

Ohio's Native Bees

Taking a Closer Look

LOVE OUR LAND

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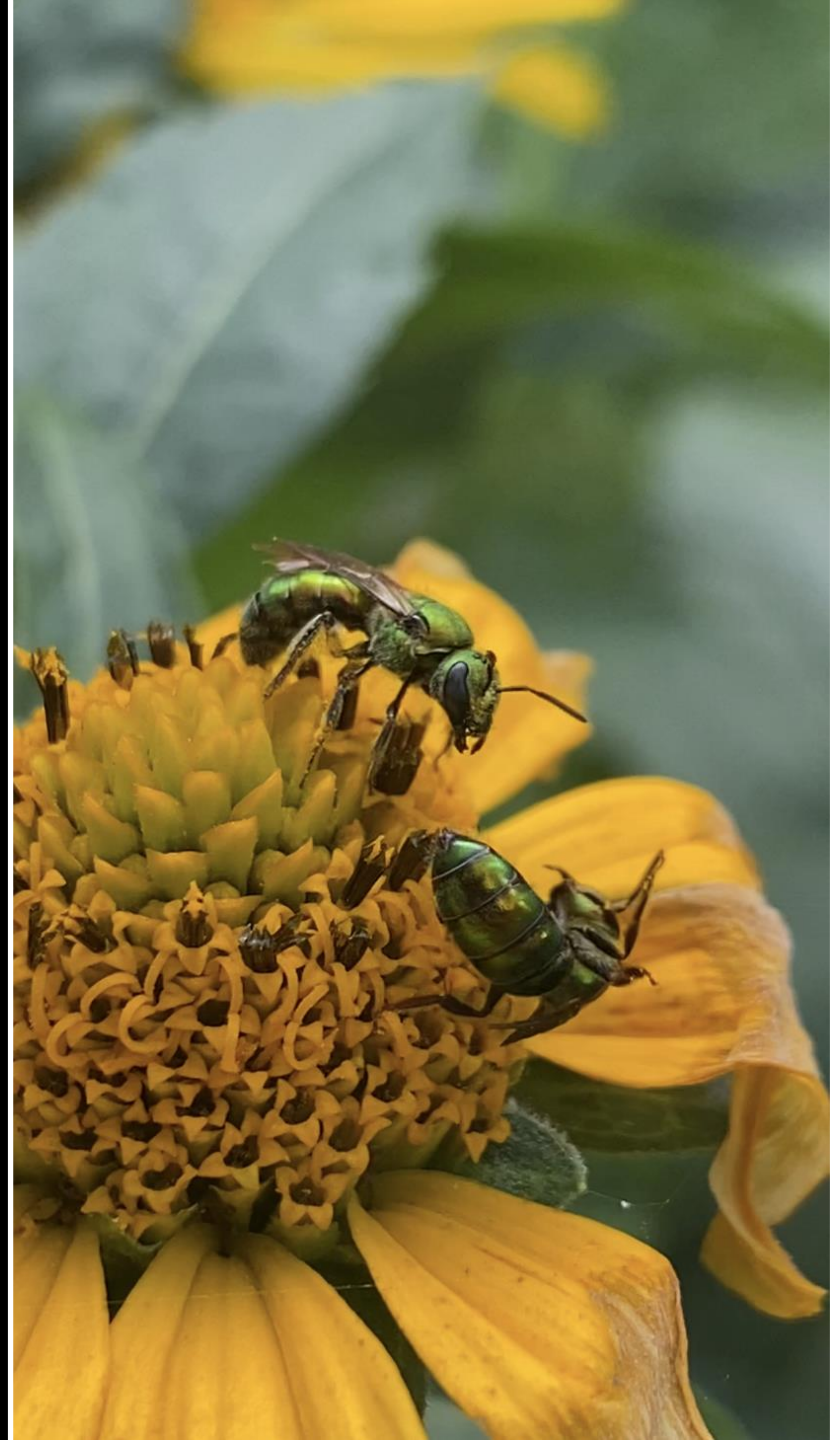
www.loveourland.org

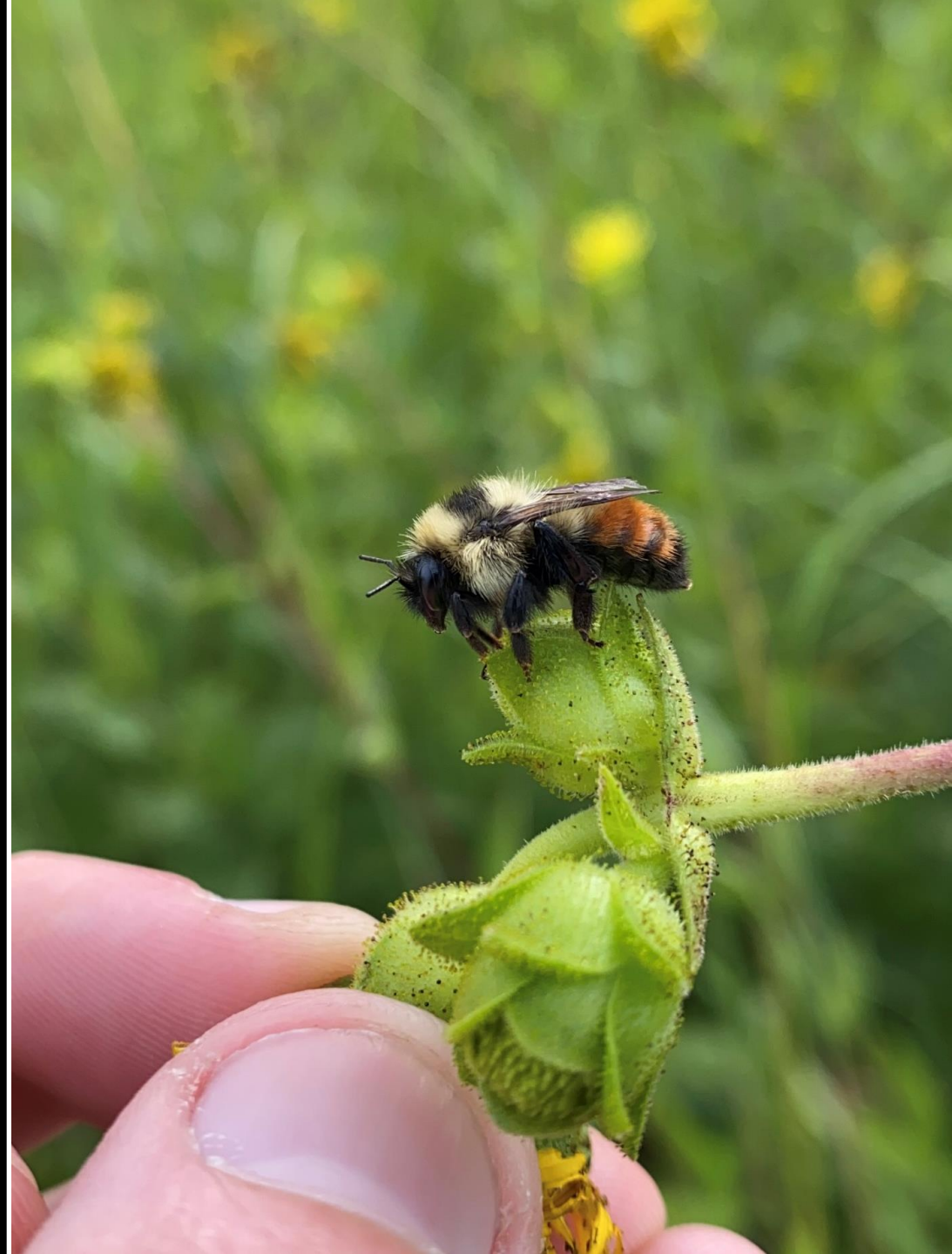
Outline

- Importance of native bees
- Bee diversity
- Conservation status of North American bees
- Threats to native bees
- Common bees of Ohio
- How to help native bees



Why care about native bees?

- More than $3 billion in annual fruit pollination services
- Ecological services are invaluable
  - Primary pollinators for wild and crop plants
- Excellent indicators of ecosystem health



Bee Diversity

- Order: Hymenoptera
- Seven families worldwide:
  - Andrenidae*
  - Colletidae*
  - Halictidae*
  - Megachilidae*
  - Apidae*
  - Melittidae
  - Stenotritidae (only in Australia)

*We'll cover these families

Bee Diversity

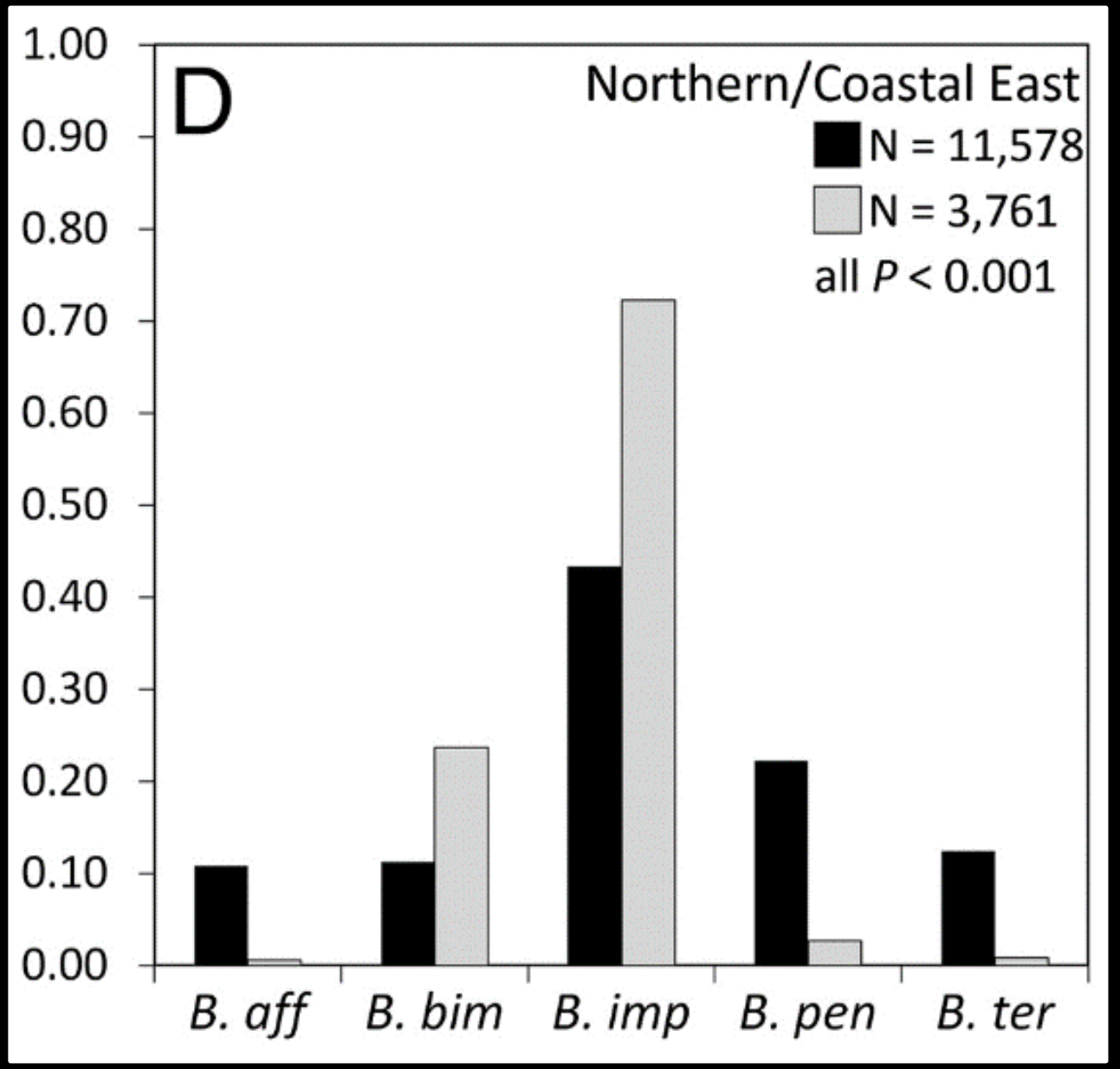
- Globally:
  - ~20 to 30,000 species
- North America:
  - ~4,000 species
- Eastern NA:
  - ~770 species
- Ohio:
  - ~500 species

How are native bees?

- Among native bee species with sufficient data to assess (1,437), more than half (749) are declining.
  - Nearly 1 in 4 (347 native bee species) is imperiled and at increasing risk of extinction.
- For many species, available data is insufficient to evaluate status
  - Increased monitoring and targeted research are necessary to address this
- Declines of North American bumble bees
  - Approximately 1/3 of North America's bumble bees are at risk of extinction
  - 2 federally endangered species (RPBB & FRBB)

Status of Bumble bees

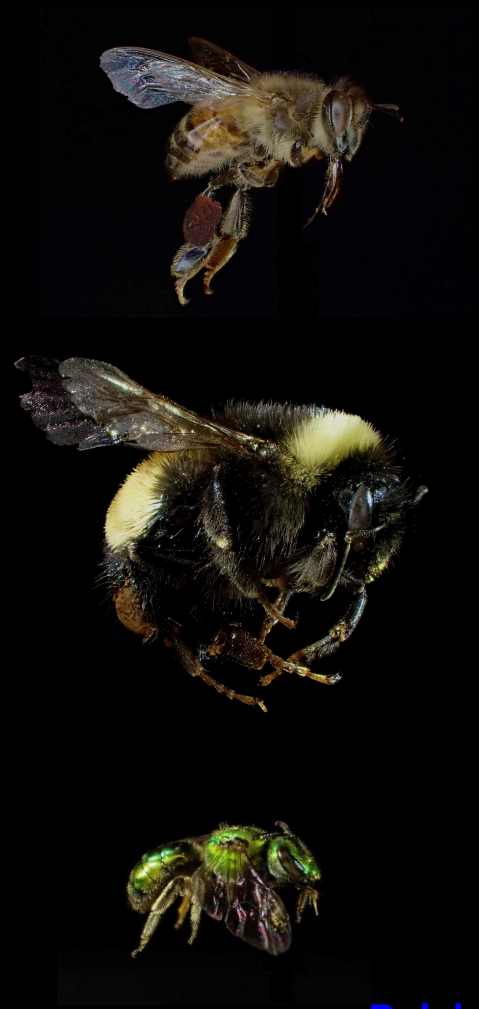
- Decline of at-risk bumble bees:
  - 2011 study by Cameron et al. identified significant declines of North American bumble bees
    - Black bars represent historic relative abundance of each species
    - Gray bars represent relative abundance of each species between 2007 and 2009
  - Relative abundance of *B. affinis*, *B. pensylvanicus*, and *B. terricola* declined significantly from historic levels
- In Ohio:
  - *B. affinis* appears to have disappeared from Ohio; last record from 2013 in Toledo
  - Records of *B. terricola* have been rare for the past couple decades
  - *B. pensylvanicus* can still be found, but in fewer areas and in lower numbers than historically present



Threats to native bees

- Habitat Loss
- Habitat Degradation
- Spread of nonnative invasive species
    - Plants
    - Pests
    - Pathogens
- Pesticides
    - Insecticides (e.g., Neonicotinoids)
    - Additives
- Climate change
- A broken relationship between people and nature

Polylectic v.s. Oligolectic



Polylectic - Collects pollen from a variety of flowering plants

Polylectic v.s. Oligolectic

Oligolectic - Collects pollen from a small number of flowering plants--sometimes a single species

Polylectic v.s. Oligolectic

Polylectic v.s. Oligolectic

Everyone!

Andrenidae

- Globally:
  - ~3,000 species
    - 45 genera
- North America:
  - ~1200 species
    - 11 genera
- Eastern NA:
  - ~175 species
- Ohio:
  - ~130 species
  - ~25% of Ohio species

Andrena ♀

Approximately 9.0 mm in length

Andrena nubecula ♂

Oligolectic - Specializes on pollen of Asteraceae

Approximately 7.0 mm in length

Andrena ♀

Andrena ♂

Protandrena ♀

Approximately 9.0 mm in length

Pterosarus ♀

Approximately 6.5 mm in length

Oligolectic - Specializes on pollen of Asteraceae

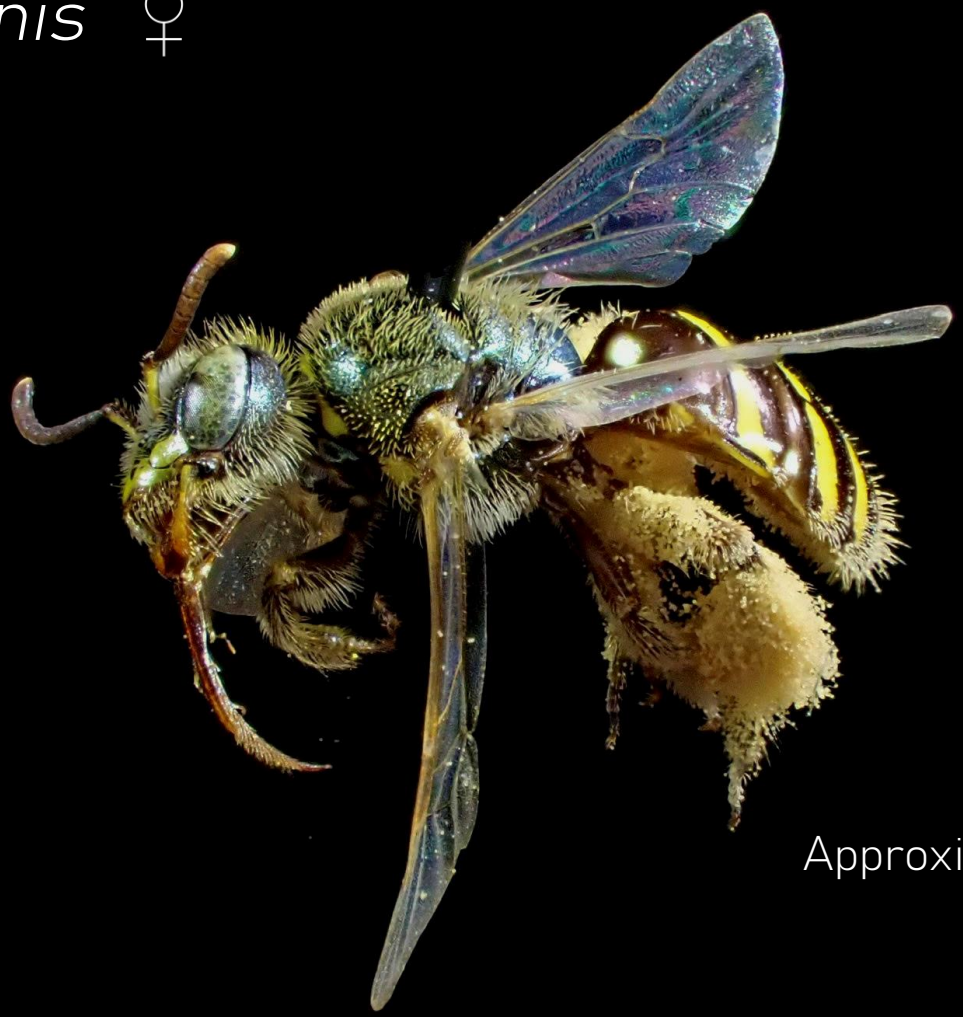
Pterosarus* is a subgenus of *Protandrena

Perdita gerhardi ♀

Approximately 4.5 mm in length

Oligolectic - Specializes on pollen of *Monarda punctata*

Perdita pallidipennis ♀



Approximately 9.0 mm in length

Oligolectic - Specializes on pollen of Asteraceae

Calliopsis nebraskensis ♀

Approximately 7.5 mm in length

Oligolectic - Specializes on pollen of *Verbena*

Calliopsis nebraskensis ♀

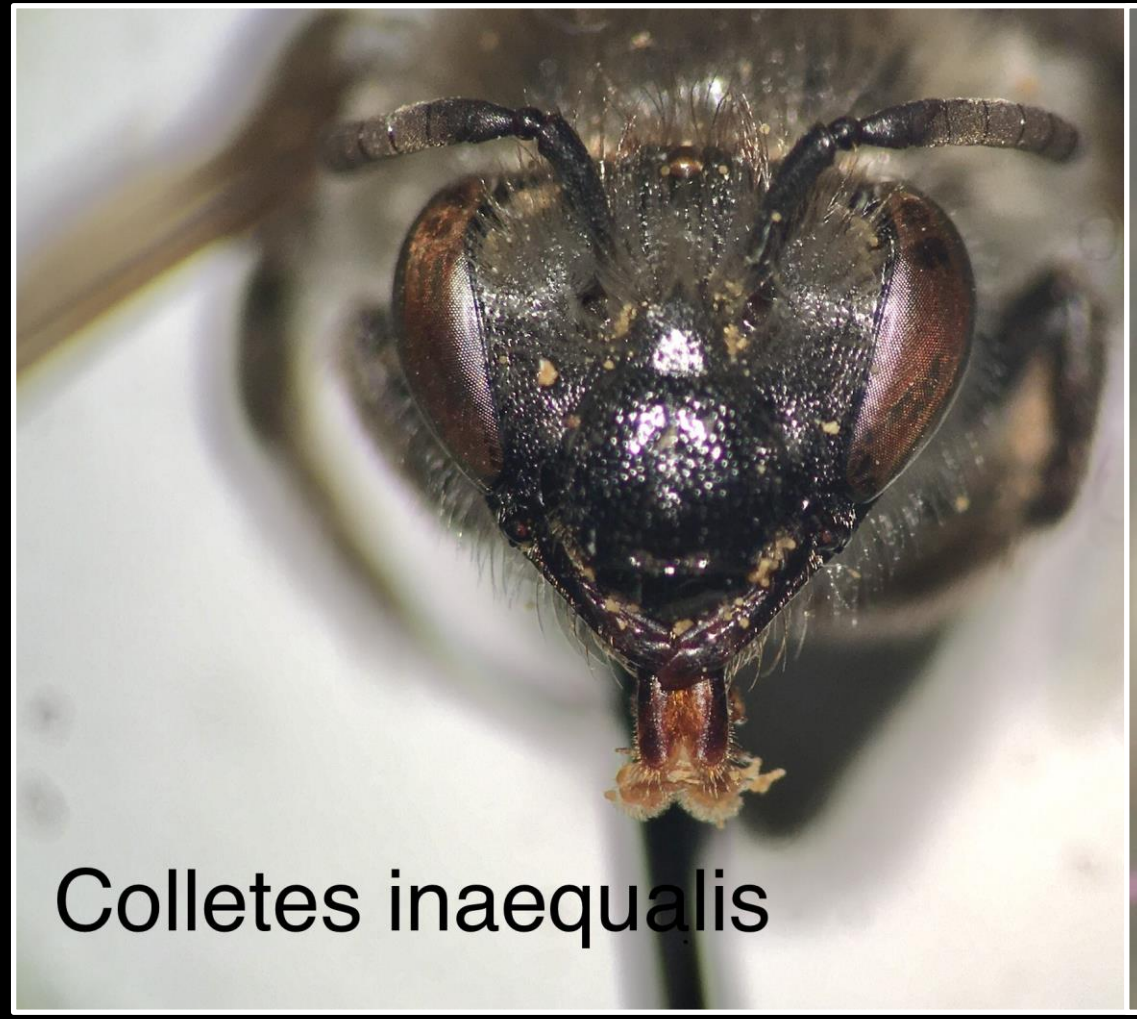
Approximately 7.5 mm in length

Colletidae

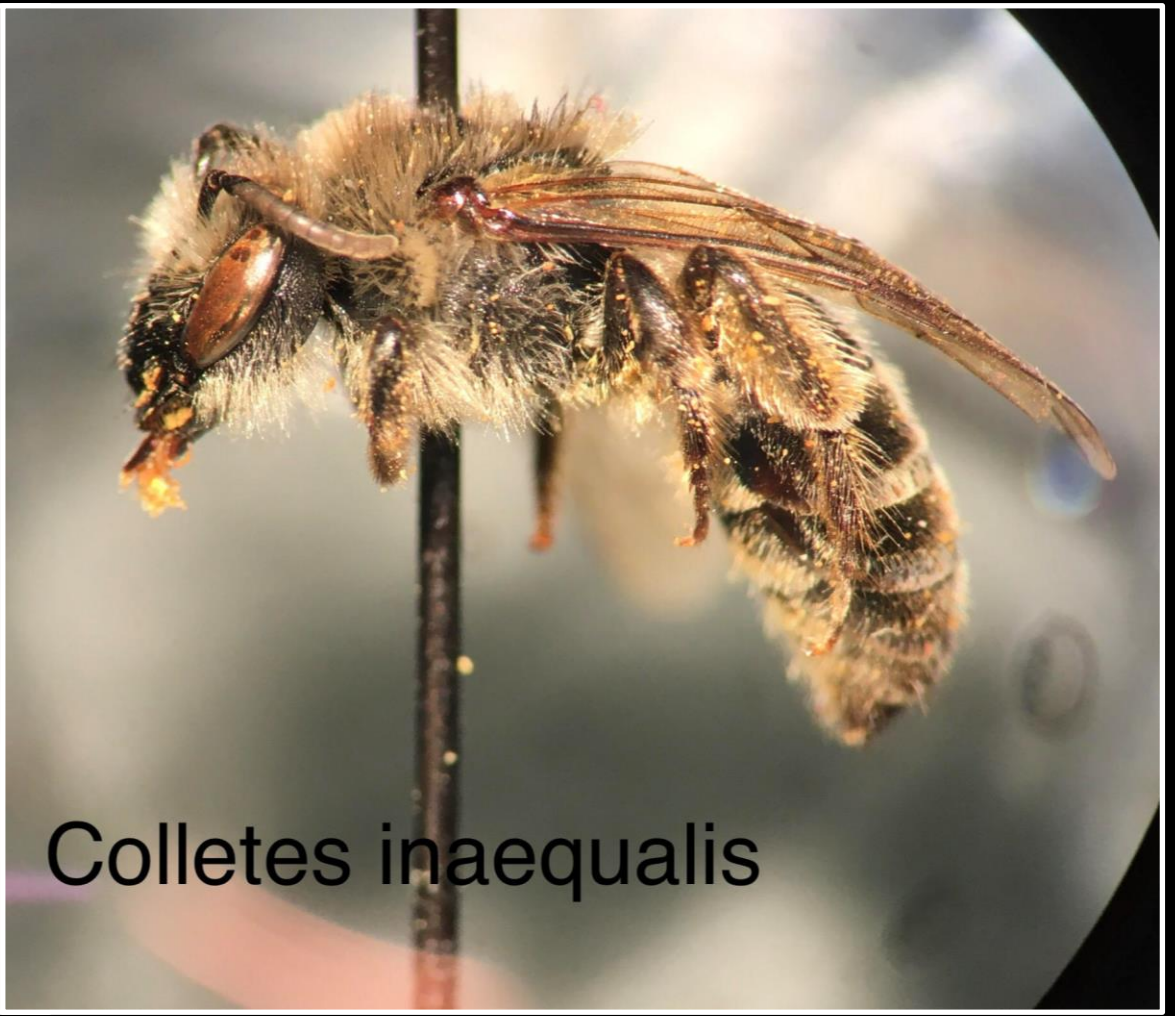
- Globally:
  - ~2,500 species
    - 54 genera
- North America:
  - ~150 species
    - 3 genera
- Eastern NA:
  - ~65 species
- Ohio:
  - ~40 species
  - ~8% of Ohio species

Colletes inaequalis ♀

Approximately 12.0 mm in length



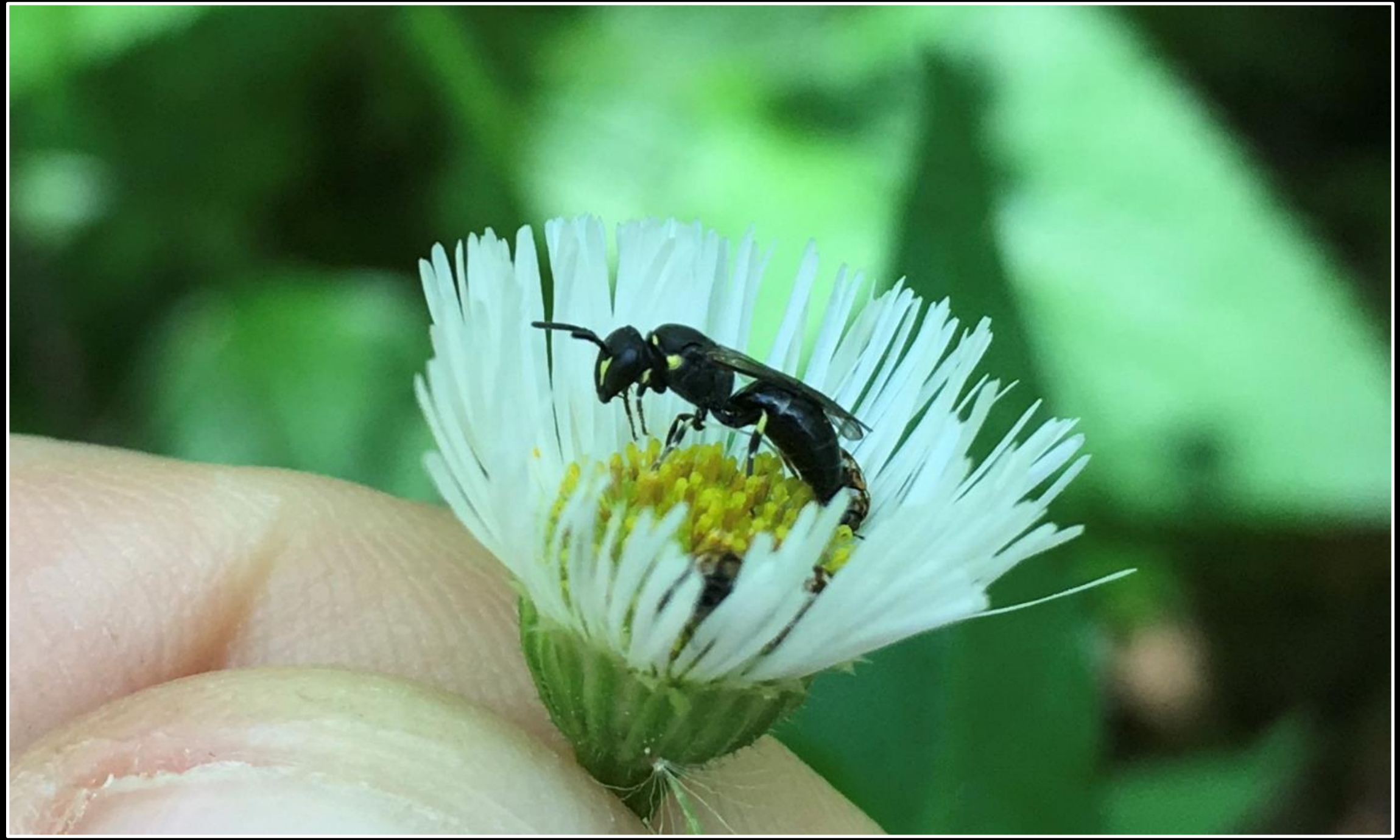
Colletes inaequalis



Colletes inaequalis

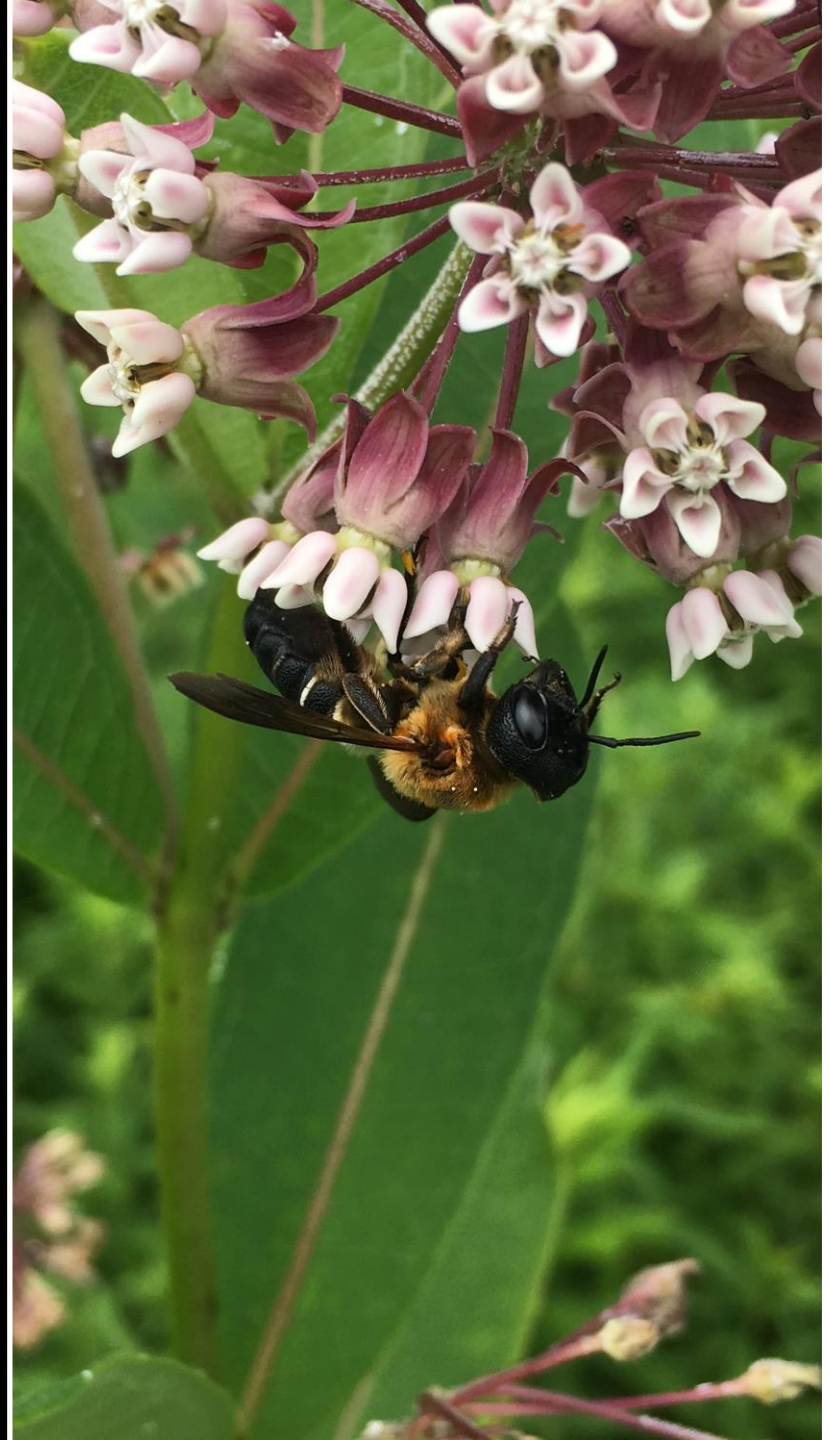
Hylaeus ♀

Approximately 5.5 mm in length



Megachilidae

- Globally:
  - ~4,000 species
    - ~80 genera
- North America:
  - ~600 species
    - 18 genera
- Eastern NA:
  - ~150 species
- Ohio:
  - ~95 species
  - ~20% species



Megachile ♀

Approximately 14.0 mm in length

Osmia ♀

Approximately 9.0 mm in length

Chelostoma philadelphi ♀

Approximately 8.5 mm in length

Oligolectic - Specializes on pollen of *Philadelphus*

Heriades ♀

Approximately 6.5 mm in length

Coelioxys ♀

Approximately 10.0 mm in length

Cleptoparasitic/cuckoo bee - Hosts are species in *Megachile*

Hoplitis ♀

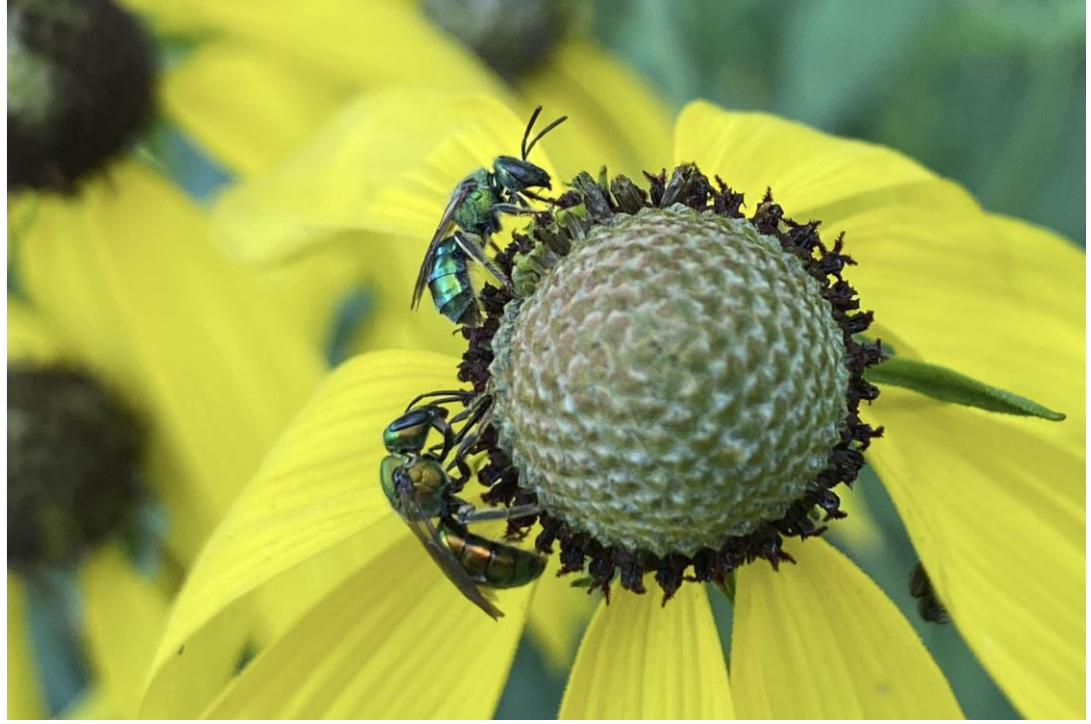
Approximately 7.0 mm in length

Dianthidium ♀

Approximately 8.0 mm in length

Halictidae

- Globally:
  - ~2,500 species
    - 54 genera
- North America:
  - ~500 species
    - 18 genera
- Eastern NA:
  - ~175 species
    - 10 genera
- Ohio:
  - ~125 species
  - ~25% of Ohio species



Augochlora pura ♀

Approximately 8.5 mm in length

Augochloropsis ♀

Approximately 8.5 mm in length

Halictus ♂

Approximately 7.0 mm in length

Agapostemon virescens ♂

Approximately 9.0 mm in length

Lasioglossum ♀

Approximately 9.5 mm in length

Nomia nortoni ♀

Approximately 14.5 mm in length

Dieunomia ♀

Approximately 17.0 mm in length

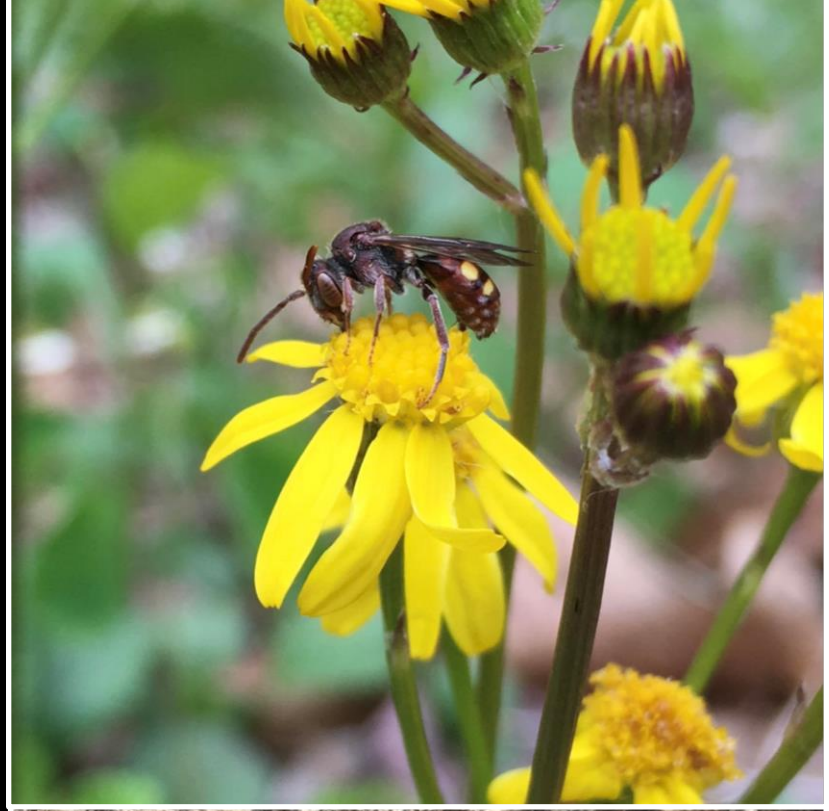
Sphecodes ♀

Approximately 6.0 mm in length

Cleptoparasitic/cuckoo bee - Hosts are small sweat bees, including *Augochlora pura* and *Dialictus*

Apidae

- Globally:
  - ~6,000 species
    - 200 genera
- North America:
  - ~1,000 species
    - 50 genera
    - 3 subfamilies
- Eastern NA:
  - ~240 species:
    - Xylocopinae – 7 spp.
    - Apinae – ~120 spp.
    - Nomadinae - ~110 spp.
- Ohio:
  - ~140 species (~1/4 species)
    - Xylocopinae – 5 spp.
    - Apinae – ~65 spp.
    - Nomadinae - ~70 spp.



Bombus terricola ♀

Approximately 14.5 mm in length

Rusty patched bumble bee (*Bombus affinis*)

A former resident of SW Ohio…

- Formerly widely distributed throughout Midwest, Northeast, and Appalachia
- Historic range contracted by 90%
- Threats to RPBB and other bees
  - This species is believed to have been strongly affected by the rise of the commercial bumble bee industry
  - Bees taken to Europe for domestication interacted with native bumble bees there allowing for pathogen spillover
  - The prevalence of *Vairimorpha* (*Nosema*) *bombi* appears linked to sharp decline in RPBB and close relatives—*B. franklini*, *occidentalis*, & *terricola*


Bombus) affinis Cresson
#2442
#3316
18 August 2001 8:30
IN: Jasper Co.; Nipsco

Cemolobus ipomoeae ♀

Oligolectic - Specializes on pollen of *Ipomoea pandurata*

Approximately 14.0 mm in length

Cemolobus ipomoeae ♀

Cemolobus ipomoeae ♂

Approximately 14.0 mm in length

Cemolobus ipomoeae ♂

Native bee spotlight

Wild sweet potato bee (*Cemolobus ipomoeae*)

- Morning glory specialist
  - Wild potato vine (*Ipomoea pandurata*)
- Solitary and ground nesting
  - Every female creates her own nest
  - Exposed soil near creeks/rivers
- Matinal
  - Active in early morning
- Imperiled
  - Not very well studied, but many experts believe this rare bee is becoming more rare
  - Less than two dozen iNaturalist records in recent years

Male sleeping in WPV

Male

Female

Melitoma taurea ♀

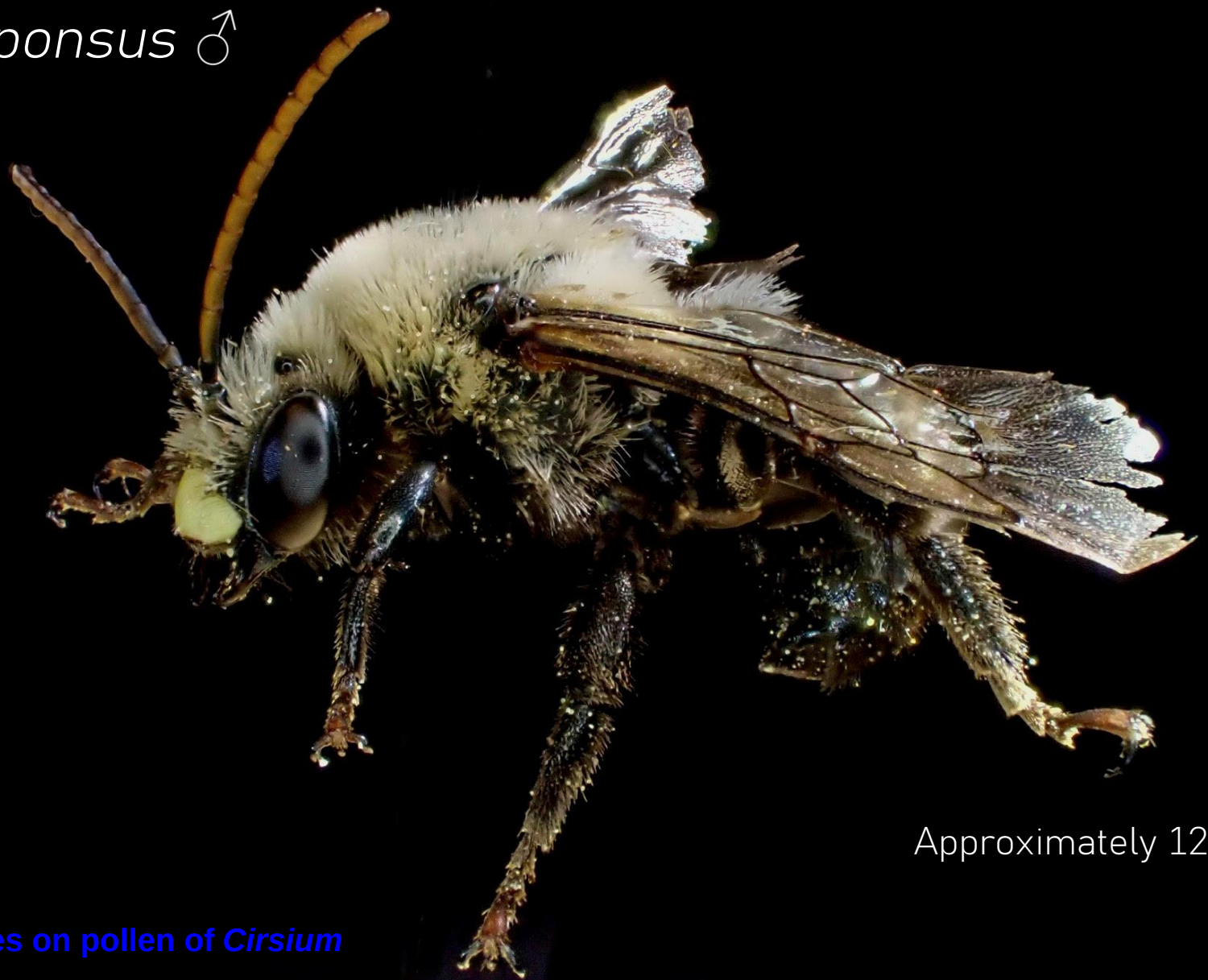
Approximately 12.0 mm in length

Oligolectic - Specializes on pollen of *Ipomoea pandurata* and a few others

Ceratina ♀

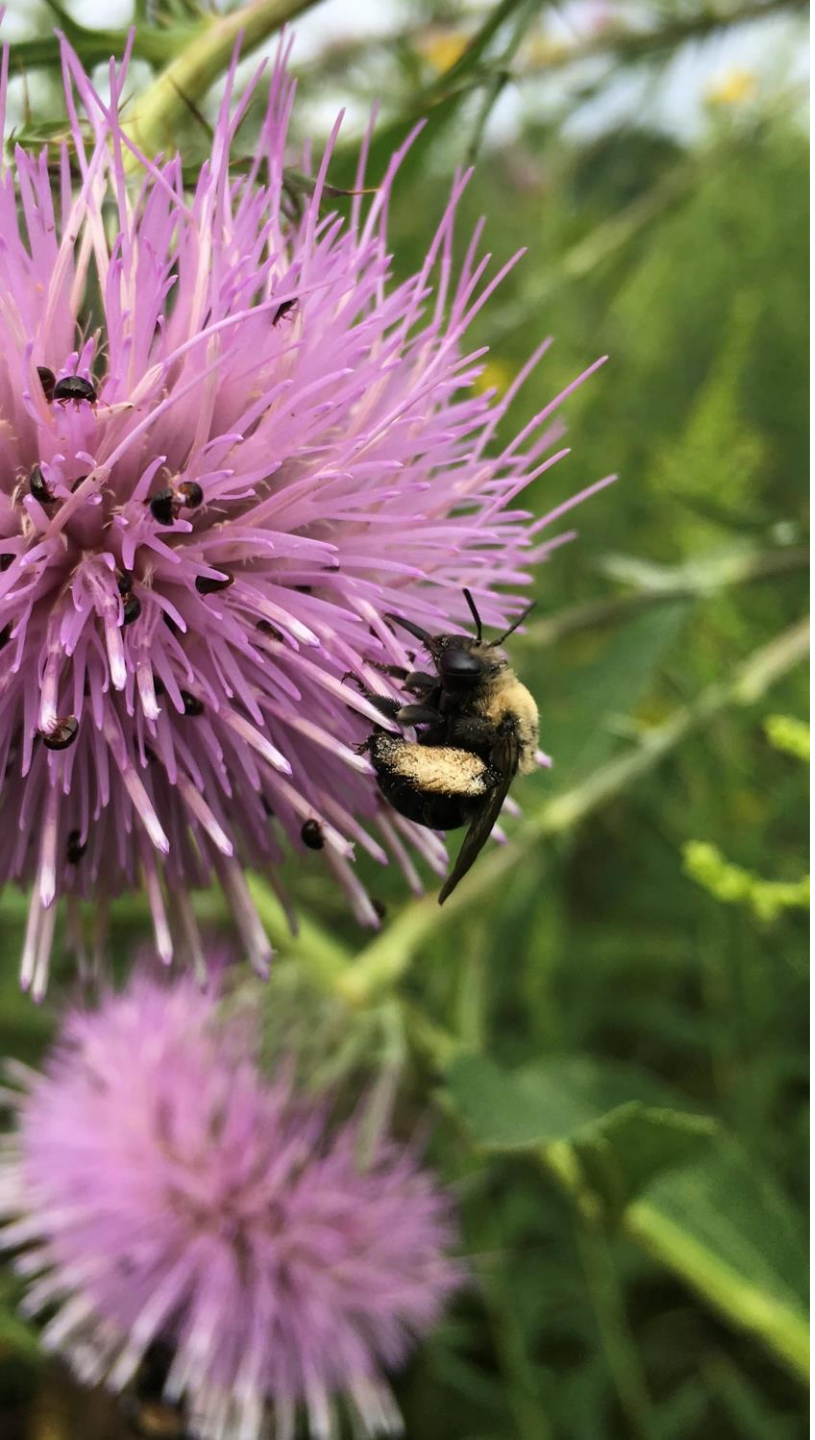
Approximately 7.0 mm in length

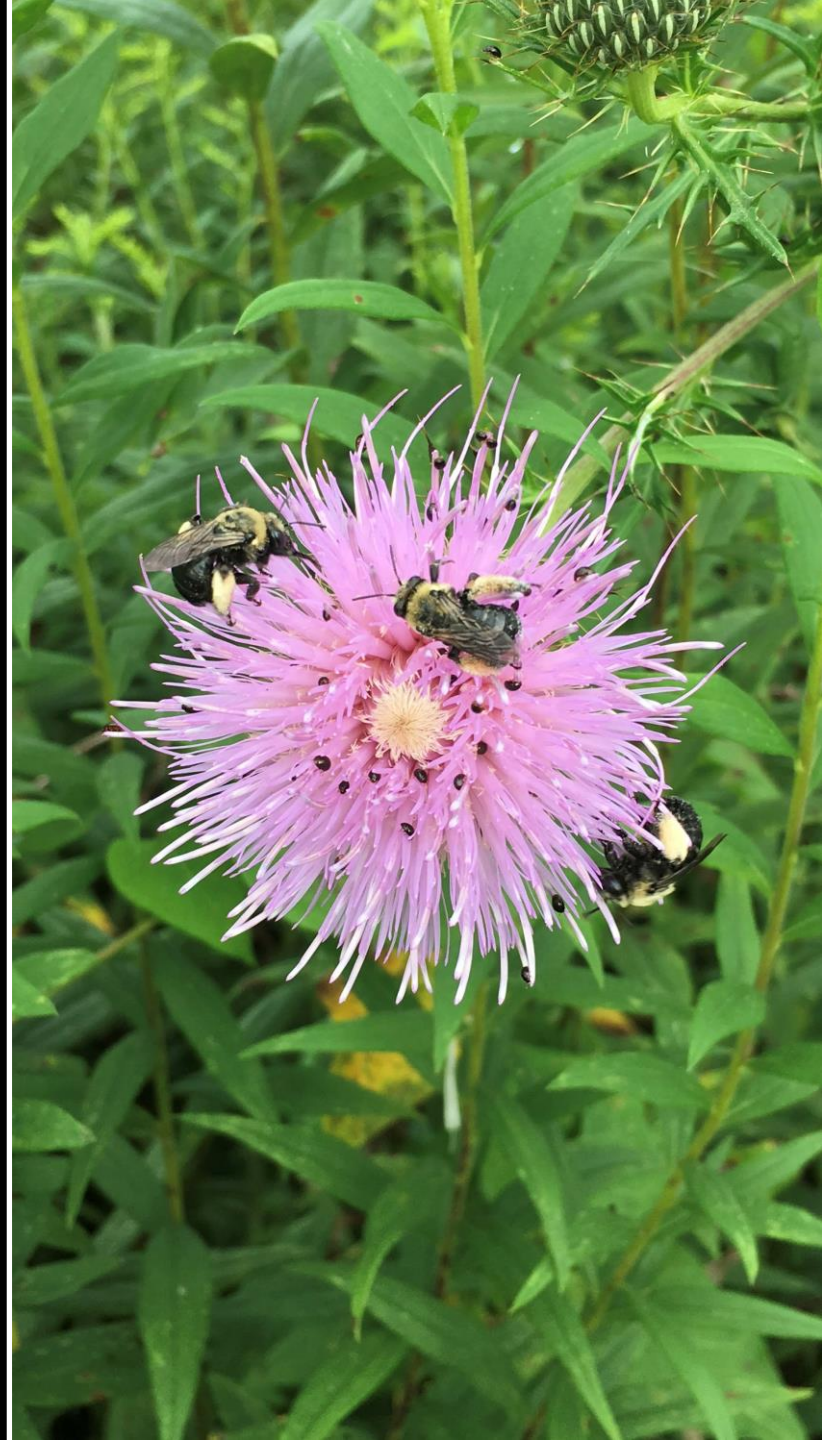
Melissodes desponsus ♂



Approximately 12.5 mm in length

Oligolectic - Specializes on pollen of *Cirsium*





Eucera ♂

Approximately 9.0 mm in length

Peponapis pruinosa ♀

Approximately 10.5 mm in length

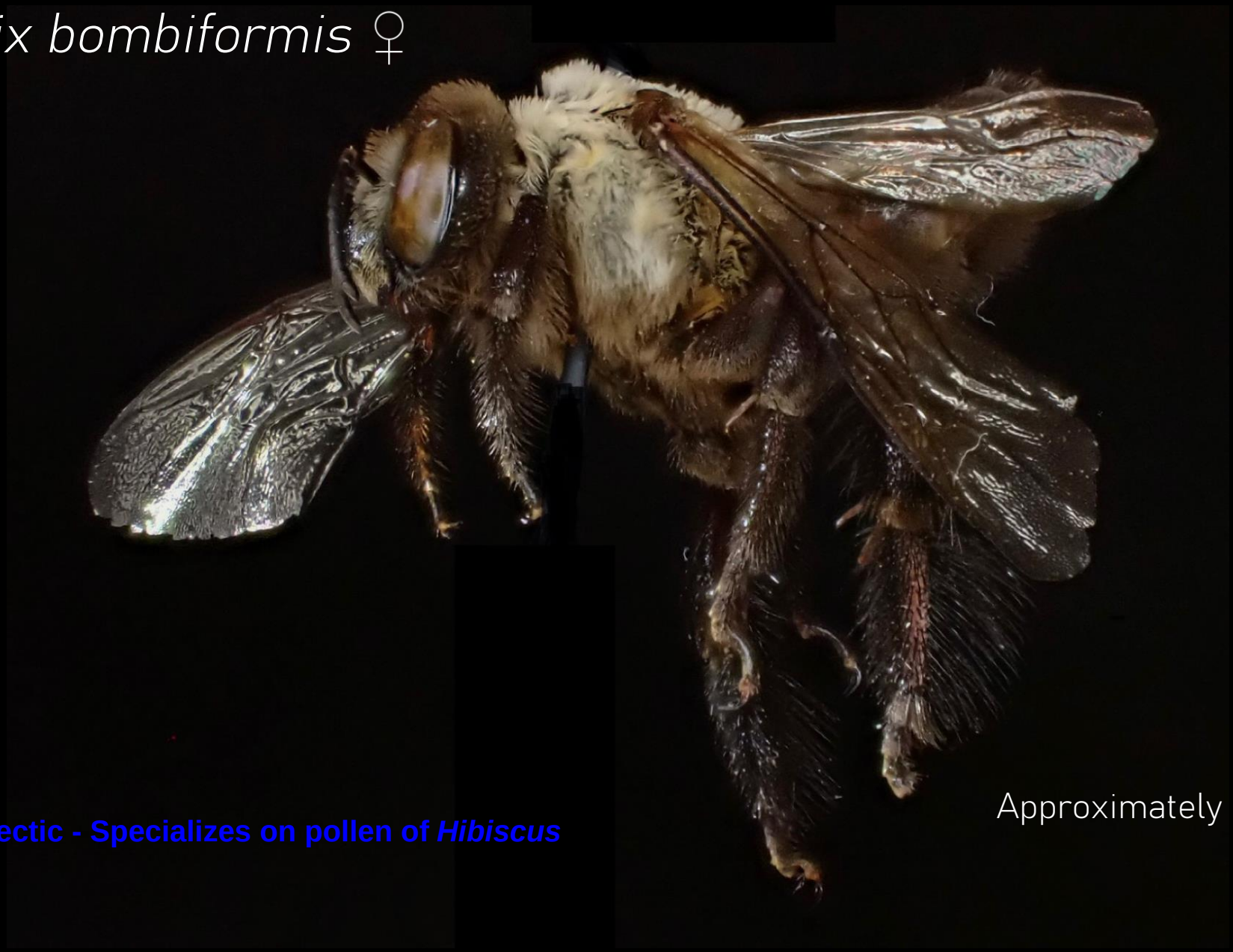
Oligolectic - Specializes on pollen of squash and their relatives

Svastra obliqua ♀

Approximately 14.0 mm in length

Oligolectic - Specializes on pollen of Asteraceae, particularly, *Helianthus*

Ptilothrix bombiformis ♀



Approximately 14.0 mm in length

Oligolectic - Specializes on pollen of *Hibiscus*



Nomada ♀

Approximately 7.0 mm in length

Cleptoparasitic/cuckoo bee - Hosts include *Andrena*

Triepeolus ♀

Approximately 12.5 mm in length

Cleptoparasitic/cuckoo bee - Hosts include *Melissodes*

Holcopasites calliopsidis ♀

Approximately 7.5 mm in length

Cleptoparasitic/cuckoo bee - Hosts include *Calliopsis andreniformes*

Common nonnative bees

European honey bee (*Apis mellifera*) ♀

Common nonnative bees

Horn-faced bee *(Osmia cornifrons)* ♀

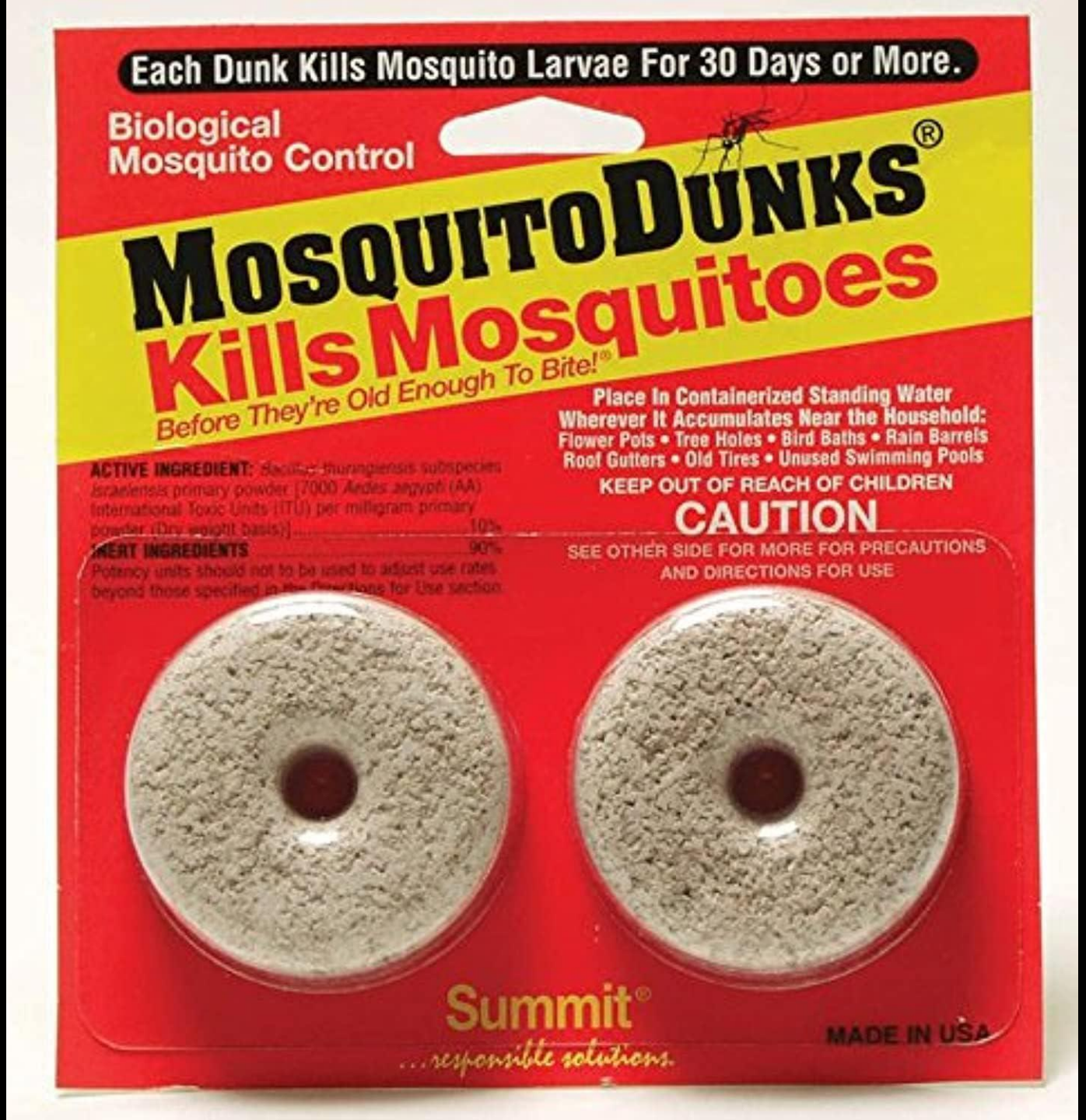
Common nonnative bees

European wool carder bee (*Anthidium manicatum*) ♀

Helping native bees

- Plant native vegetation that blooms from spring to fall
- Remove nonnative vegetation
- Avoid insecticides
  - Neonic – common
  - Lawn – pyrethrins
- Provide nesting habitat
  - Bare ground
  - Dead stems
  - Large dead wood
- Take your role as a land steward seriously

*AVOID hiring companies that treat lawns for mosquitoes.
1) It is ineffective, and
2) Those insecticides kill bees and other insects, not just mosquitoes.



*Instead, remove/reduce standing water and use mosquito dunks to attract and kill larva. These can be purchased at most hardware/garden stores.

Helping native bees

- Support research efforts to better understand bee communities
  - Where are species distributed?
  - Are they genetically diverse?
  - What types of conservation actions can improve health?
- Citizen science
  - Bumble Bee Watch
  - iNaturalist – *Loving Life in Loveland*
- Engage all ages, **especially youth**, in projects that promote health of bumble bees and other biodiversity
  - We must encourage children to connect with nature; its only when we know something that we can begin to love and care for it
- Join & support local organizations promoting the conservation actions listed above

Bee Educational Resources

- Common Native Bees of Eastern United States
  - 2022, Holm, H.
- Common Bees of Eastern North America (book)
  - 2021, Messinger Carril, O. & J.S. Wilson
- Common Bees of Eastern North America (pamphlet)
  - 2019, Messinger Carril, O. & J.S. Wilson
- The Solitary Bees Biology, Evolution, Conservation
  - 2019, Danforth, B., R.L. Minckley, & J.L. Neff
- Bees: An Identification and Native Plant Forage Guide
  - 2018, Holm, H.
- The Bees in Your Backyard
  - 2016, Wilson, J.S. & O. Messinger Carril

Any questions?

Email Doug at:

doug@loveourland.org

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