



# POLLINATORS: The Wings of Life

POLLINATOR STEWARD  
TRAINING  
2024



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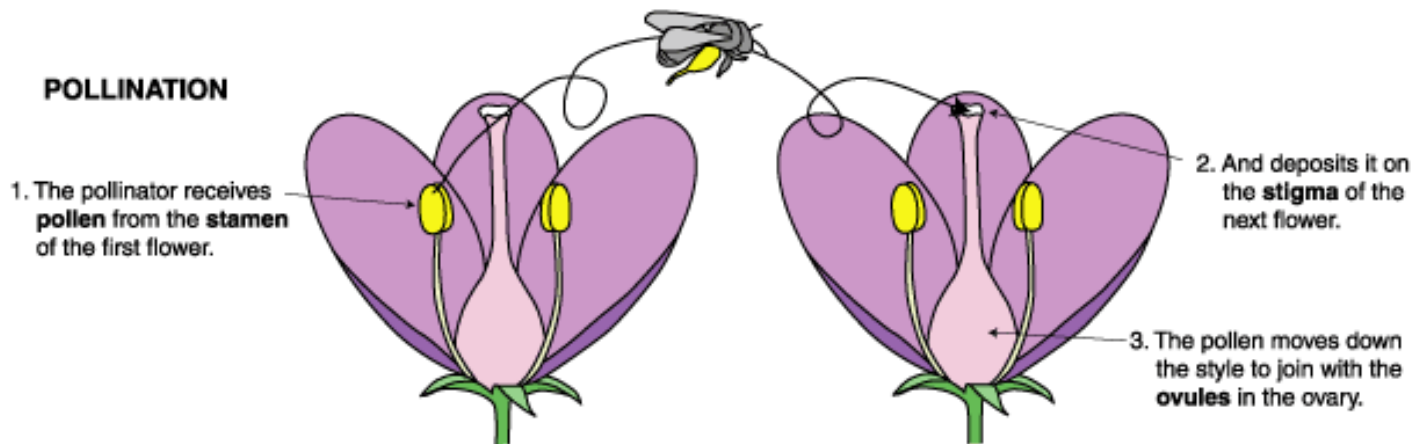
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# Pollinator Foundations (~50min)

- Pollination and importance
- Who are the pollinators?
- Bees– why so special?
- Issues pollinators are facing and status (Anthony)
- How bees live (and what they need)
- How to help



## POLLINATION



How does pollination happen? Self, Wind, Animal

# Flowers need pollination

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# Importance of Animal Pollination

**90% World's flowering plants need  
animal pollinators**

**Seeds and berries, plant material  
needed by wild animals**

**87 of the top 128 Global food crops**

**1/3 of the food we eat**

**Important nutrition: fruits,  
vegetables, seeds, nuts, oils**

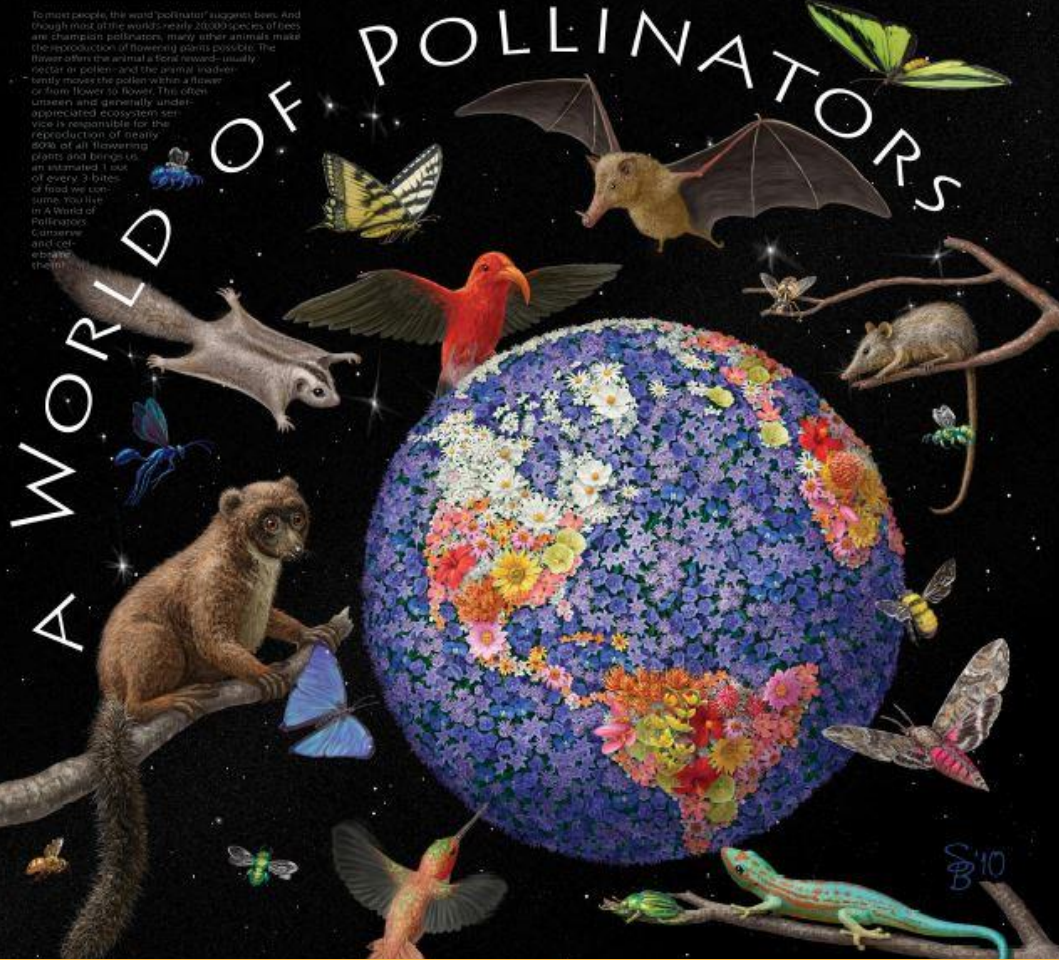




Ecosystem Services

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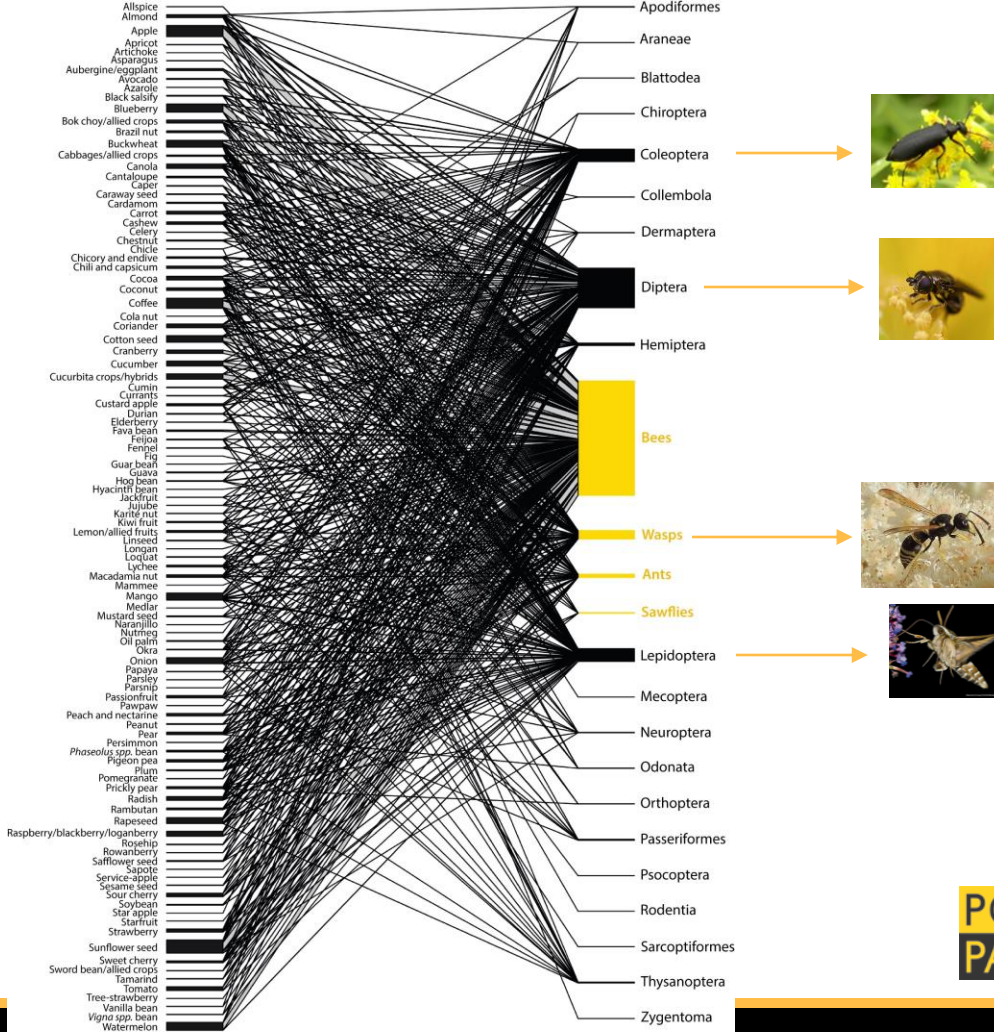


To most people, the word "pollinator" suggests bees. And though many of the world's nearly 20,000 species of bees are champion pollinators, many other animals make the reproduction of flowering plants possible. The flower offers the animal a food reward—usually nectar or pollen—and the animal inadvertently moves the pollen within a flower or from flower to flower. This often unseen and generally underappreciated ecosystem service is responsible for the reproduction of nearly 80% of all flowering plants and brings us an estimated 1 food of every 3 bites of food we consume. You live in A World of Pollinators. Consume and celebrate them.

# Who are the Pollinators?

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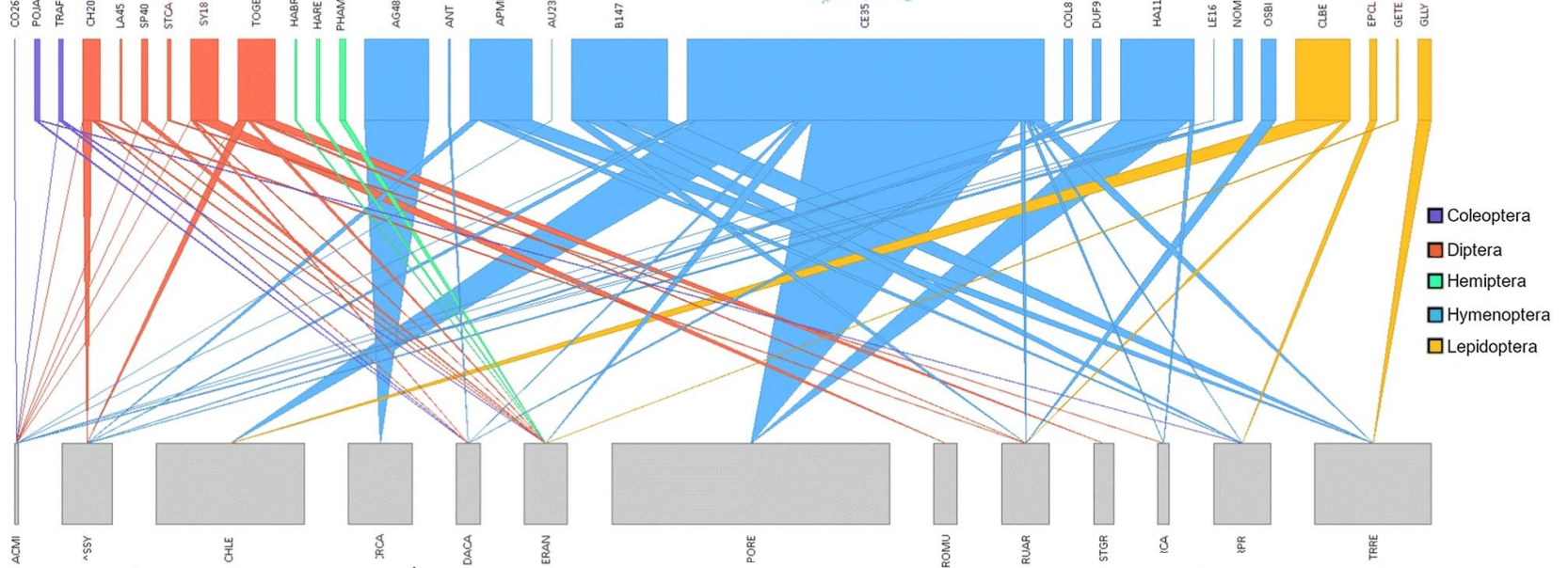
Rader et al. 2020.  
 Non-Bee Insects as  
 Visitors and  
 Pollinators of Crops:  
 Biology, Ecology, and  
 Management. Annual  
 Review of  
 Entomology



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Site 2



- Coleoptera
- Diptera
- Hemiptera
- Hymenoptera
- Lepidoptera







Honey bees important for agriculture

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# Join the Conversation about Native Bees



## What's the buzz?

North America has over 4,400 described species of native bees\* that pollinate wildflowers and crops. From the tiny *Pardosa minima* to the substantial carpenter bee (*Xylocopa varipuncta*), these local pollinators are hard at work in the floral landscapes of gardens, farms, forests, grasslands and urban and wild lands. Unfortunately, several species of native bees are showing disturbing signs of decline. Learn more about these colorful pollinators and how you can support them at [www.pollinator.org](http://www.pollinator.org)

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beranibot

# Over 4,000 Native Bee Species in North America!

Art and Design: David Bevan







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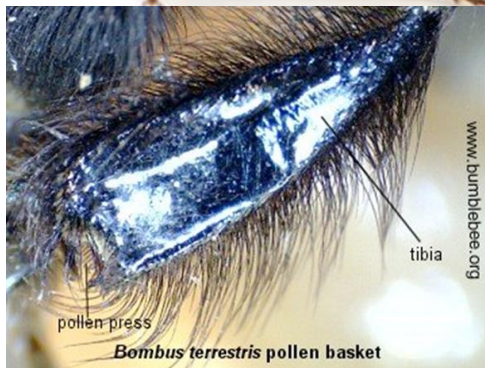
<https://www.walterreeves.com/gardening-q-and-a/magnolia-beetles-in-flower/>





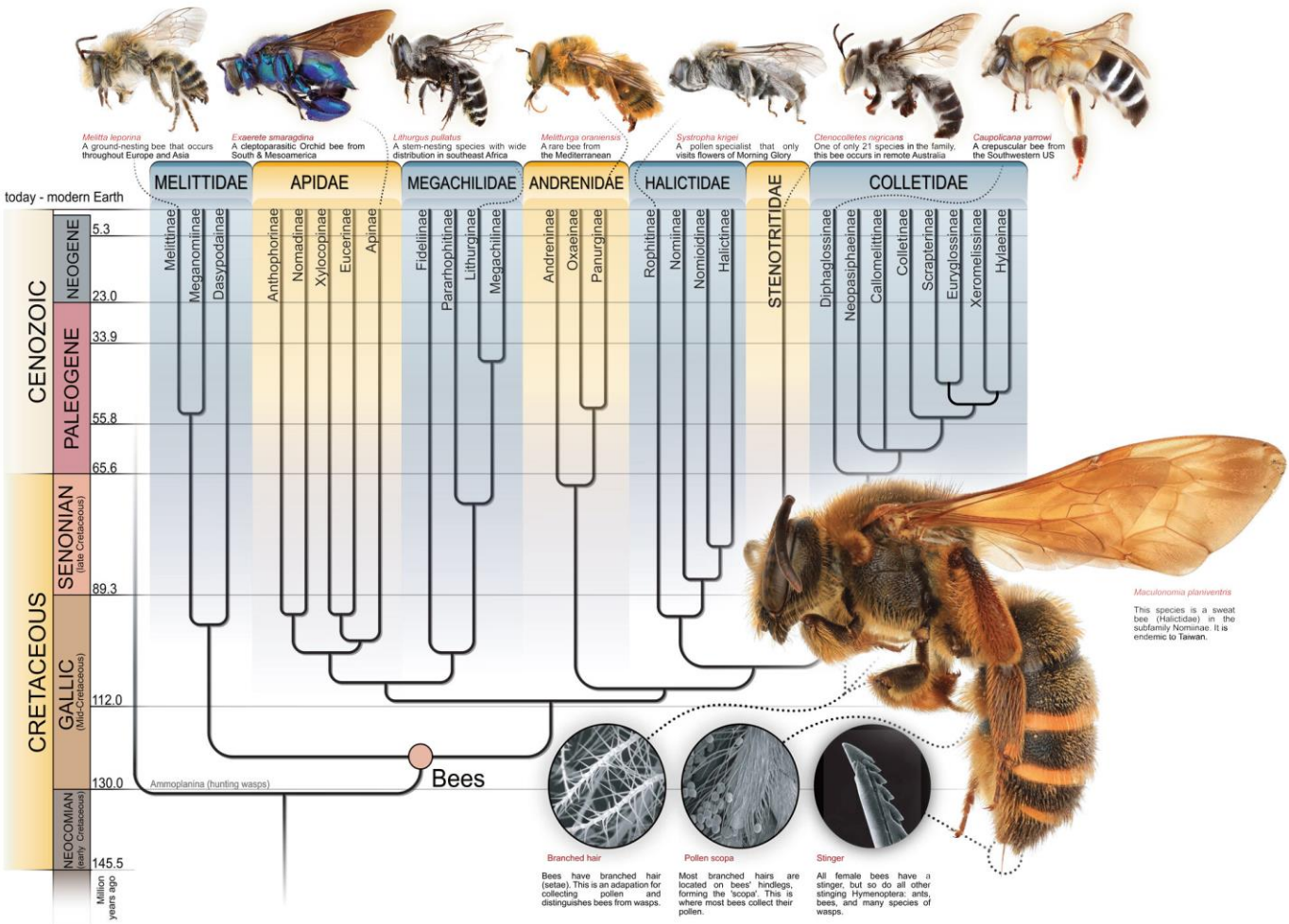
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Pollen carrying hairs  
Only bees have these  
grocery bags!



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Rabeling et al. 2013 Current Biology



Stephen Buchmann

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# Honey Bees

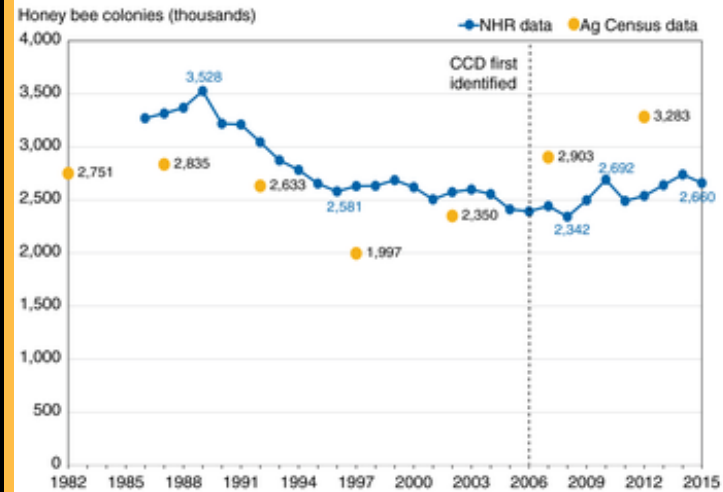
**Managed by humans**

**Not native to North America**

**Important for agriculture**

# SHORT NA HISTORY OF HONEY BEES

- Brought to eastern US from Europe 1622 (400 yrs ago)
- Mainly honey production
- Out west mid-1800s
- Peak 5.9 million 1947
- Declines 1950-1990s: honey demand and prices fell, importation, less exports
- Last 15yrs: Increasing disease and other issues: high yearly loss
- About 2.5 million colonies US since 1990's- stable
- Increasing hobby numbers (not reflected in NASS)
- Reduction forage private lands urbanization
- Great Plains private farmland to wheat, corn, soybeans (much biofuel) less CRP
- 1,600 commercial beekeepers need 158 million acres summer forage
- Increasing requests for pasturing on public lands



Notes: CCD = Colony Collapse Disorder. NHR = National Honey Report.





# Honey Bees

Managed by humans

Not native to North America

Important for agriculture

Not a conservation concern *per se*

Not in decline

**HARD TO KEEP HEALTHY**



# Native Bees

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**4000+ species in North America!**

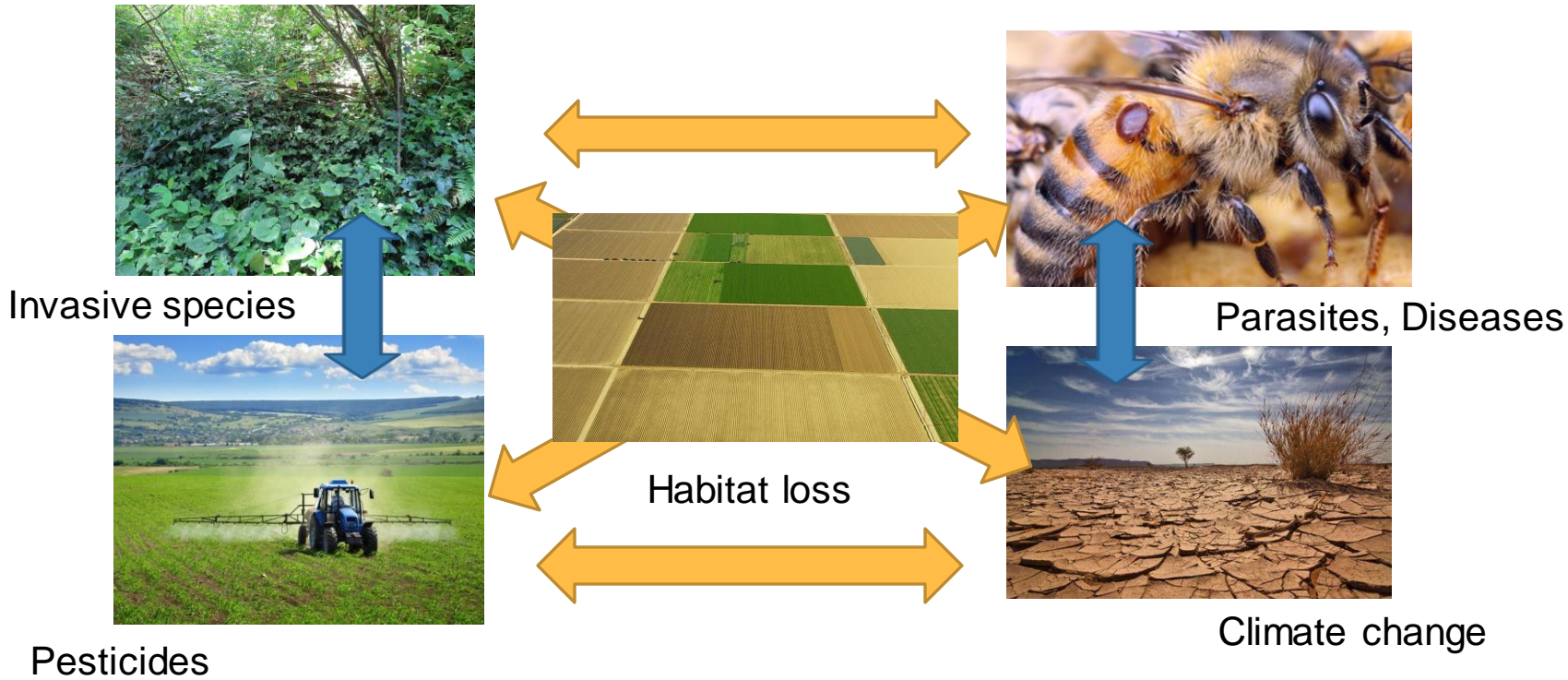
**Essential for agriculture**

**Essential for native ecosystems**

**Great crop pollinators**

**MANY IN DECLINE**















So, what can you do to help?

1. Habitat!
2. Outreach and education
3. Support conservation

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# Honey bees are unique!

## Honey Bees

Perennial, large colonies

Live over winter

Generalists

Barbed stinger

Fly long distances

## North American Native Bees

Most solitary, ground nesters

Short lived/short flying season

Specialize

Do not store honey

Forage close to nest

Do not defend colonies



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### Solitary Bee Life Cycle



1. Egg



2. Larva



3. Pupa



6. Nest Building:  
and Storing and Egg Laying



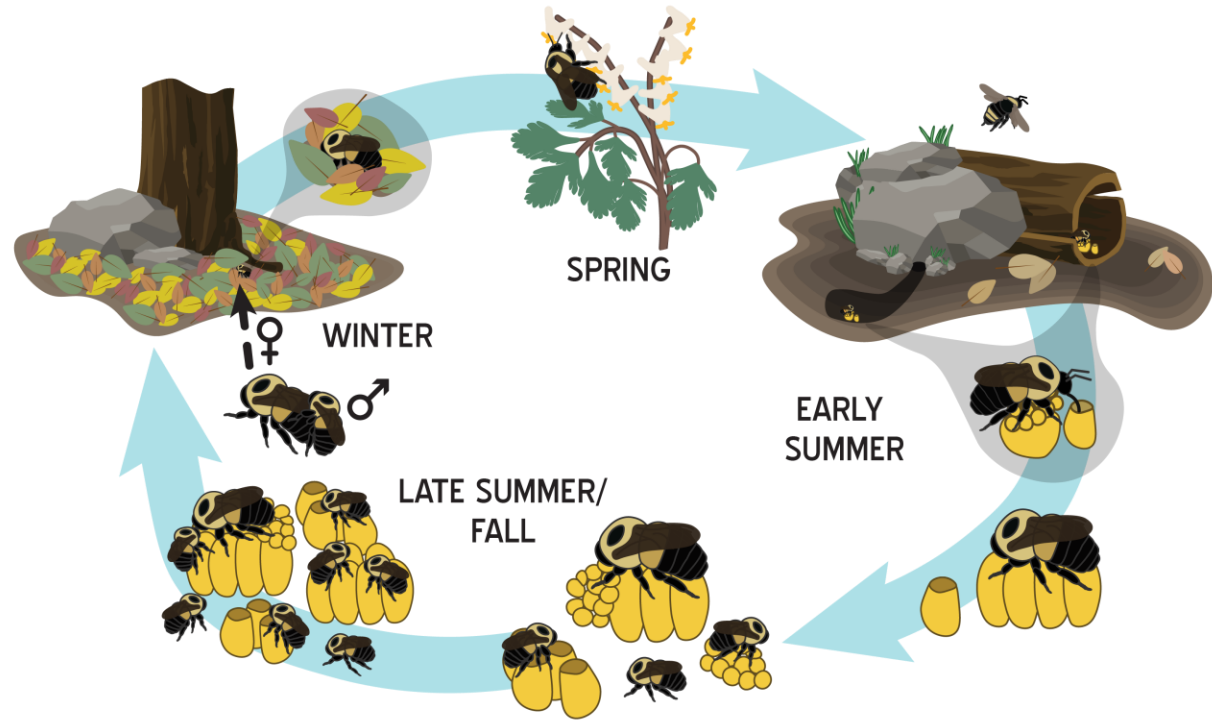
5. Foraging:  
Collecting Pollen and Nectar  
Pollination!



4. Adult

Illustrations: Steve Buchana  
Modified by: Victoria Wojcik

# Bumble Bee lifecycle



<https://wisconsinbumblebees.entomology.wisc.edu/about-bumble-bees/life-cycle-and-development/>



# Habitat Elements

## 1. Nesting/overwinter habitat:

ground

scrubby/woody

cavity

## 2. Floral resources:

Native, non-invasive

Diverse

Continuous

Host

## 3. Pesticides:

No pesticides harmful to bees

Limit others









# No Fear of Stings!

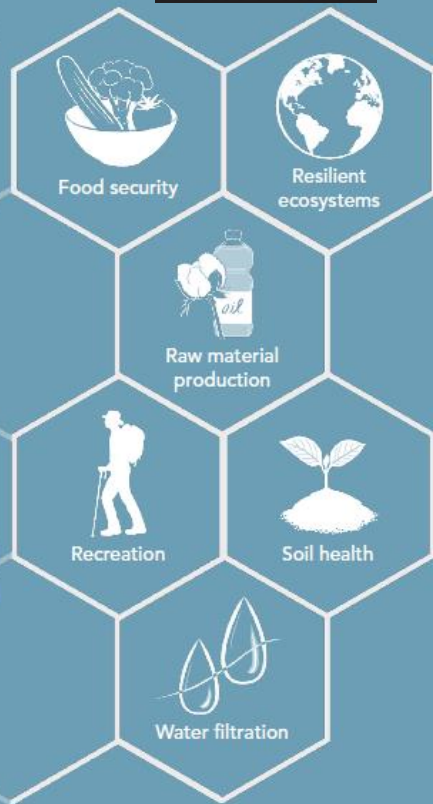
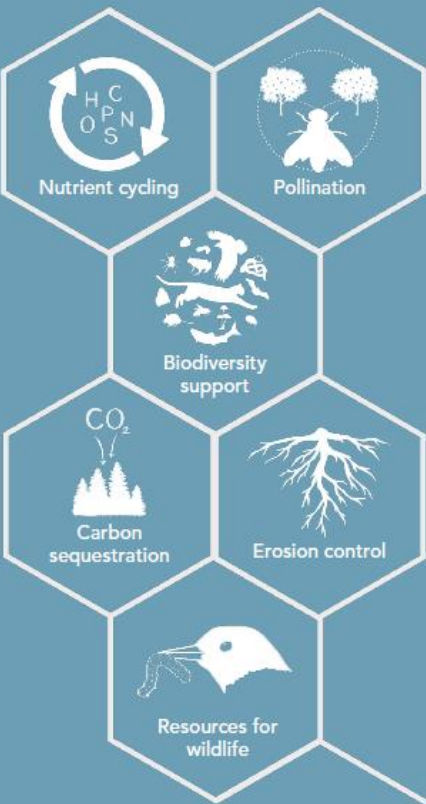
- Only half of bees (maybe) can sting
- So many others that can't
- Reduced stingers
- Solitary (all females are 'queens')
- Not defending colonies
- Vegetarians
- Only after flowers





# OUR FUTURE FLIES WITH POLLINATORS

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Pollinators provide many ecosystem services that support the health of plants, people, and the planet. Get involved at [www.pollinator.org](http://www.pollinator.org).

Meet these plants and pollinators, and learn how you can help them at <https://www.pollinator.org/poster-2020>.

Art by **Fiorella Ikeue**

Los polinizadores proveen de los servicios ecosistémicos que mantienen la salud de las plantas, la gente y el planeta. Involúcrate a [www.pollinator.org](http://www.pollinator.org).

Les pollinisateurs assurent plusieurs services écosystémiques qui contribuent à la santé des plantes, des personnes et de la planète. Impliquez-vous en visitant [www.pollinator.org](http://www.pollinator.org).





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