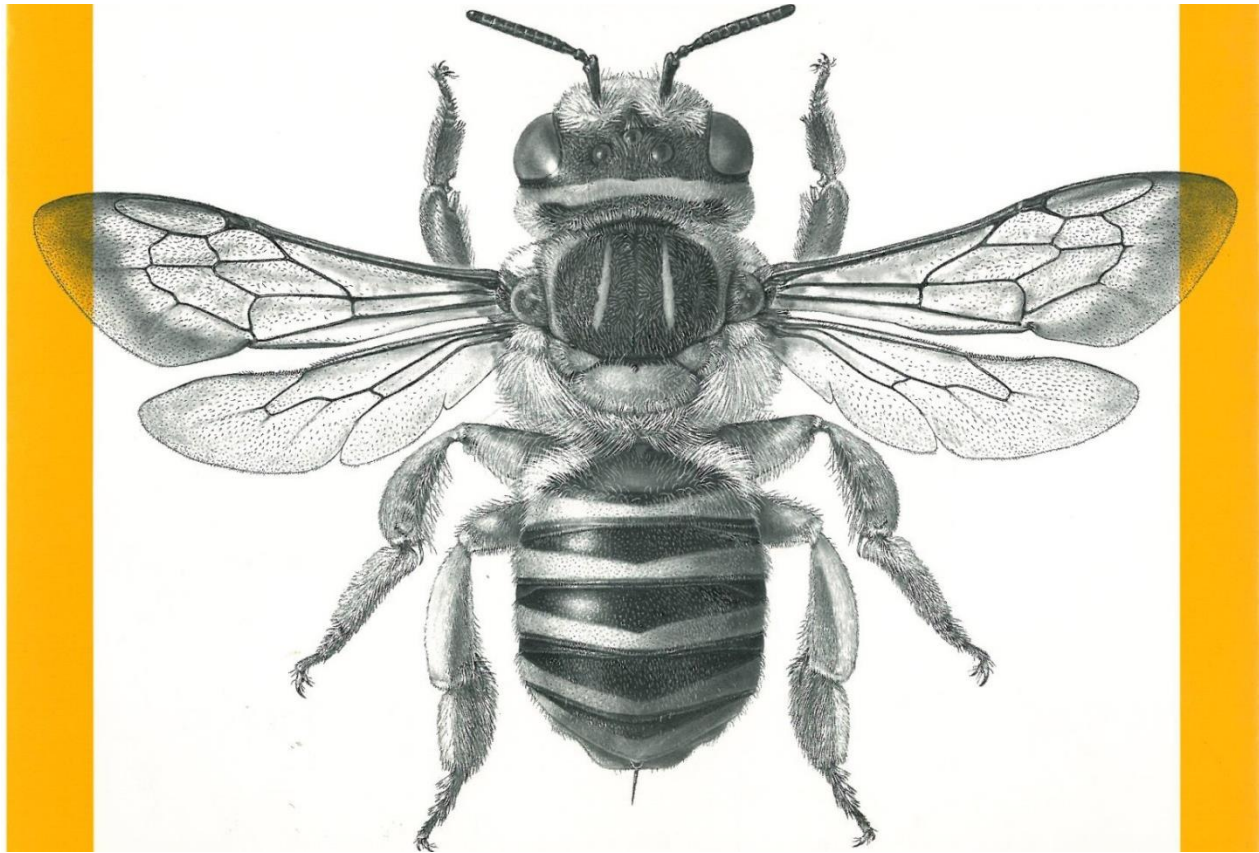


Boulder County Bees: **an Overview of Diversity and Life Histories**



Virginia L. Scott
Entomology Collections Manager
University of Colorado Museum



**What
is a
Bee ?**





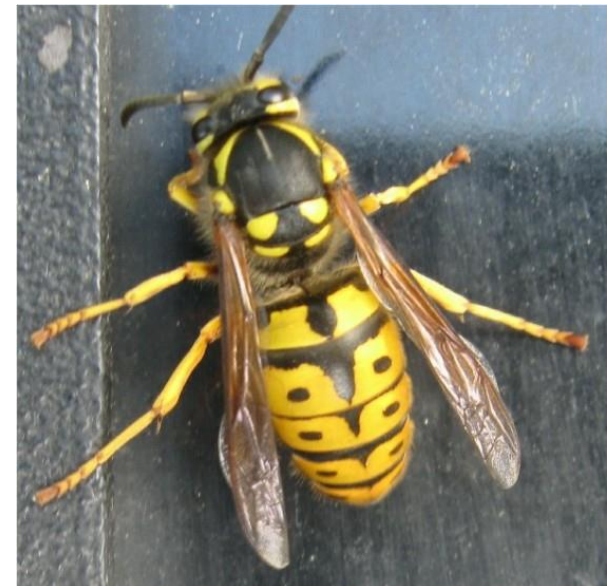
Bees



Not bees

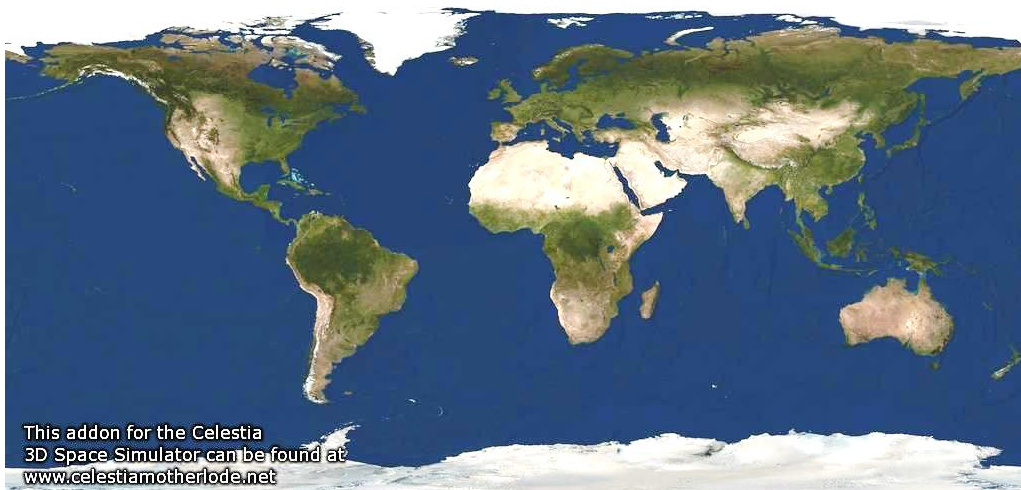


- Wasps
- Flies
- Moths

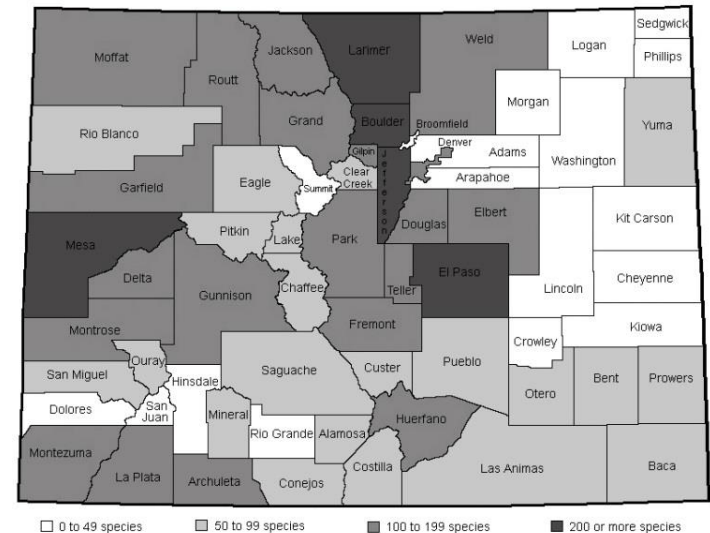


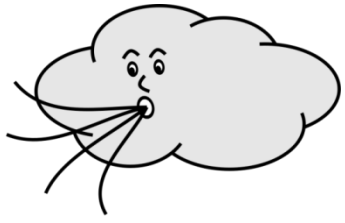
Bee Diversity

- 19,600+ species world-wide
- 3600 species in North America
- 946 species in Colorado
- 660 species in Front Range
- 555 species in Boulder County

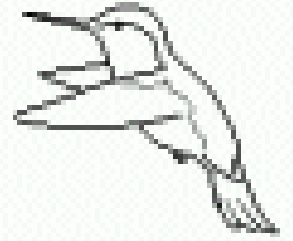


This addon for the Celestia
3D Space Simulator can be found at
www.celestiamotherlode.net





Great Pollinators

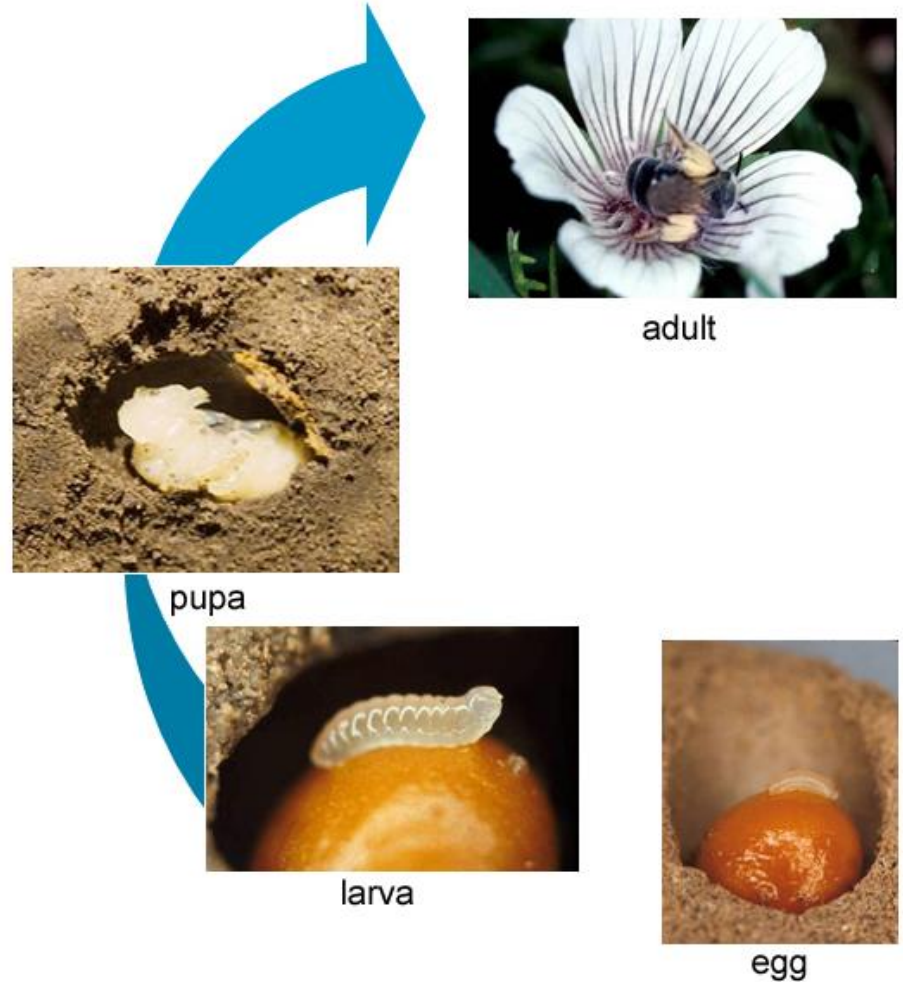


- Wind
- Bats
- Birds
- Insects
 - Butterflies and Moths
 - Beetles
 - Flies
 - **Bees**



Bee Life Cycle

- Holometabolous
 - Egg
 - Larva
 - Pupa
 - Adult
- Pollen and Nectar
- Sexually dimorphic



Sexual Dimorphic

Males



Females



Megachile



Agapostemon

Bee Natural History

- Sociality
- Floral associations
- Nesting sites



Sociality

- Social
- Solitary
- Parasitic



Social

- Division of labor
 - Castes
- Overlap of generations
- 12% of Colorado bee species



Solitary

- No division of labor
- No queens or All queens
- Each female creates and provisions her own nest and lays eggs
- 69% of Colorado bee species



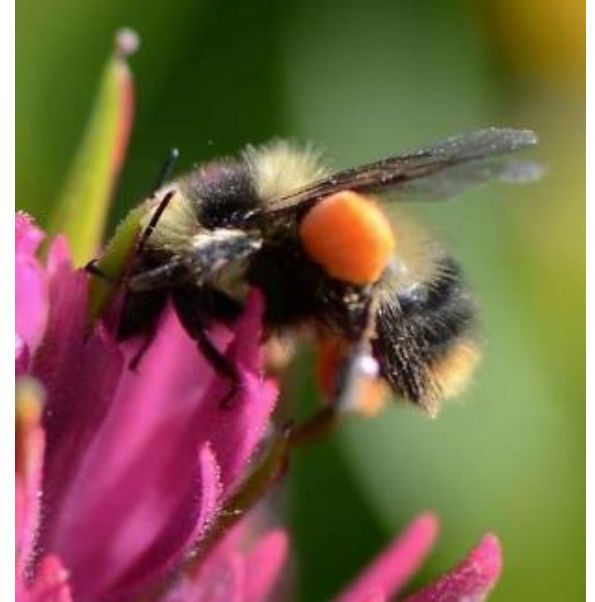
Parasitic

- “Mass” provisioners
- Cleptoparasites, Social Parasites
- Do not collect pollen
- 19% of Colorado bee species



Floral Associations

- Why bees visit flowers
- Oligolecty and Polylecty
 - Refers to pollen, not nectar
- Relationships with sociality

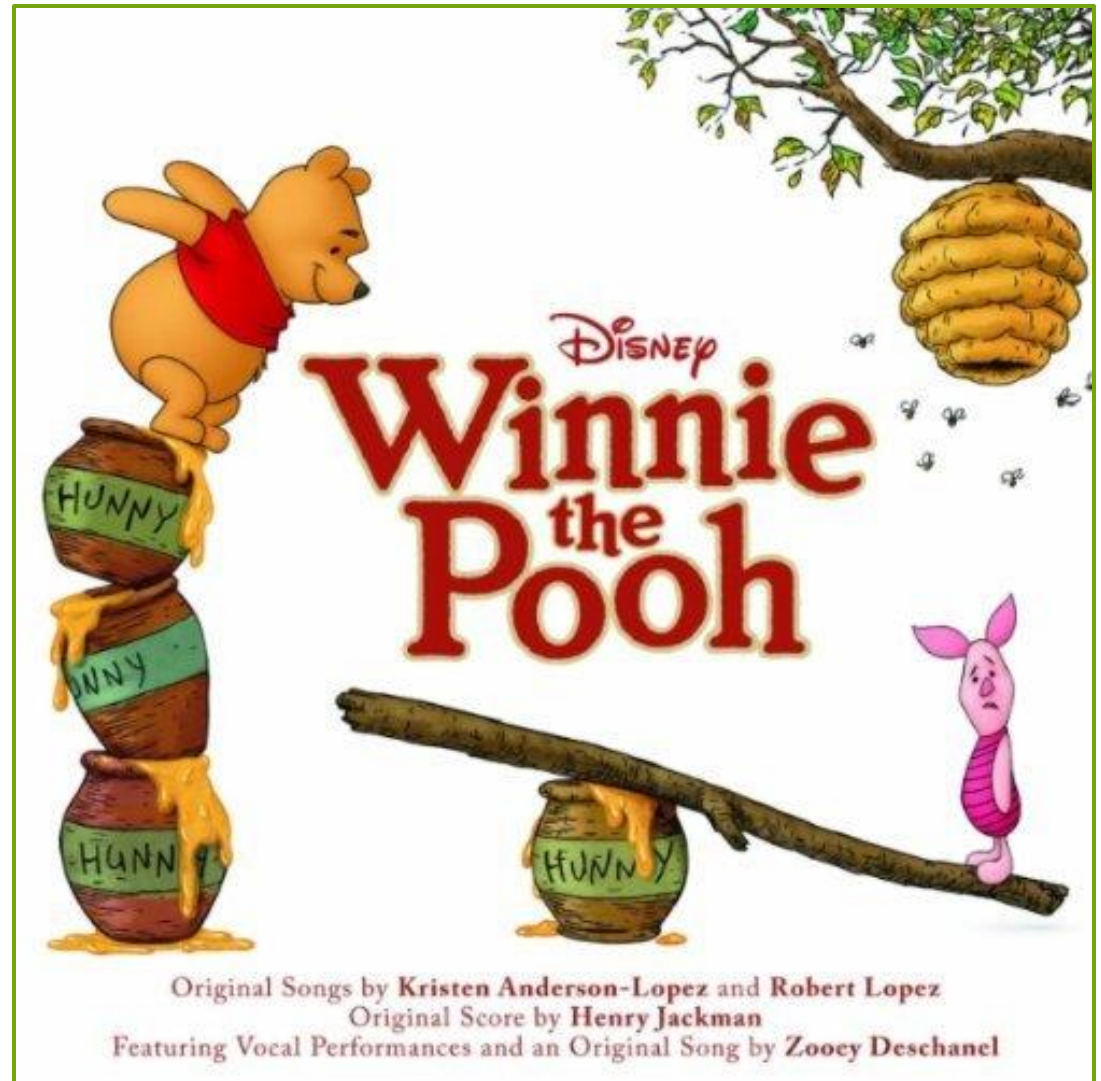


Great Bee Plants

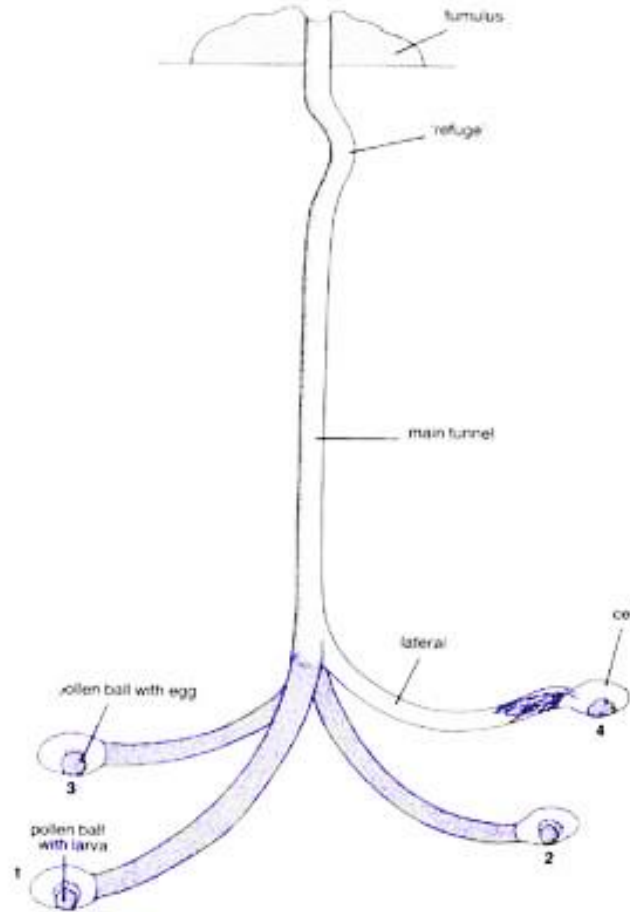
- Willows (natives)
- Apples and Plums
- Dandelions (!)
- Oregon Grape
- Strawberries and Raspberries
- Onions and Chives
- Carrots
- Mints
- Speedwell
- Sumac
- Bee Plant (*Cleome*)
- Clover
- Scorpionweed
- Cactus
- Gumweed
- Asters and Fleabane
- Goldenrod
- Sunflowers
- Rabbitbrush

Nesting Sites

- Ground
- Cavity
 - (Wood, twigs)
- Free standing



Ground Nesters



Ground Nesters Needs

- Bare soil or patches of bare ground
 - Sand boxes, mounds of dirt, paths, roads
- Areas of sparse vegetation
 - Boarder areas, rock gardens, road edges
- No mulch zones !!
 - Weed barrier is Bee barrier
 - No bee will dig through mulch to nest
- The more natural and diverse, the better

Anthophora



Macrotera opuntiae



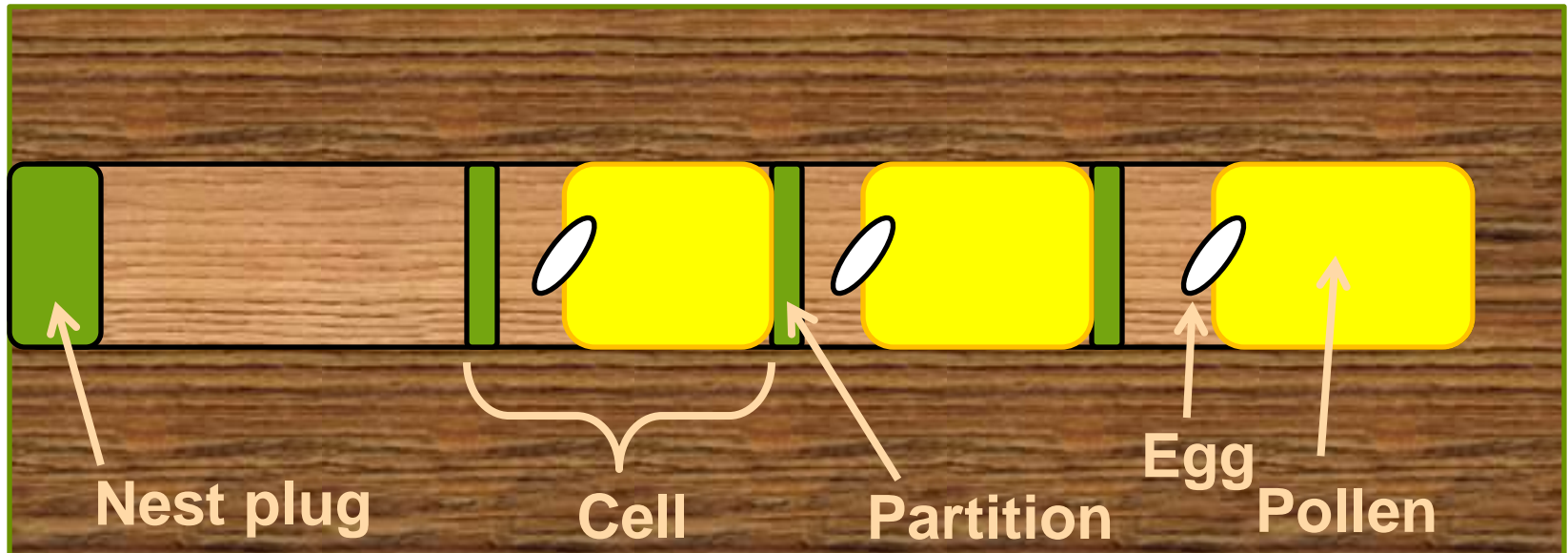
Free Standing



Cavity Nesters



Twig-nesting Bee Nest



- Finds tunnel and cleans it out
- Constructs and provisions innermost cell
- Series of cells toward entrance
- Plugs nest
- Moves to new tunnel

Cavity Nesters Needs

- Wood or Pithy twigs
 - Roses, brambles, sumac, elderberry
 - Old logs
- Nesting materials
 - Leaves
 - Mud
 - Resin



Artificial Nest Sites



Bees susceptible to Insecticides

- Bees are very susceptible to insecticides
- Dead bees don't pollinate anything, ever



How to support bees

- Floral Resources
 - Diverse, native plants
 - Long season
 - Pollen and nectar sources
- Nesting Sites
 - Bare Ground, Twigs, Wood
 - Nesting materials
- Insecticide Free



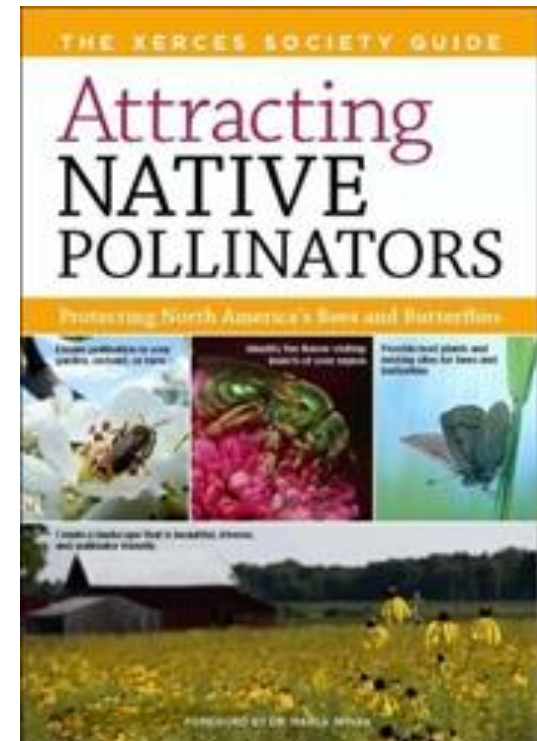
Resources

- **Xerces Society**

- Pollinator Conservation Resource Center
- Pollinator Conservation Program
- <http://www.xerces.org/>

- **BugGuide**

- Identifications of photographs
- <http://bugguide.net/>



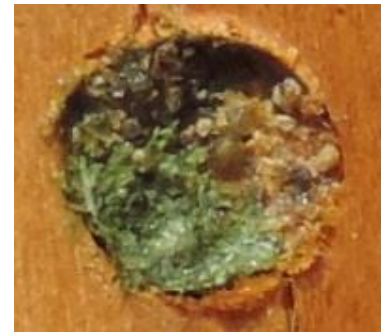
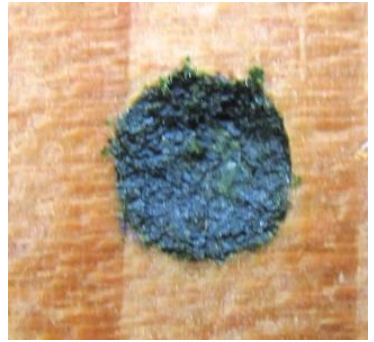
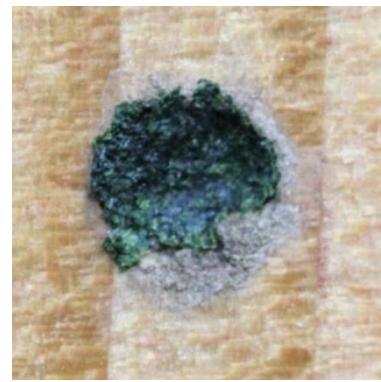
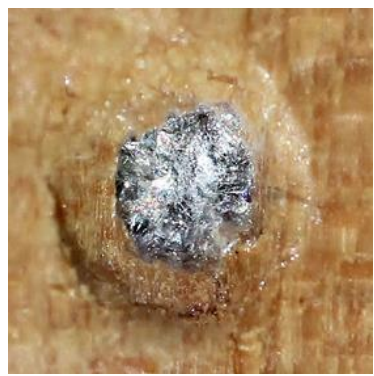
The Bees' Needs

- Citizen Science Project
 - University of Colorado Museum of Natural History
- To explore Diversity and Distribution (large and small scale) on local solitary wood nesting bees and wasps

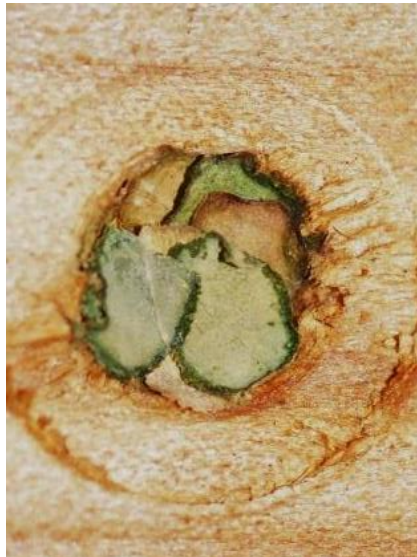


Volunteers

- Reported on Nest Plugs
 - Date and Tunnel number
 - Composition
 - Distance Recessed
 - Intactness
- Submitted Photos



Plug \Leftrightarrow Nester



2015 Bee Blocks



- 8 bee blocks per property
 - 6 Boulder County Parks and Open Space
 - 1 City of Boulder Open Space and Mtn Parks
- Checked and photographed every 2 weeks
- Blocks collected to rear and identify offspring
 - Inventory
 - Phenology
 - Nesting behaviors
 - Parasites
 - Photos of nest plugs



2015 Bee Blocks

- 7 sites x 8 blocks - 2 + 5 = 59 retrieved
- 3803 observations
- 995 nests = 44% occupancy across blocks
- 10,591 photographs
- Waiting for offspring
 - 75 morphospecies to date from all blocks
 - Expecting more
 - Full report next fall
 - Species identifications to match nest plugs

2016

- Downed woody debris and bee populations
- St. Vrain River



2015 Kearns & Oliveras

- 14 plots - control, conventional, and organic based on farming practices.
 - 2 control plots (sites revegetated with flowering plants, no farming)
 - 5 conventional plots (sites adjacent to conventionally-farmed areas)
 - 7 organic plots (sites next to organic (or transitioning to organic) farm areas).
- We captured insects using vane traps and nets.
 - Our captures in the vane traps are similar to those reported in other studies.
- 52 a total of morphospecies of bees
- There was no difference in number and species of bees between the organic and conventional sites.
 - We hypothesize that because Boulder County farms are small, are close to one another, and have high crop diversity, the area is heterogeneous and has enough landscape benefits despite the different farm treatments.
- There was a positive relationship between floral richness (especially of native plants) and bee species richness.
 - The highest number of bees was found in one of the revegetated plots, which also had the highest number and species of flowers.

Thank You

