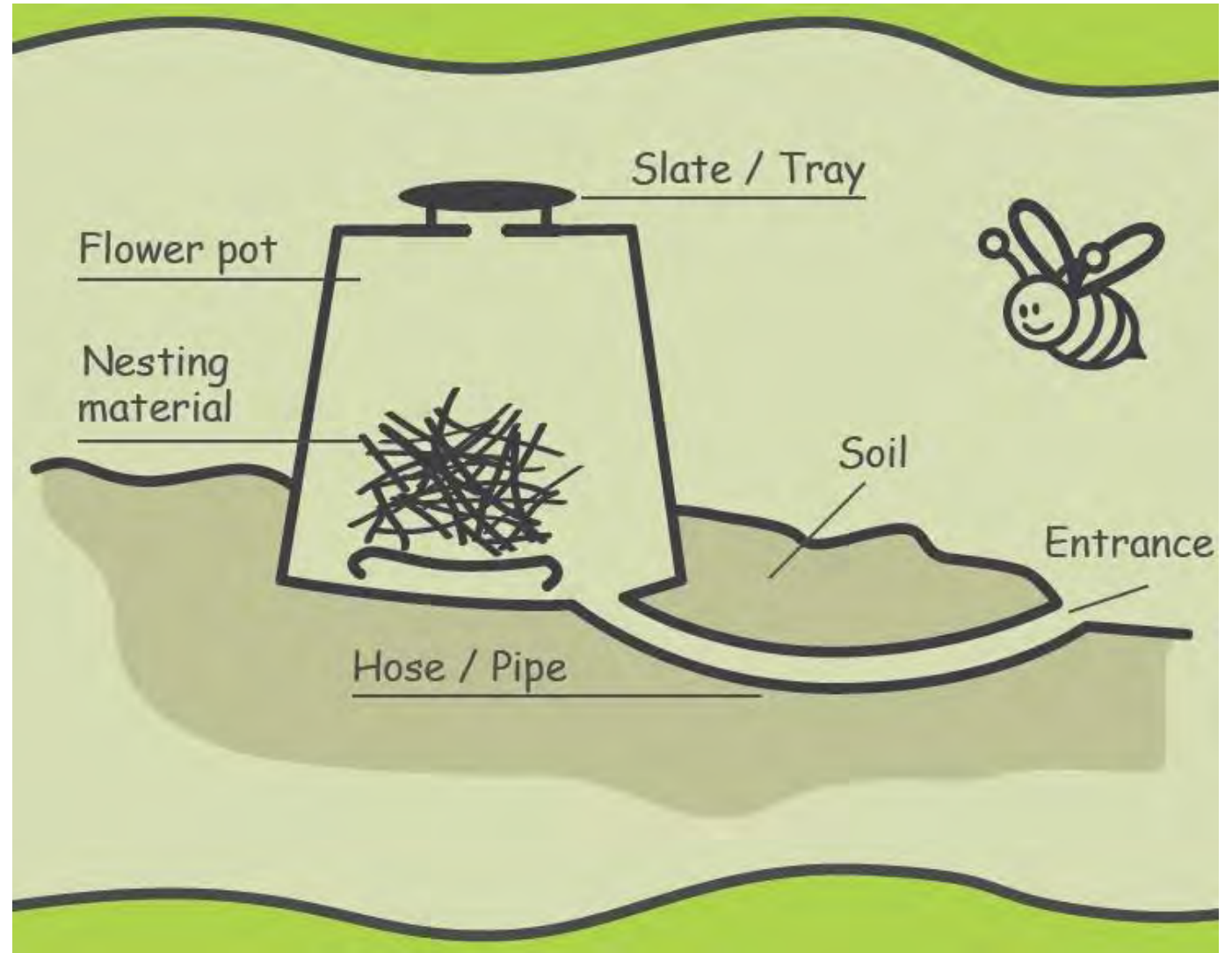


Image source: bumblebeeconservation.org/bumblebee-nests

Carpenters, Cavity Nesters, and Cocoons



30% of bees nest above ground in hollow twigs, tunnels in soft wood, or even stone.

- Many butterflies rely heavily on specific host plants for chrysalis and caterpillar habitat, not just for flowers.
- Leave your raspberry stems, your Joe-pye Weed, your sunflower stalks, and other canes when fall comes around.
- Leave your leaves in the fall.

Inspired by Colin Purrington's tips. Good houses need:

1. Removable tubes or trays. For example, in October mason bee cocoons need a bath to reduce bee deaths by keeping parasite numbers low and preventing disease spread. If the tubes are glued in, you won't be able to harvest and clean bee cocoons .

2. Nesting tubes that close at one end (at the back of the house). This will stop another access for parasites.

3. Nesting tubes about 15 cm long. Shorter and you'll end up with a skewed sex ratio. Females are in the deeper chambers. The hole diameter for mason bees should be 0.79 centimetres

4. No splinters or sharp edges! Check tubes for inside splinters that will damage bee wings and bodies. (When bees emerge in spring, exiting the tubes should not be a death-defying feat!)

5. A roof with an overhang. Too much water can cause mold, as it could in our own homes!

6. A solid attachment or mount. Homes should not dangle from a string or wire. Luckily, this is something you can easily fix.

7. Breathable nesting tubes. Avoid glass and plastic. They can mean more condensation and mould. The preference is for paper tubes. Or natural plant stems (close the end off).

8. To be alone. Avoid those that look like condos. It just attracts more parasites to one area.



This Photo by Unknown Author is licensed under CC BY-NC

Mason Bee Houses

Remember...

Opportunities for habitat are literally everywhere. But...

One space alone won't solve the whole problem.

So don't worry about trying to do it all.

Your space, however small, can be part of the fix.

And enjoy yourself!

Pollinator Resources

Insects

[Bee Basics: An Introduction to North American Bees. USDA. Moisset, B. and S. Buchmann. 48pps.](#)

[How Much Do Flies Help with Pollination? S. Pain. Smithsonian Magazine. 2021.](#)

[iNaturalist. A joint initiative of the California Academy of Sciences and the National Geographic Society.](#)

[Mason Bee Houses. Choosing/Making the House and Caring for the Cocoons.](#)

[Native Bee Watch Community Science Program. Colorado State Cooperative Extension.](#)

[Xerces Society for Invertebrate Conservation: Pollinator Conservation in Yards and Gardens](#)

[Wasps: the Astonishing Diversity of a Misunderstood Insect. E. Eaton. Princeton Univ. Press. 256 pps.](#)

Plants and Landscape

[Colorado Native Plant Society.](#)

[HomeGrown National Park. Douglas Tallamy.](#)

[National Wildlife Federation: Food For Caterpillars](#)

[Wild Ones: Front Range Chapter.](#)

You can find me at:

manitouseedlibrary@gmail.com

&

[facebook.com/ManitouSeedLibrary](https://www.facebook.com/ManitouSeedLibrary)

Thank you!