

Ground Nesting Bees

**MaLisa Spring
Pollinator Specialization
Course**



Outline: (45 minutes)

- Bee Review
- Ground versus cavity nesting bees
 - Andrenidae
 - Apidae
 - Colletidae
 - Halictidae
 - Megachilidae
- Collecting and identifying specimens
- iNaturalist

Bee Review:

Bee Basic body plan:

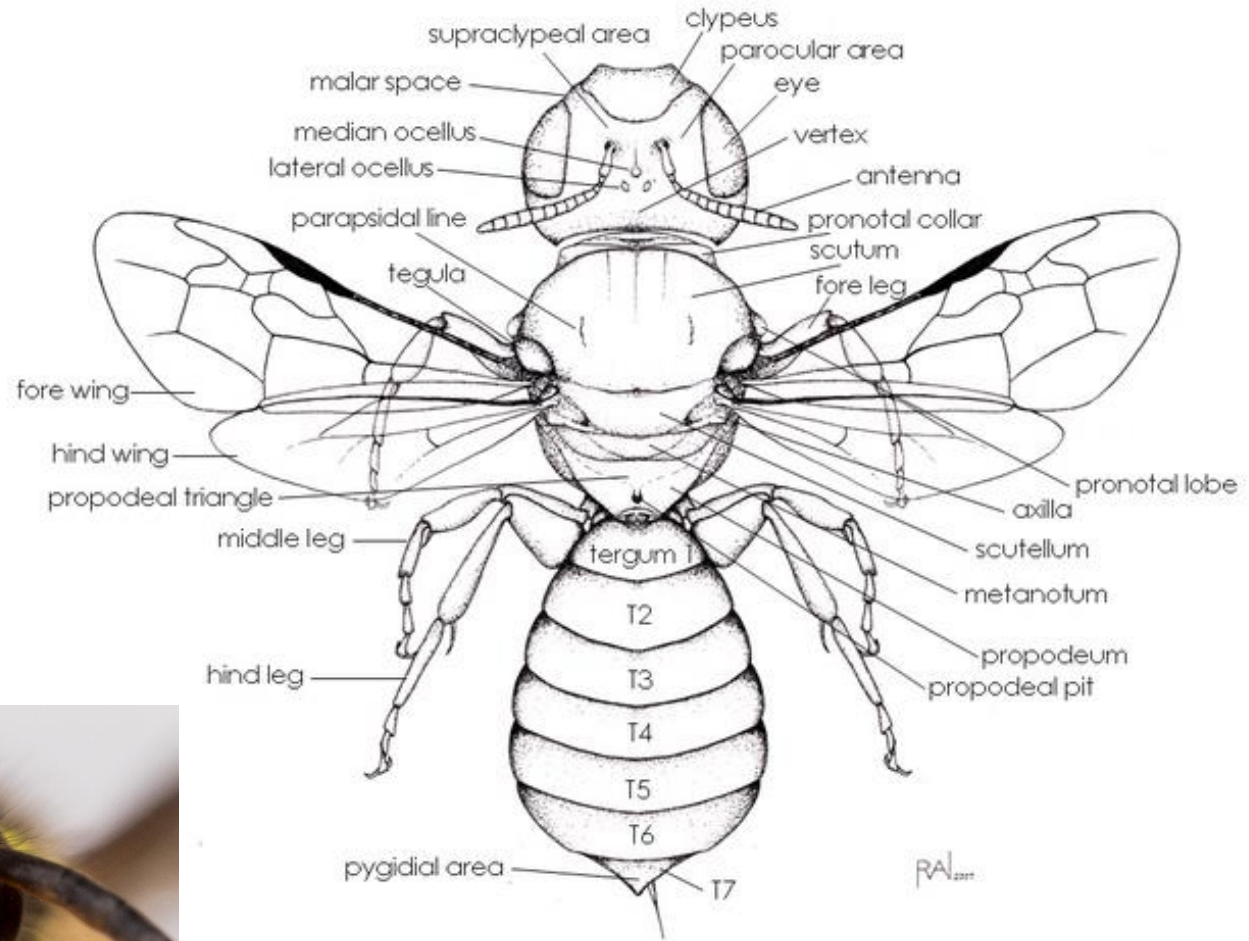
2 pairs of wings

Restricted (thin) waist

Fuzzy, branched hairs

More robust and hairy

(generally)





© MaLisa Spring

Am I a bee?



Bee Review

- Ohio has ~400 species of bees!
(US has ~4,000 species)
- A majority are solitary

NOTE: Wasps are not bees

Bees = vegetarians

vs

Wasps = carnivores



~30% are cavity nesters



© MaLisa Spring



© MaLisa Spring



© MaLisa Spring

~70% of all bee species nest in the soil



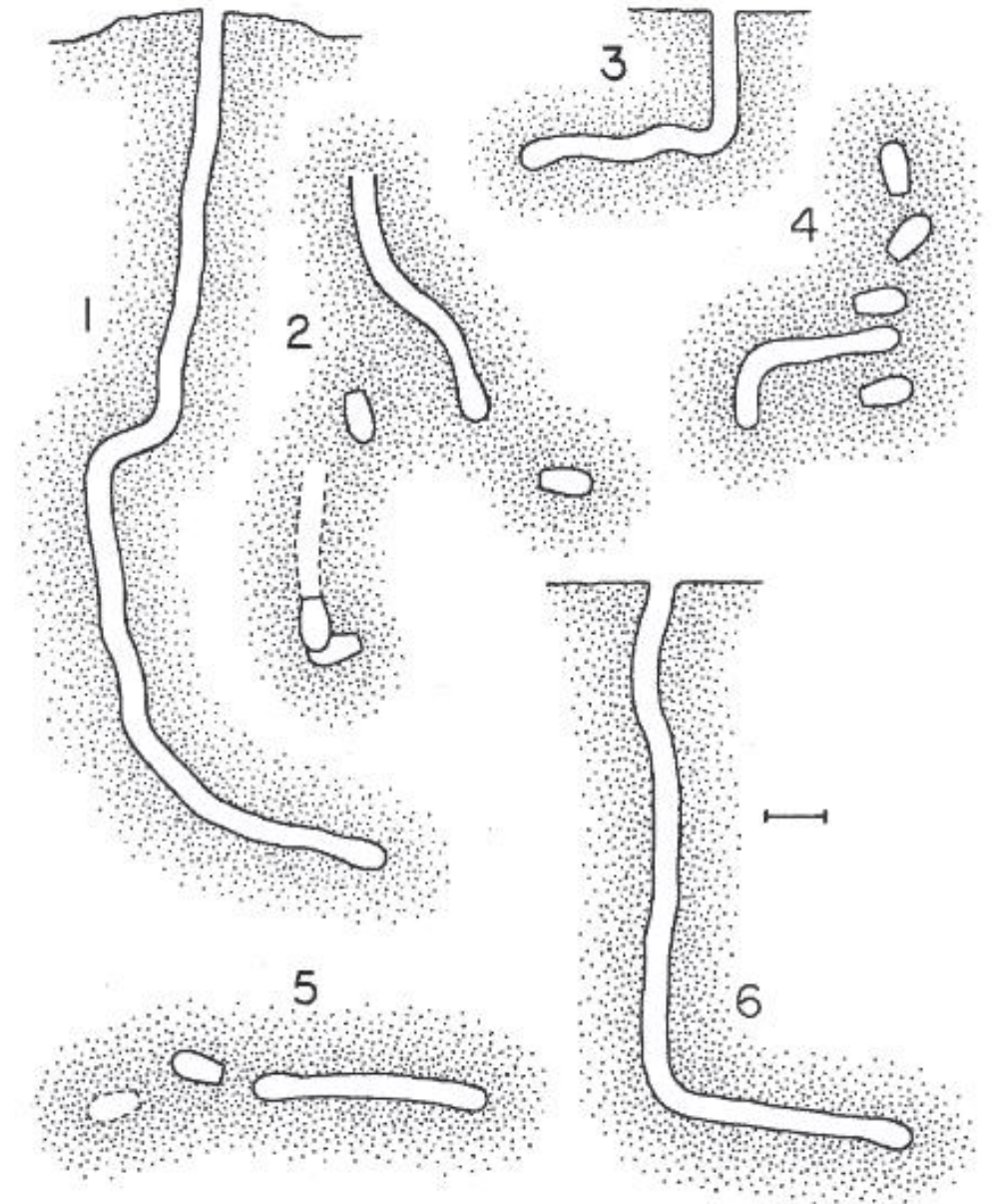
Types of Ground Nests



**Observations on the Nesting Biology of *Andrena (Plastandrena)*
prunorum Cockerell in Washington State (Hymenoptera: Andrenidae)**

EUGENE MILICZKY

Yakima Agricultural Research Laboratory USDA-ARS,
5230 Konnowac Pass Road, Wapato, Washington, USA 98951
e-mail: Gene.miliczky@ars.usda.gov



Andrenidae – mining bees

- *Andrena* (116 species in Eastern NA)
 - Facial fovea
 - Armpit hair
 - Many (not all) pollen specialists



Andrena erigenae
Specialist of *Claytonia virginica*



Andrena hirticincta

© James Hung



Andrena nubecula

© James Hung



Andrenidae – mining bees

- *Calliopsis andreniformis*
- *Sand lovers*



© USGS Bee Lab



© MaLisa Spring

Apidae:
Peponapis pruinosa

Squash bee

Soil nesting

Visits curcurbits

Males sleep in
flowers
overnight!

Avoid deep tilling so as
to not disturb
overwintering nests



© MaLisa Spring

Squash bee nests

- <https://www.youtube.com/watch?v=WobQObH4oDE>
- <https://www.youtube.com/watch?feature=youtu.be&v=N5bHA6FbTvo&app=deskt>

VOL. 41, No. 2, APRIL, 1968

255

NEST CONSTRUCTION AND LIFE HISTORY OF THE EASTERN CUCURBIT BEE, *PEPONAPIS PRUINOSA* (Hymenoptera: Apoidea)¹

JOHN A. MATHEWSON

Department of Plant Pathology-Entomology, University of Rhode Island,
Kingston, Rhode Island 02881

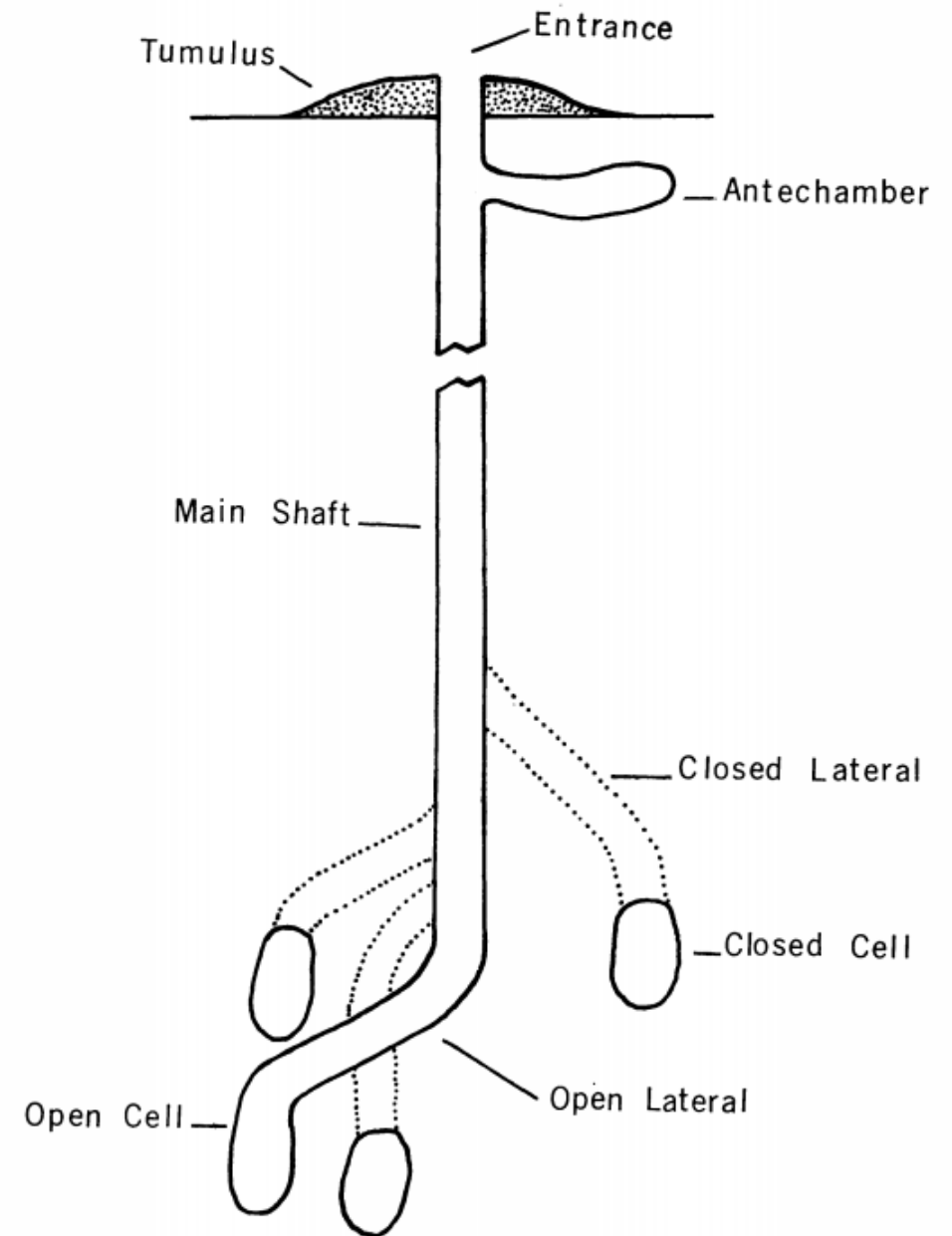


FIG. 1. *Peponapis pruinosa*. Structure of nest (diagrammatic).

Anthorphora spp. and turrets



© MaLisa Spring



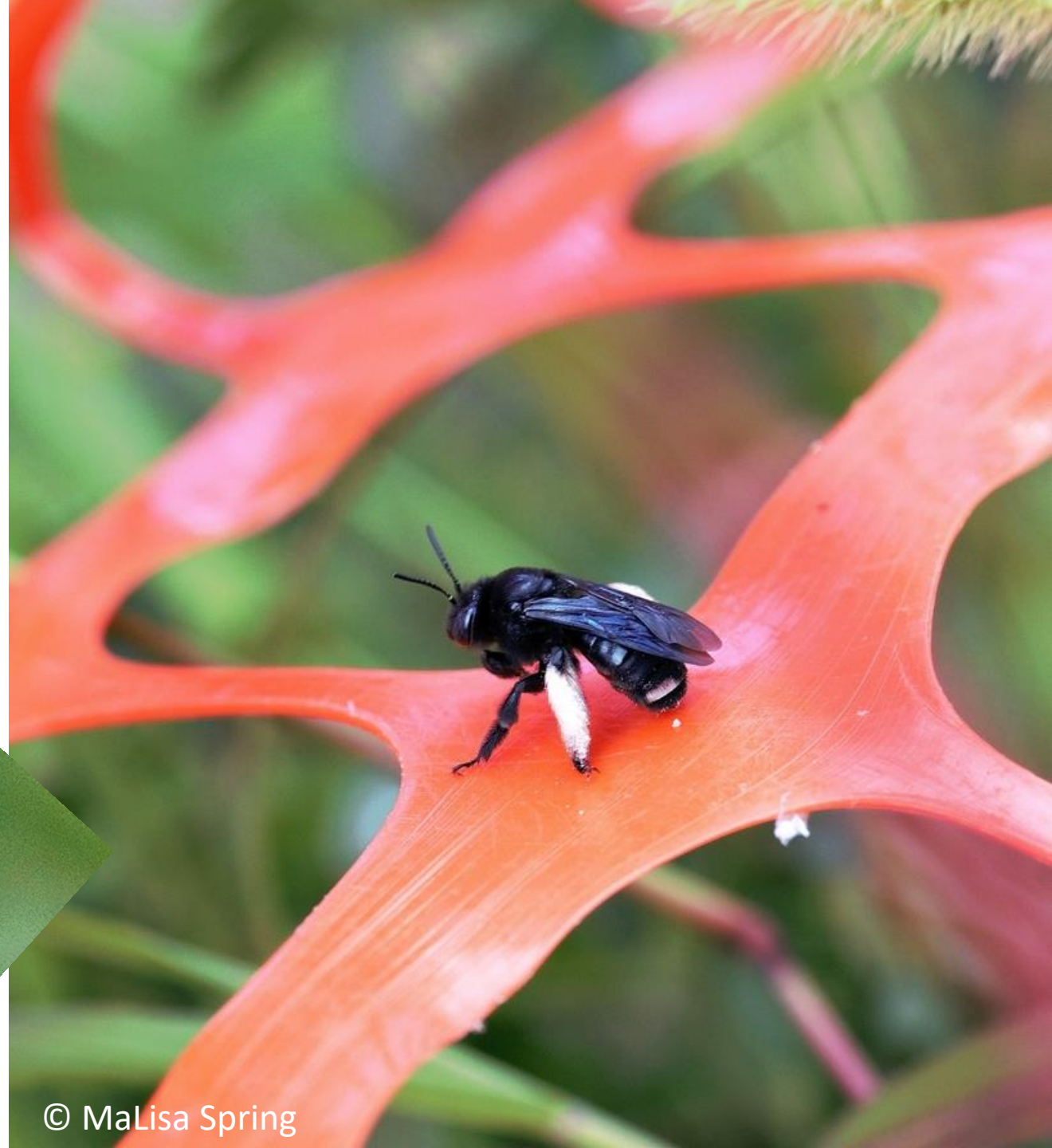
Apidae: *Melissodes* sp.
Longhorn bee

© MaLisa Spring



Melissodes sp.
Longhorn bee

Melissodes bimaculatus
Two-spotted Longhorn bee



Melitoma

- Clay slopes with chimneys
- *Ipomoea* and similar



*Holcopasites
calliopsidis*



Parasitic bees

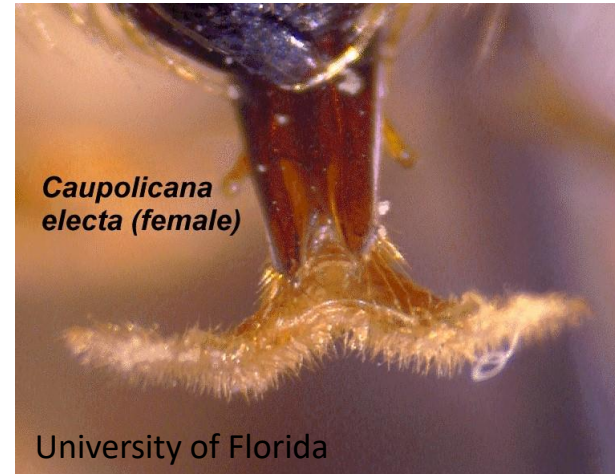


Apidae: *Nomada* sp.



Colletidae – Polyester bees

- Named for nest types
- 2 common genera
 - *Colletes*
 - *Hylaeus*



Colletidae – Polyester bees

- *Colletes* (24 species in Ohio)
 - Similar to *Andrena*, but lack facial fovea
 - Wing venation
 - Hair banding



© MaLisa Spring



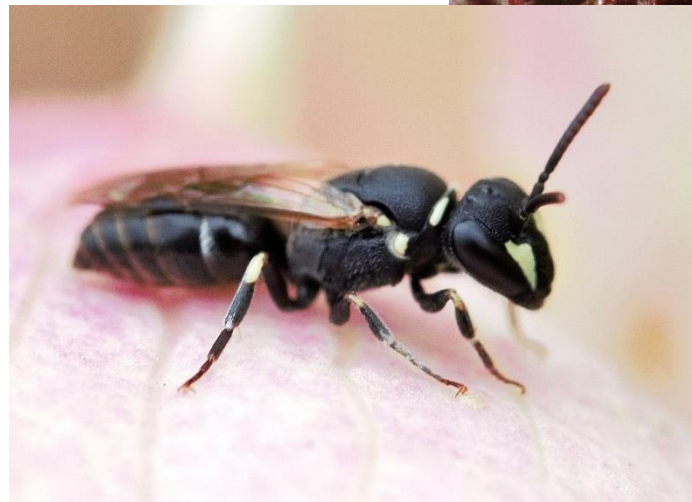
Colletidae – Polyester bees

- *Colletes*
 - Similar size to Honey bee
 - Heart shaped face
 - No facial fovea!
 - Distinct wing venation



Colletidae – Polyester bees

- *Hylaeus* (24 species in Eastern NA)
 - Small – TINY
 - Collect pollen in stomach
 - Male v female
 - Lots on Queen Anne's Lace
- **STEM/CAVITY NESTERS!!**



Halictidae – “Sweat” bees

7 genera easily identifiable

Racecar green bees

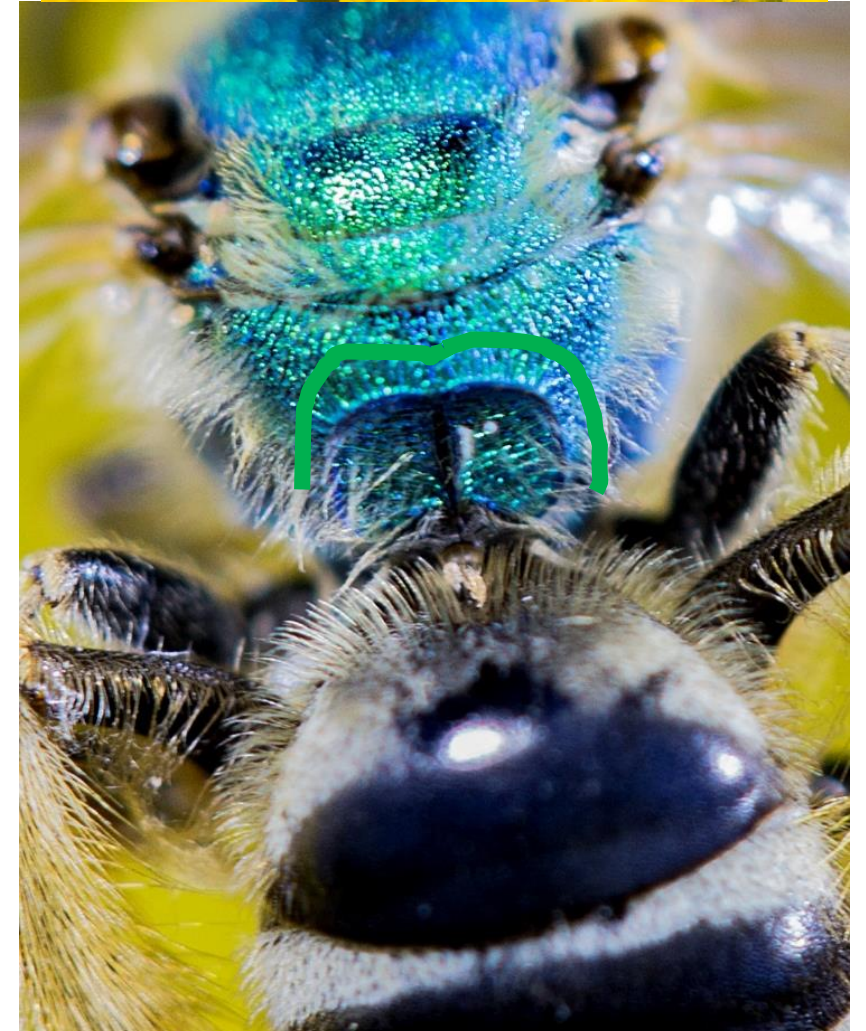
Dull green sweat bees

Cuckoo bees



Racecar Green Sweat bees

- *Agapostemon*
 - Largest racecar green bee
 - Raised carina (Peace ridge)
 - Black abdomen (sometimes)
 - Males – alternating black and yellow



Racecar Green Sweat bees

- *Agapostemon*
 - Largest racecar green bee
 - Raised carina (Peace ridge)
 - Black abdomen (sometimes)
 - Males – alternating black and yellow

A. virescens



[Insectes Sociaux](#)

June 1981, Volume 28, [Issue 2](#), pp 105–116 | [Cite as](#)

Nest switching and guarding by the communal sweat bee *Agapostemon virescens* (Hymenoptera, Halictidae)

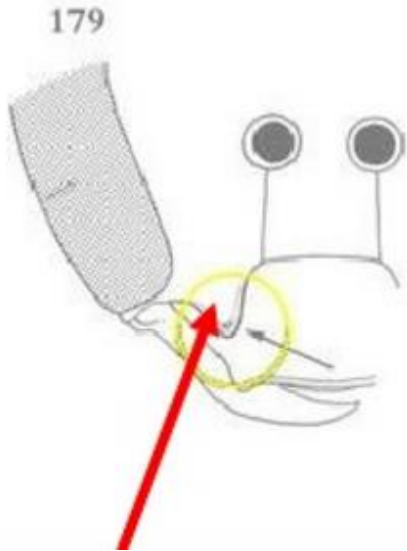
[Authors](#)

[Authors and affiliations](#)

Judith Abrams, George C. Eickwort

Racecar Green Sweat bees

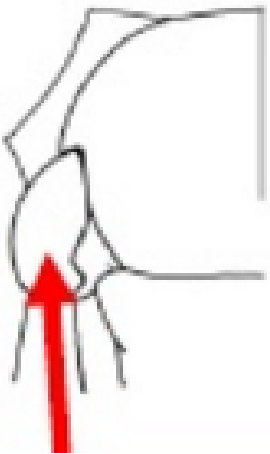
- *Augochlora* – nests in decaying logs
- *Augochlorella*
- *Augochloropsis*





Racecar Green Sweat bees

- *Augochloropsis*
 - Least common bright green bee
 - Non-oval tegula

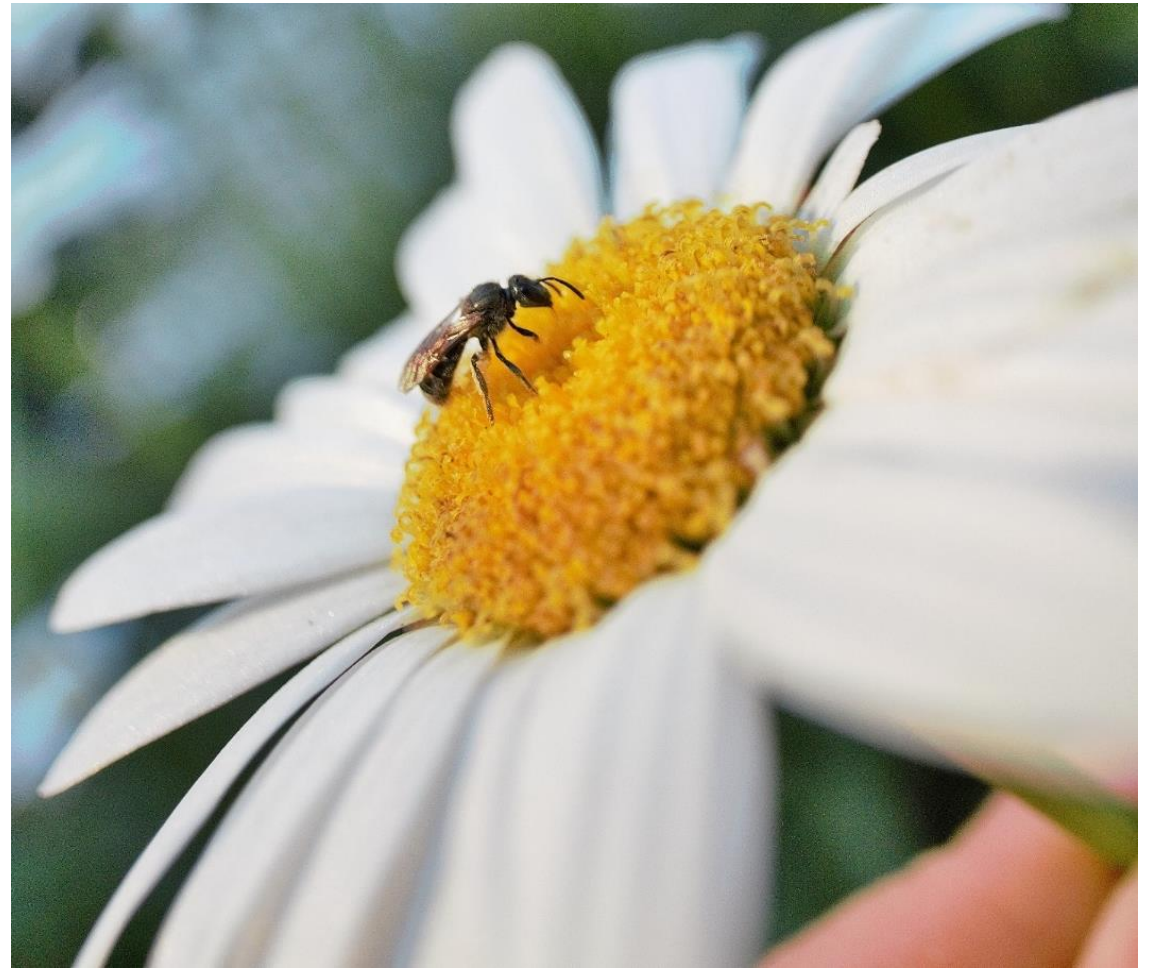


Dull Green Sweat bees

- *Halictus*



- *Lasioglossum*



Dull Green Sweat bees

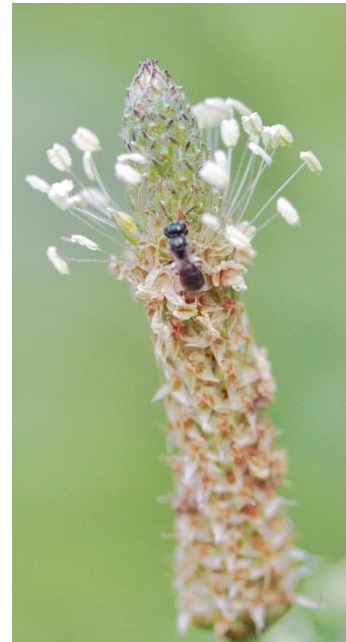
- *Halictus*
 - *H. ligatus* with distinct chin projections
 - *H. rubicundus*
 - *H. parallelus*
 - *H. confusus* looks like *Lasioglossum*

© LA State Arthropod
Museum



Dull Green Sweat bees

- *Lasioglossum*
 - Most common!
 - Super small – small
 - Wing venation + Hair banding
 - Species ID = Hardest.



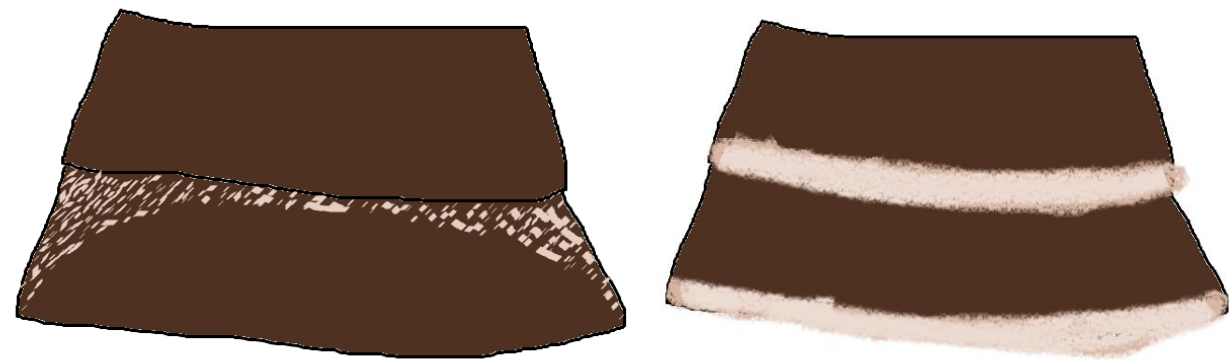
Dull Green Sweat bees

- *Lasioglossum*



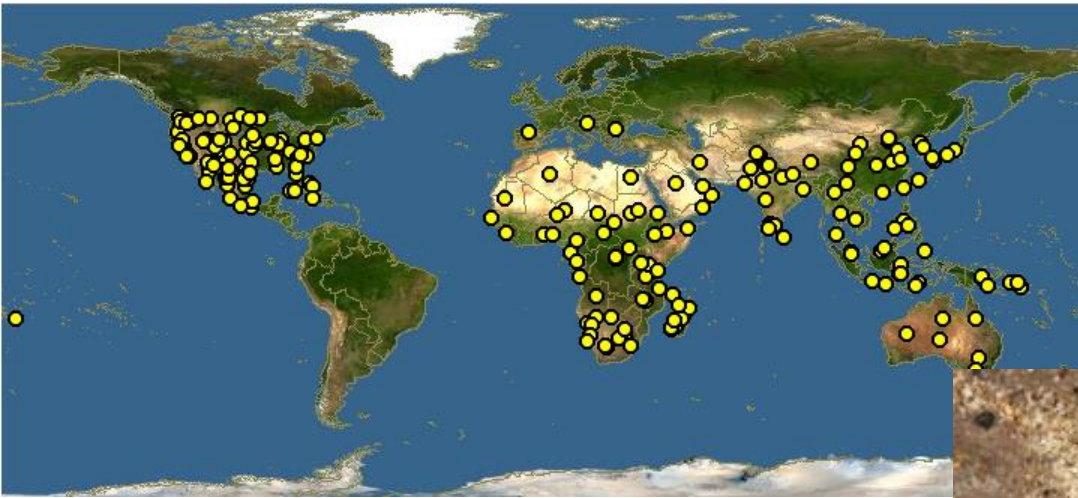
© Erin Maxson

Basal hairs (Base) = *Lasioglossum*
Apical hairs (away) ~ = *Halictus*
(compare *Andrena* and *Colletes*)



Other sweat bees?

- Not common, but do exist
- *Nomia* (aka Alkali bee)



© James Cane



Megachilidae – mostly cavity nesters

- Leafcutting, Mason, and Wool Carder bees
 - Scopa on abdomen (Hairy stomach)
 - Boops flowers with hairs
- Leafcutting + Mason bees: triangular abdomen



Megachilidae – mostly cavity nesters

FORUM

Substrates and Materials Used for Nesting by North American *Osmia* Bees (Hymenoptera: Apiformes: Megachilidae)

JAMES H. CANE,¹ TERRY GRISWOLD, AND FRANK D. PARKER

USDA-ARS Bee Biology and Systematics Laboratory, Utah State University, Logan, UT 84322-5310

ECOLOGY AND POPULATION BIOLOGY

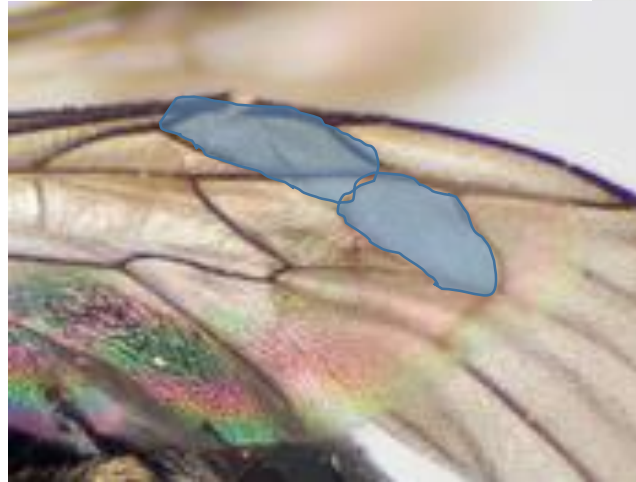
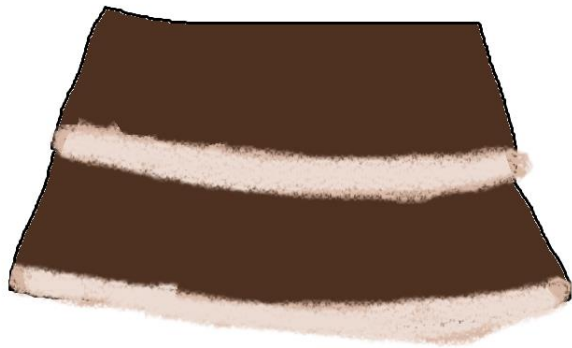
Pollination, Foraging, and Nesting Ecology of the Leaf-Cutting Bee *Megachile (Delomegachile) addenda* (Hymenoptera: Megachilidae) on Cranberry Beds

JAMES H. CANE, DANIEL SCHIFFHAUER,¹ AND LINDA J. KERVIN

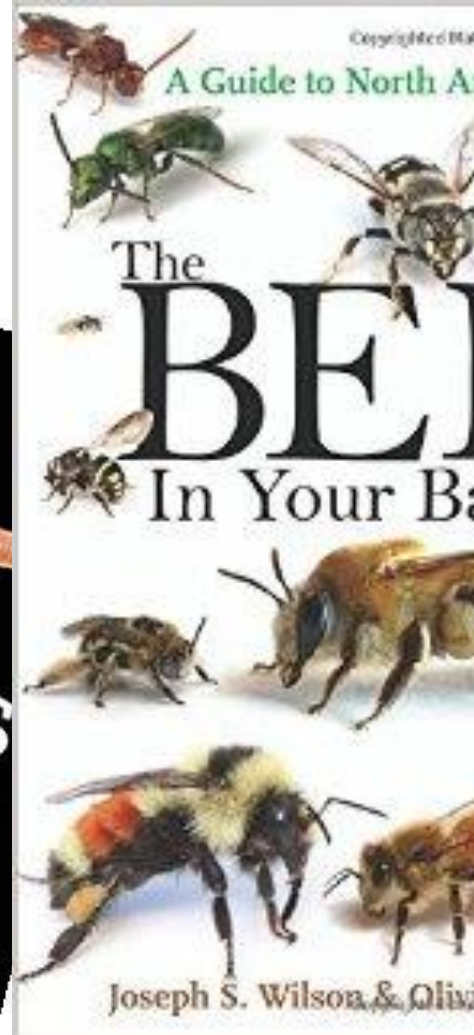
Department of Entomology and Alabama Agricultural Experiment Station, Auburn University, Auburn, AL 36849-5413

Bonus family! Melittidae

- *Macropis nuda* – oil collecting bee
- Need Yellow Loosestrife and sandy/loamy soil
- Solitary ground nesters
- Identification:
 - moderate sized
 - Two submarginal cells!
 - Apical hair bands



Resources?



BACKYARD BEES OF NORTH AMERICA



Did you know... * There are nearly 4,000 bee species in the United States. * A majority are found in the southwest deserts and along the California coast. * Most species are solitary; they do not live in a hive. * Roughly 20% of bee species live in the ground in hollows they excavate themselves. * Some bees are generalists and will visit many different kinds of flowers. * Other bees are specialists, only visiting one or two types of flowers. * Wild bees are great pollinators. For example, in some orchards, two million bees can pollinate as much as 500 European honey bees.

Ohio Bee ID guide

Extension fact sheet
Various versions online

Ohio Bee Identification Guide

Developed by Scott Prajzner and Mary Gardiner
Department of Entomology, The Ohio State University-OARDC, Wooster, OH

2013

Bees are beneficial insects that pollinate flowering plants by transferring pollen from one flower to another. While the honey bee gets most of the credit for providing pollination, there are actually about 500 bee species in Ohio. Key features needed to identify 10 types of bees are listed for each type.

Small

Medium

Large

Common nesting locations.

Identifying behaviors to watch for.

Features that may be seen with the aid of a hand lens.

Honey bee (*Apis mellifera*) Medium 12-15mm

Light to dark brown body with pale and dark hairs in bands on abdomen. Pollen basket present. Abdomen barrel-shaped. Head heart-shaped.

Colonies nest in man-made hives, in the open, and in cavities. Swarm to locate new nest.

Honey bees have hairy eyes.

Bumble bee (*Bombus* spp.) Large 8-21mm

Black body, extensively covered with black and yellow hairs on all body segments. Pollen basket present. Robust body. Long face.

Colonies nest underground, commonly in old rodent burrows.

Bumble bees pollinate in cool, cloudy weather when most bees are in their nests.

Leaf cutting bee (*Megachile* spp.) Medium 7-15mm

Black body with light or dark hairs. Pollen-carrying hairs beneath abdomen. Some have rather pointy abdomens. Head is as broad as the thorax with large mouthparts used to cut leaves.

Solitary, but nest in aggregations in above-ground pre-existing holes, natural or man-made.

They cut circular pieces from leaves which are used to line their nests.

Large Carpenter bee (*Xylacopa* spp.) Large 15-23mm

Black body with light or dark hairs. Pollen-carrying hairs on rear legs. Similar body shape to bumble bee, but abdomen shiny and mostly lacking hair. Round face.

Nests are burrowed into wood, often in roof eaves.

Fly fast and erratically like a hummingbird.

OHIO STATE UNIVERSITY EXTENSION

AGRICULTURE AND NATURAL RESOURCES FACT SHEET

Ohio Bee Identification Guide

Scott Prajzner and Mary Gardiner, Department of Entomology

2015

ENT-57-15

Bees are beneficial insects that pollinate flowering plants by transferring pollen from one flower to another. This is important for plant reproduction and food production. In fact, pollinators are responsible for 1 out of every 3 bites of food you take. While the honey bee gets most of the credit for providing pollination, there are actually about 500 bee species in Ohio.

This fact sheet provides key features needed to identify 10 types of bees found in home landscapes. The following information is included:

- Approximate size. Your bee may vary slightly.
- Common nesting locations.
- Identifying behaviors to watch for.
- Additional ID features that may be seen with the aid of a hand lens.

How to Identify Bees

All bees have three body segments, a **head**, **thorax** and **abdomen**. The head is where large multi-faceted eyes, long slender antennae, and cutting mouthparts are found. The thorax is the middle segment where the wings and legs attach. Last is the abdomen, which for female bees ends in a sting. Special pollen-carrying hairs unique to female bees resemble dense broom bristles, and are commonly found on the rear legs or the underside of the abdomen. Some carry pollen in an almost hairless, flattened pollen basket on the rear legs.

© Donna K. Race

commons.wikimedia.org

Common nesting locations

Colonies nest in artificial hives, in the open and in cavities. Bees swarm to divide the colony.

Additional ID features that may be seen with the aid of a hand lens

Honey bees have hairy eyes.

© Scott Prajzner

© Scott Prajzner

Common nesting locations

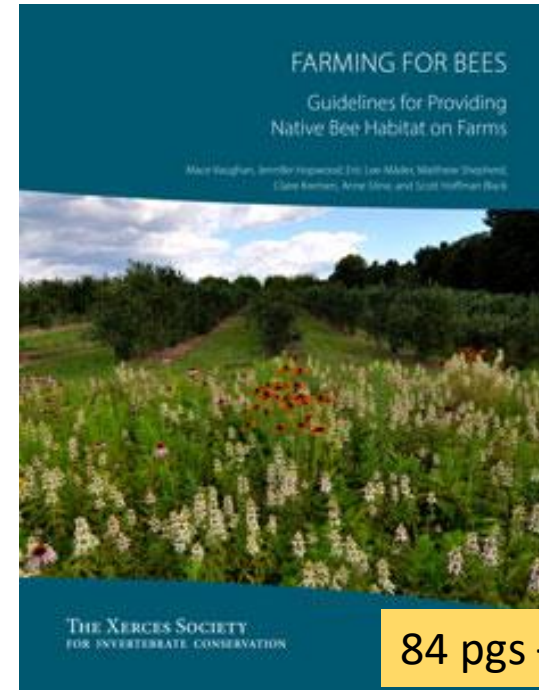
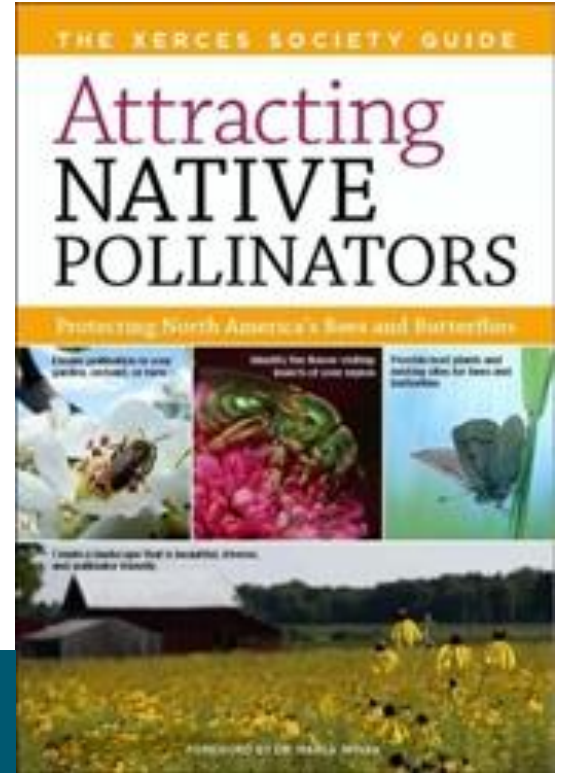
Solitary, but nest in aggregations in above-ground pre-existing holes, natural or artificial.

Behaviors to watch for

They cut circular pieces from leaves which are used to line their nests.

Xerces Society (Xerces.org)

- Pollinator Plant Lists
- Pollinator Conservation
- Pollinators and Agriculture
- Managing Pesticides to protect bees



84 pgs – free online!

Documenting Species

You can help!

- Photo submissions
- Physical collections



Creating a voucher collection

- What is the goal of your collection?
 - Scientific vouchers
 - Outreach
 - Art displays



Example Label

- Data Matters!
- Other info to include
 - Collection method
 - County
 - Project or Specimen #

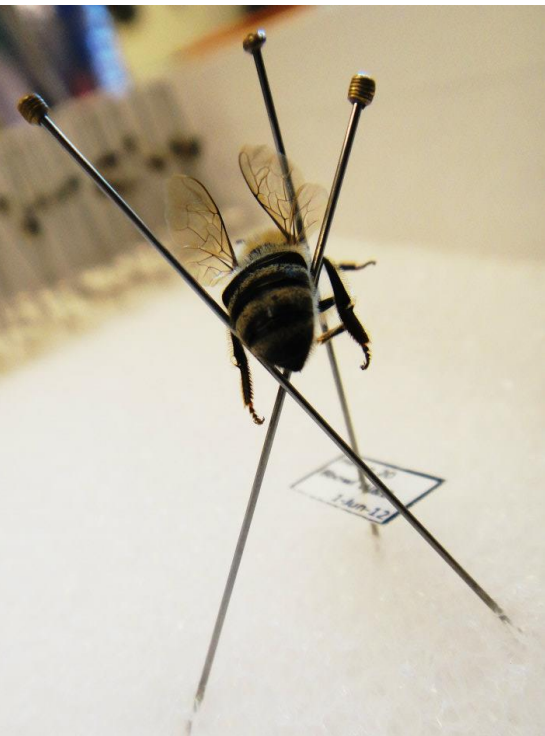
Columbus, Ohio: USA
Franklin Park Conservatory
39.96488, -82.95409
April 26, 2018
Collected on *Narcissus* sp. By
MaLisa Spring

Pinning Bees – pin by date/location



Pinning Bees

- Other tips:
 - If matted hairs (from bee bowls), do a gentle wash
 - Extra small bees can be glued to pins
 - Insect Repair Adhesive
 - Elmers Glue

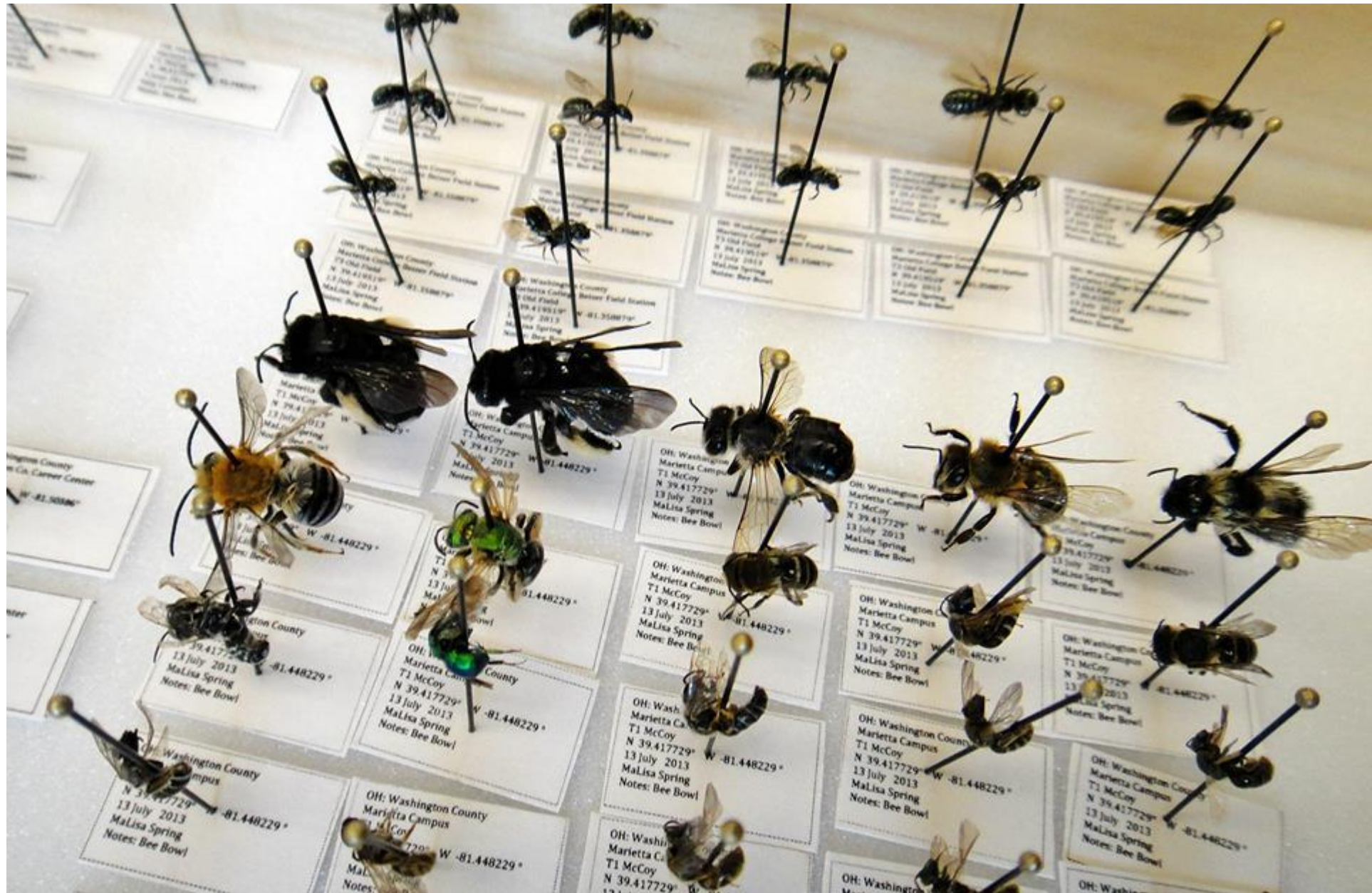


Pinning heights



Organization





iNaturalist – Photo Documentation

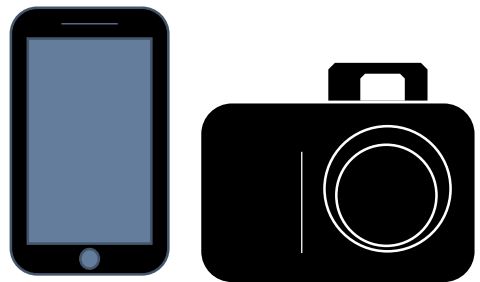


ADD
OBSERVATIONS





- Phone app
- Computer



Ohio Dragonfly Survey (Ohio Odonata Survey)

[Add observations to this project](#)

Stats

Totals

12898
Observations »

140
Species »

405
People »

Most Observations

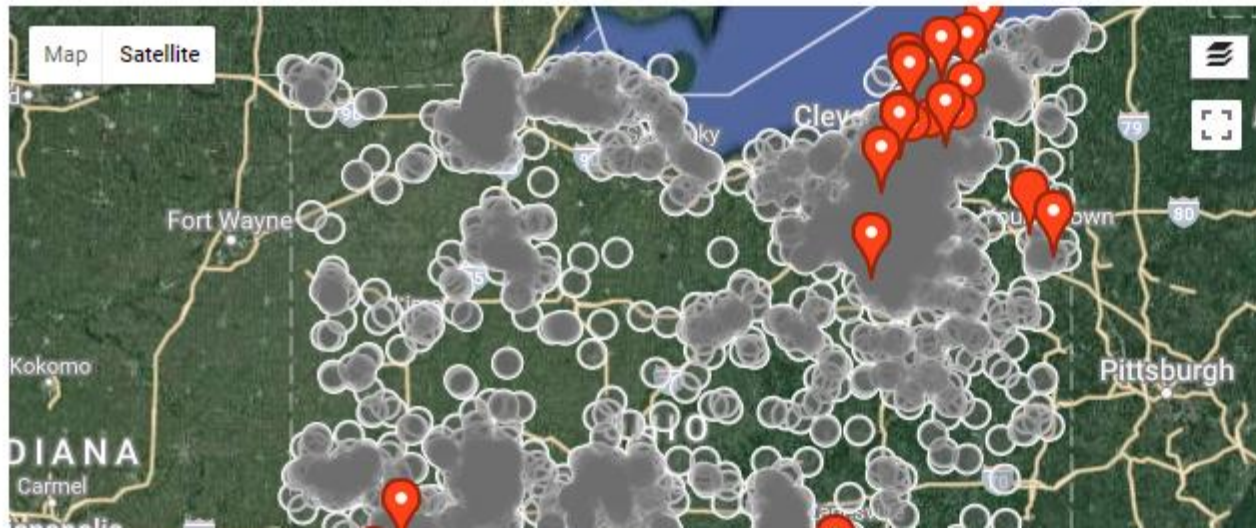
- jimlem
1775 observations
- smpvolunteer-jcannon
1166 observations
- srm Myers
979 observations
- coachwhipbooks
712 observations
- dmcshaffrey
577 observations

Most Species

- ricknirschl
97 species
- jimlem
89 species
- smwhite
78 species
- lgilbert
77 species
- christopherswan
75 species

Most Observed Species

- Eastern Pondhawk
866 observations
- Blue Dasher
692 observations
- Eastern Forktail
631 observations
- Widow Skimmer
603 observations
- Eastern Amberwing
516 observations



» [Members](#) 104 members

[View all members »](#)

» [Your membership](#) 313 observations

» [Add from your observations](#)
[Download template for use in the bulk uploader](#)

» [Export observations](#)
[Atom](#) / [KML](#) / [CSV](#)



Other

Receive updates from this project

Receive updates about this project on your dashboard and in the daily updates email.

Do you want to make your private/obscured observation coordinates visible to the project curators?

- Yes, but only if I add the observation to the project myself.
- Yes, no matter who adds the observation to the project.
- No.

Note: You can also choose to share the private coordinates of observations in this project on a case-by-case basis. These are just the defaults for new observations added to the project.

[Yes, I want to join](#)

[Cancel](#)



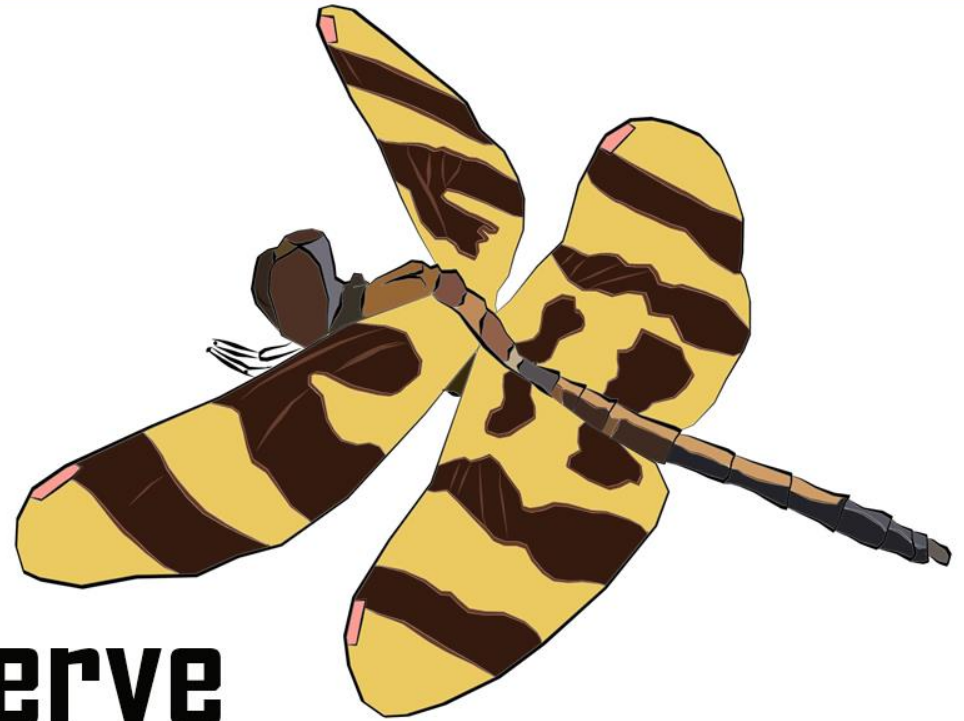
ADD
OBSERVATIONS



Ohio Tiger Beetles (Cicindelidae)



**Join us for Odo-Con-18!
June 22-24, 2018
in Hancock County, Ohio
at Oakwoods Nature Preserve**



**Register on the
Ohio Dragonfly Survey webpage**

Questions?



Contact:
MaLisa Spring
Spring.99@osu.edu
@EntoSpring 

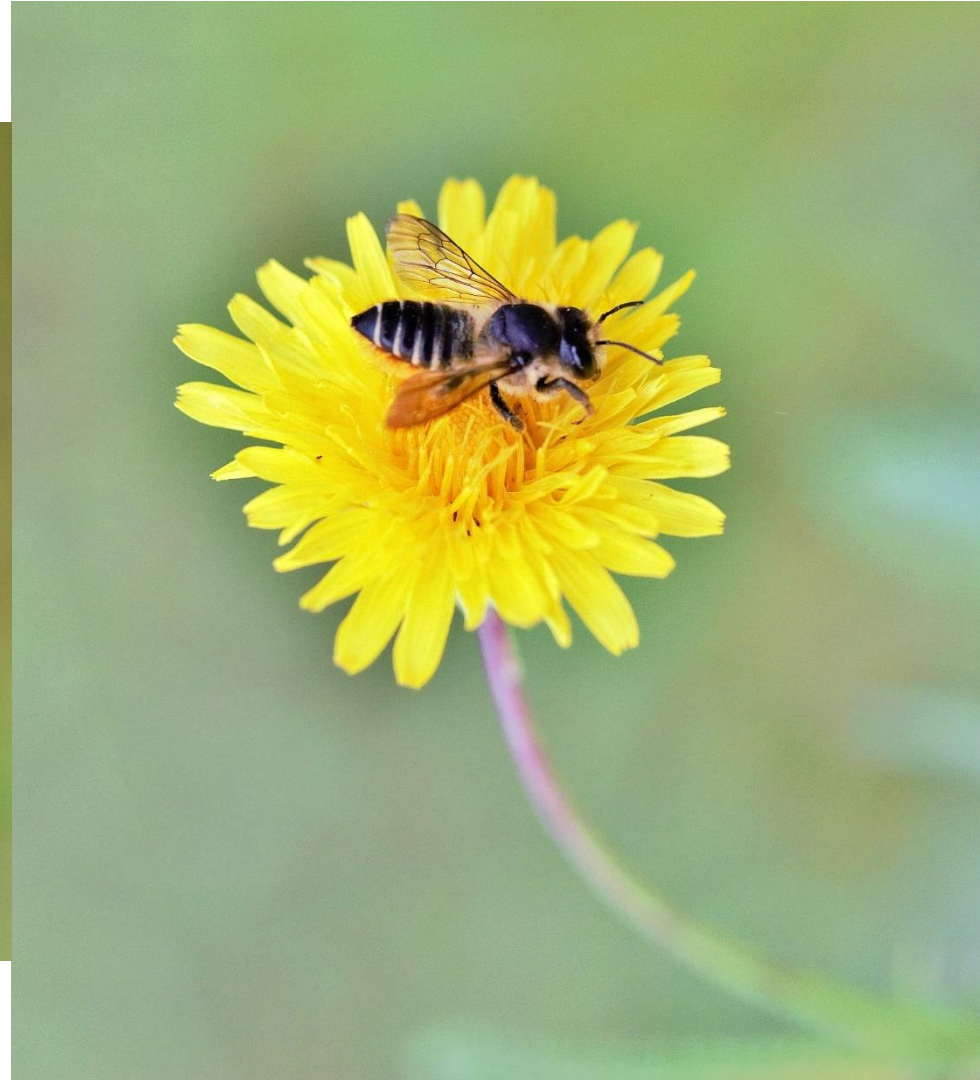


Non-Native Species

- *Andrena wilkella*
- *Anthidium manicatum*, *oblongatum*, and soon maybe *florentinum*
- *Apis mellifera*
- *Hylaeus hyalinatus*, *leptocephalus*, *pictipes*, and soon maybe *communis*
- *Megachile apicalis*, *concinna*, *centuncularis*, *rotundata*, and *sculpturalis*
- *Osmia caerulescens* and *taurus*
- *Peponapis pruinosa*
- *Pseudoanthidium nanum*
- Maybe *Anthophora polumipes*, and *Lithurgus chrysurus* soon

Extra slides of cavity nesters

Megachilidae: *Megachile* sp.



Megachilidae: *Osmia* spp.
Orchard/Mason Bees
Live in cavities and stems



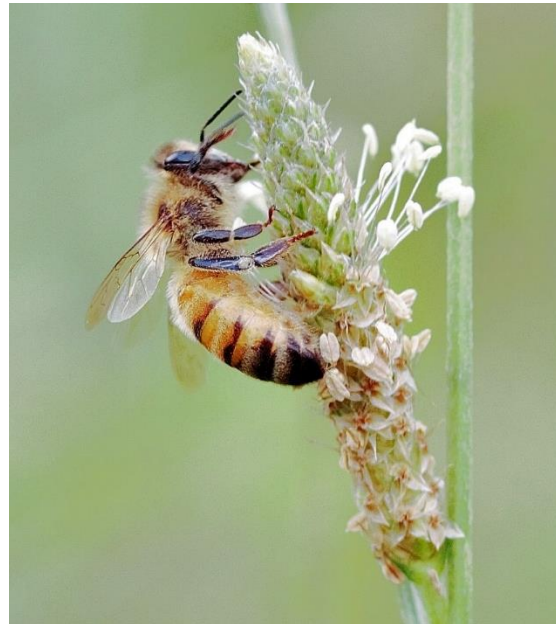


Small Carpenter Bees: *Ceratina*

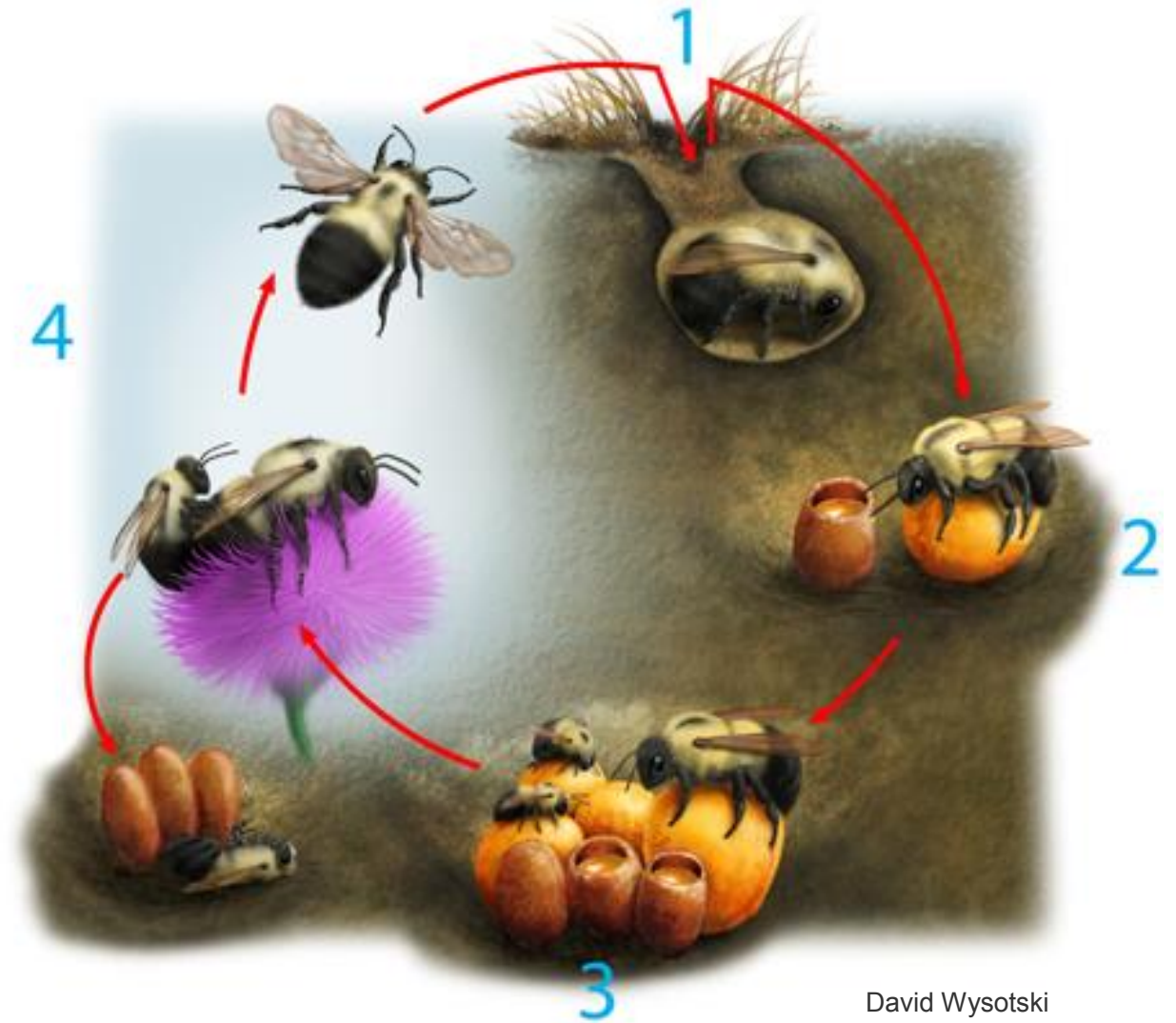


Honey bees – *Apis mellifera*

- Not native to the US!
- Managed by humans
 - Create honey
- Social in hives



Native Pollinators: Social Bees



Carpenter Bees – *Xylocopa virginica*

- Bores into wood for nests
- Shiny black abdomen – (not a hairy butt like Bumble bees)



- Resin Bee

