



The Secret Life of Native Bees:

Misconceptions,
Natural History,
and
Making Choices
as a Single Bee

Olivia Carril





A Guide to North America's Bees

The
BEEES
In Your Backyard

Joseph S. Wilson & Olivia Messinger Carril

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SAVE THE BEEES

SAVE *Humanity*

Colony collapse disorder (CCD) is a phenomenon in which worker bees from a bee colony abruptly disappear. The list of crops that simply won't grow without honey bees is a long one. Without bees to pollinate many of our favorite fruits and vegetables, the United States could lose \$15 billion worth of crops.



Learn More @ <http://www.nrdc.com/bees>



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Photo: Fir0002/Flagstaffotos

Mighty
Spiders!



INTRODUCTION: NATURE'S SECRET WEAPON

MEET THE BEES

After a long, cool, mostly rainy spring, the bees at last appeared in our garden. One sunny morning, I watched as a bumblebee landed on a tiny purple flower and began to sip the nectar inside the blossom. Its sheer bulk caused the stem to swing down like an unbalanced teeter-totter, but the bee hung on, finishing its sweet drink before flying off, its furry body and legs dusted with yellow pollen.

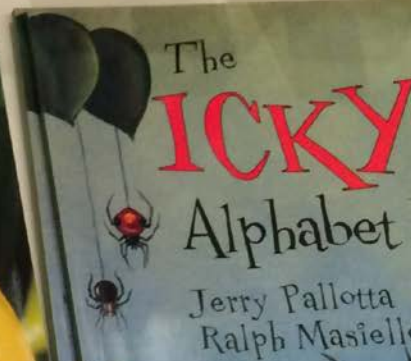
Scientists have identified more than 20,000 bee species in the world, and close to 4,000 species are found in North America. (Some, like the honeybee, aren't native to this continent but were imported by European settlers.) Most of us are familiar with the

highly social honeybees and bumblebees that live in busy colonies. Yet the majority of bees are, in fact, solitary bees that live on their own or in loose associations with neighbors, burrowing into the ground or into plant stems or old wood to make their nests.

As the bumblebee in our spring garden transferred pollen to the next flower, it was playing its part in pollination, a process that insects and plants have shared for more than 100 million years. By enabling the cross-fertilization that produces the next generation of plants, pollination makes our lives possible too. Let's learn more about bees, whose day jobs in our backyards have such far-reaching consequences for the planet.

WHAT'S THE BUZZ?

All bees belong to a superfamily called Apoidea. Like other flying insects, bees are critical to human life because of the mutually beneficial relationship they share with flowering plants, including many food crops.





**I DIE
YOU DIE.**

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STEM

Learning

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Snack Bee and Flower Jigsaw
Puzzle (100 pcs)



x



What do people know about bees in the US?

Respondents N=1427



Are Bees Important?

What do people know about bees in the US?

Respondents N=1427

99% of people think bees are important



Are Bees Important?

How many bee species are there in the US?

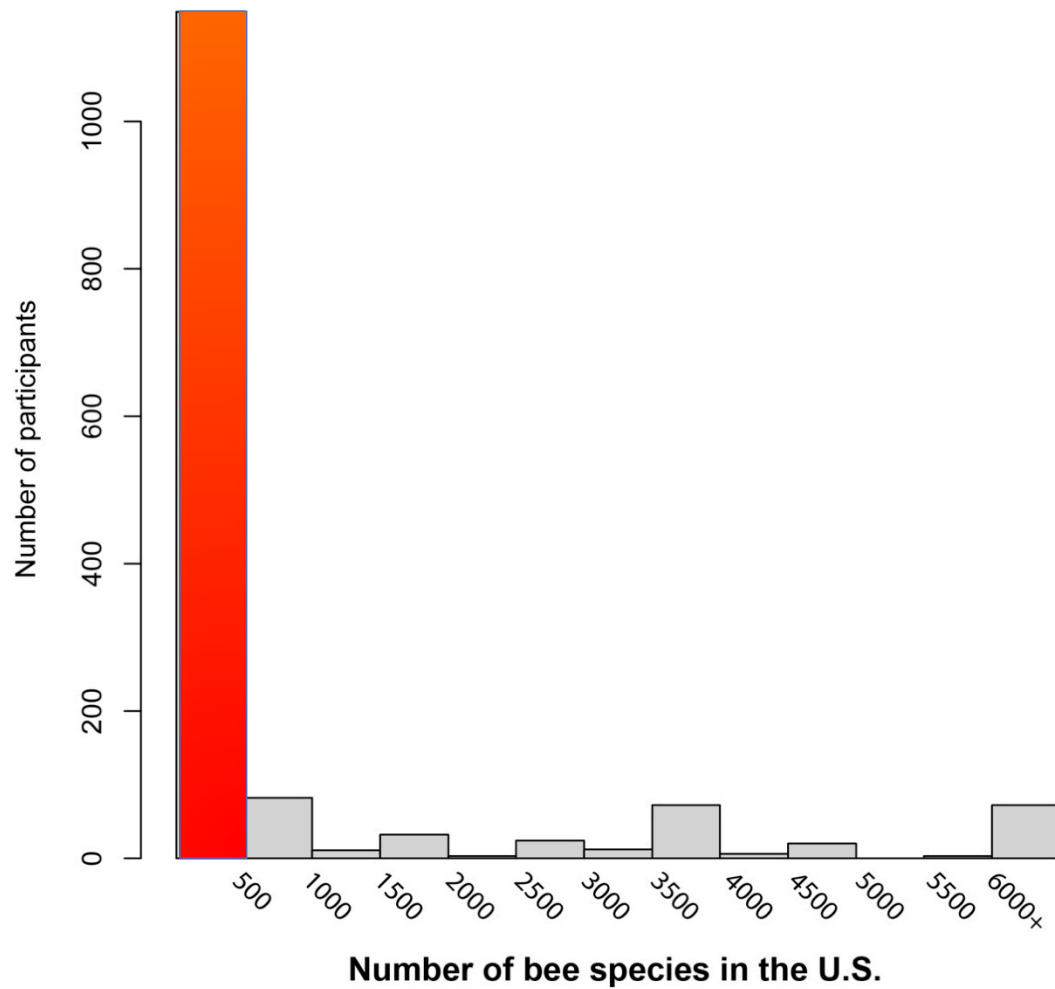


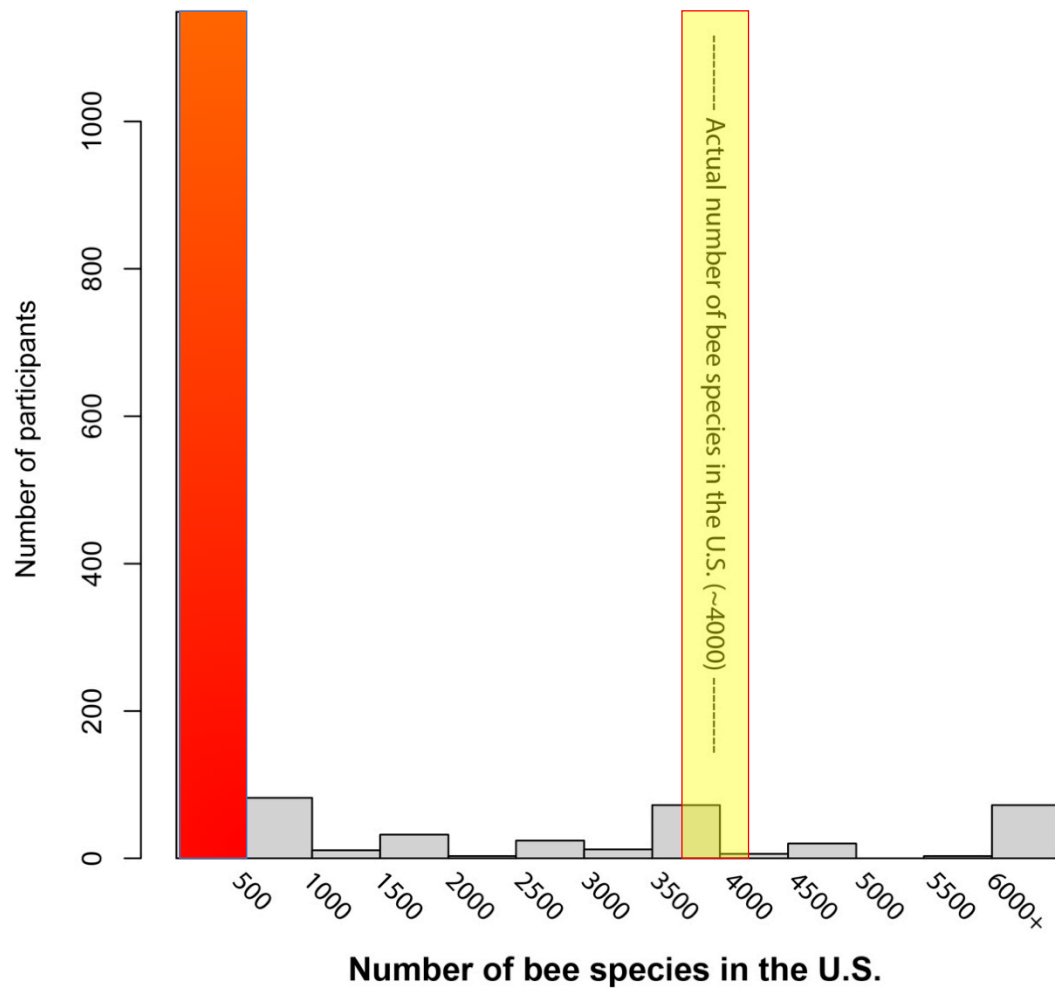
How many bee species are there in the US?



1. 50
2. 100
3. 850
4. 4000
5. 20000







Which insects are bees?



1



2



3



4



5



6



7



8

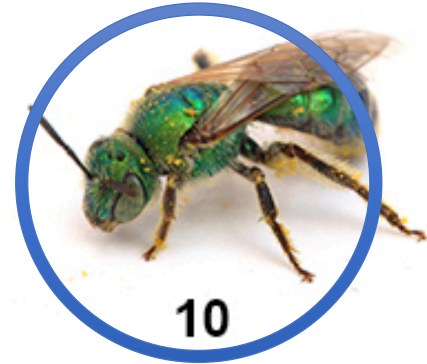
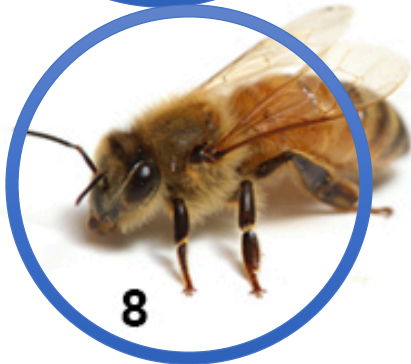
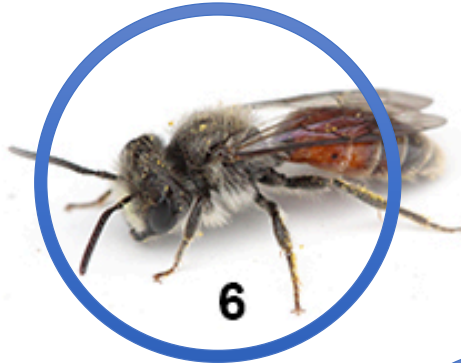


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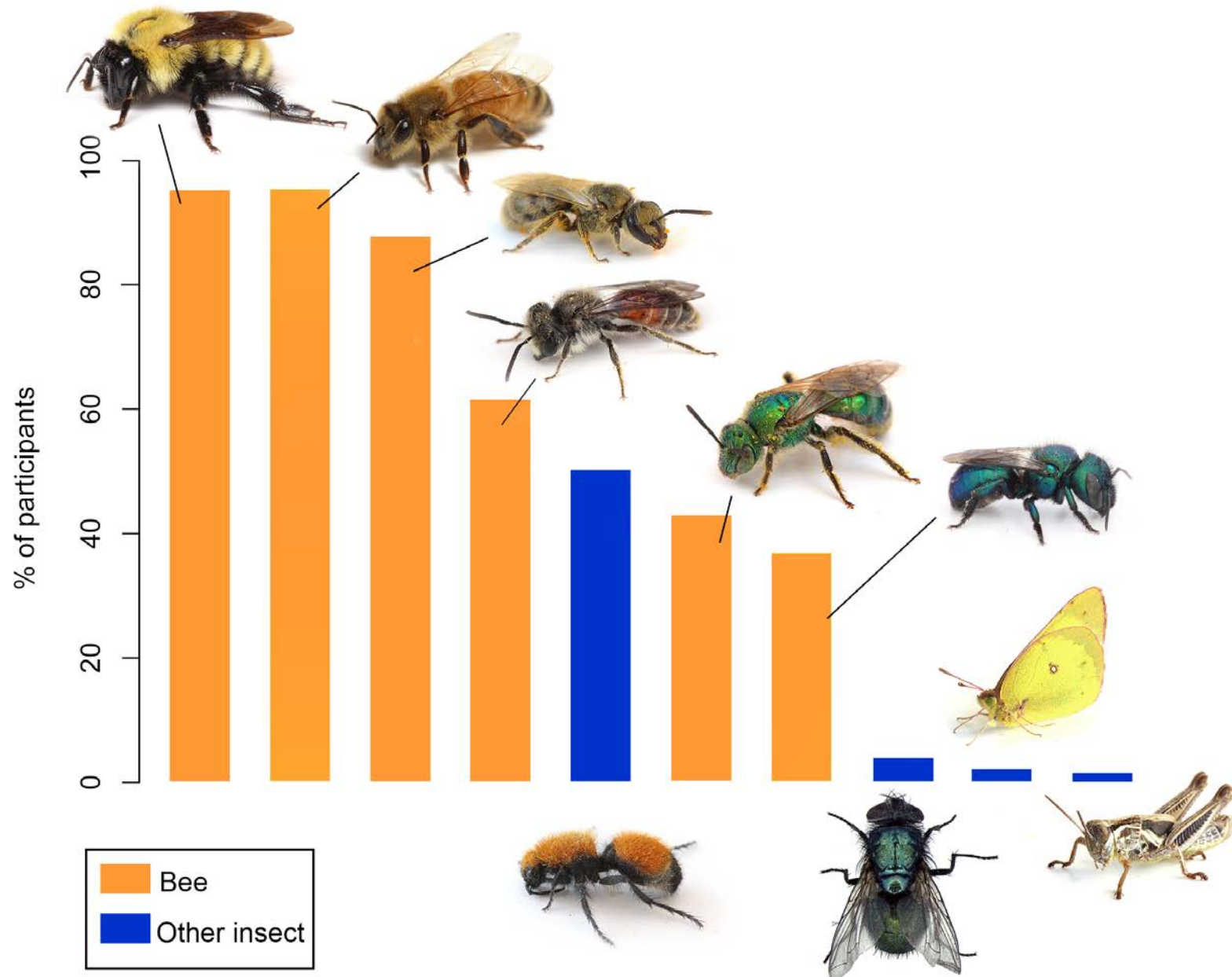


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Which insects are bees?



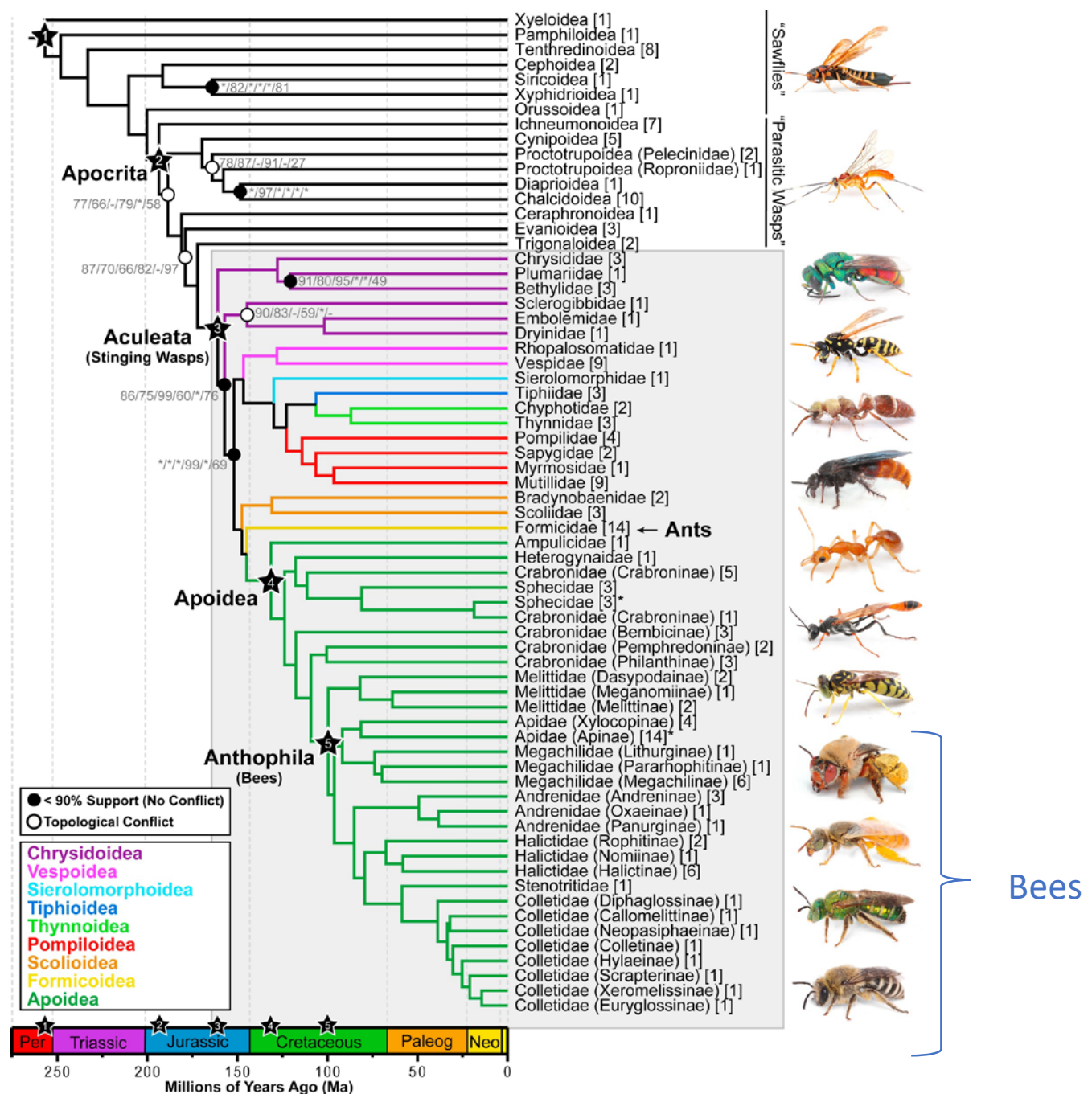
% of people identifying each image as a bee



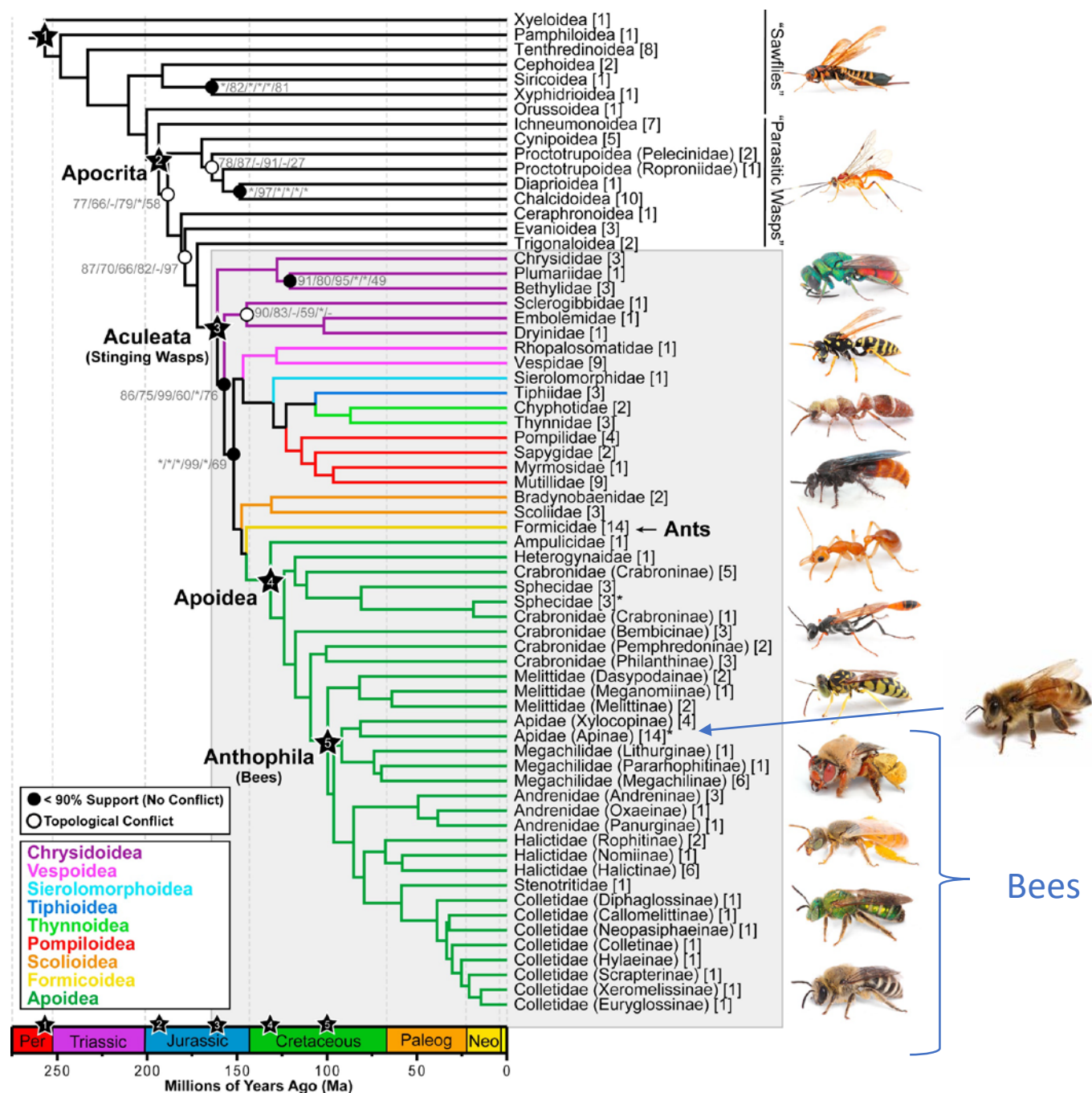
What is a bee?



What is a bee?



What is a bee?





125 mya



Taken by Ken-Ichi-Ueda,
September 16, 2007

125 mya



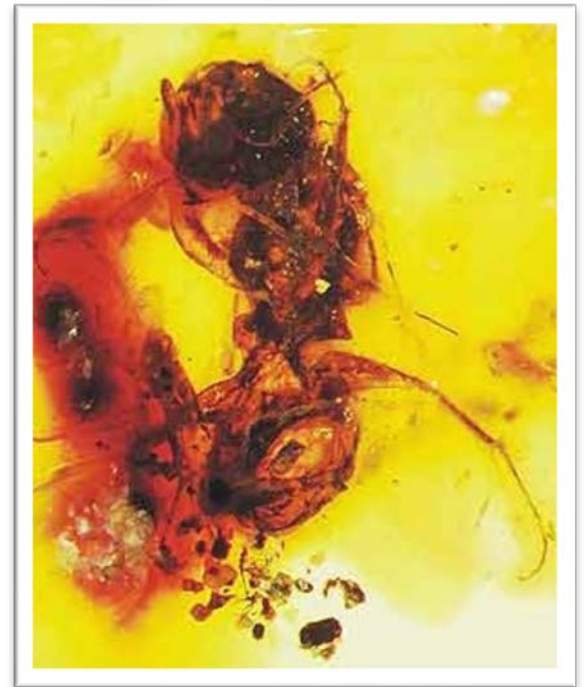
125 mya



125 mya



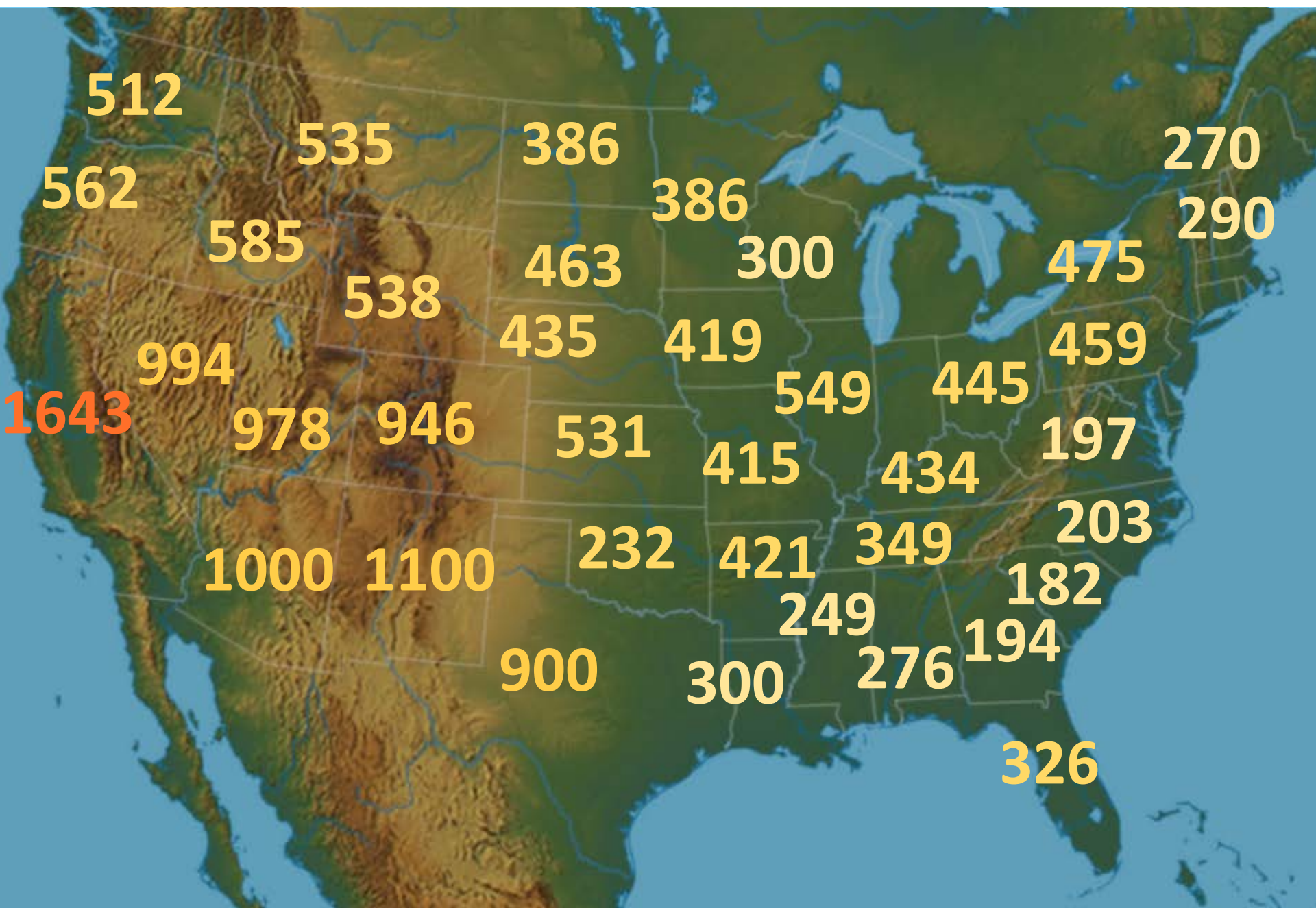
Taken by Ken-Ichi-Ueda,
September 16, 2007



100 mya



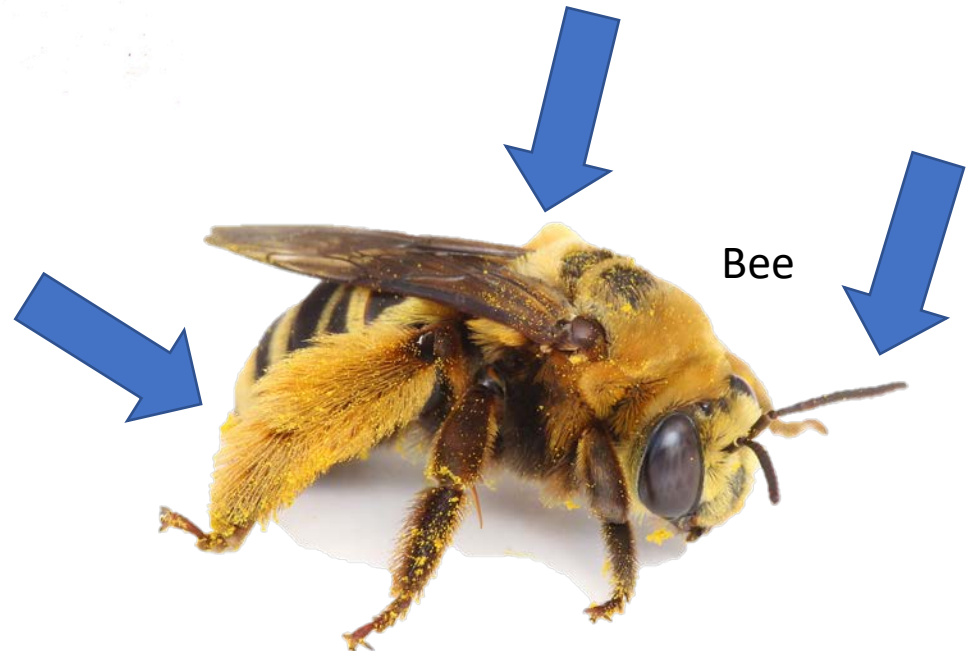
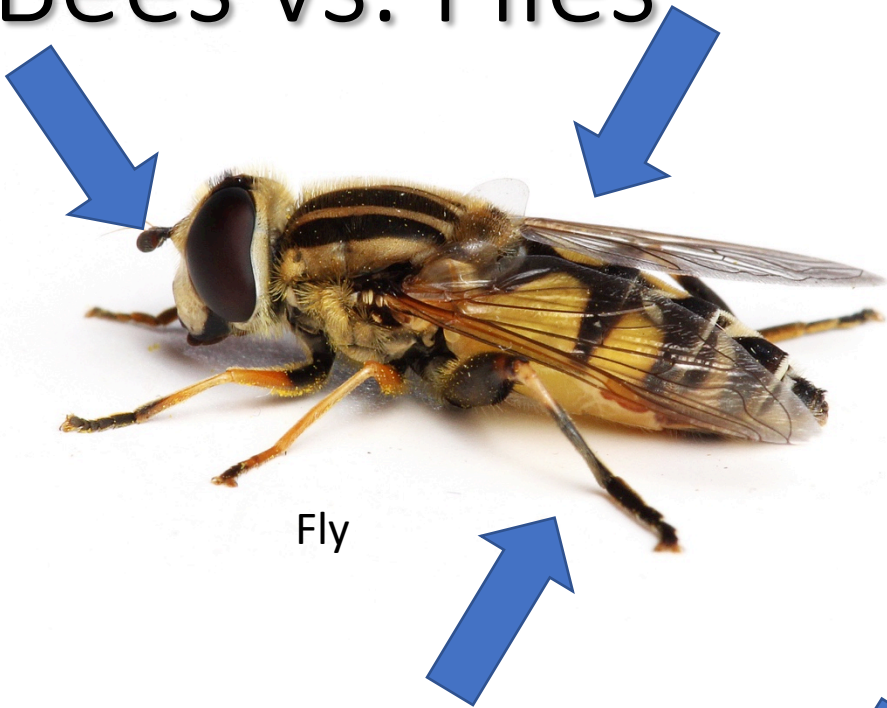
- 
- **30,000 Species on Earth**
 - **~4000 Species in U.S.**
 - **~500 in Ohio**



How To Identify A Bee

Bees vs. Flies

- Look for pollen collecting hairs
- Look for longer antennae
- Look for thicker waist



How To Identify A Bee

Bees vs. Flies

- Look for pollen collecting hairs
- Look for longer antennae
- Look for thicker waist
- Look for the number of wings



Fly



Bee

How To Identify A Bee

Bees vs. Wasps



How To Identify A Bee

Bees vs. Wasps



How To Identify A Bee

Bees vs. Wasps

- Bees have 'split ends'



Wasp



Bee

How To Identify A Bee

Bees vs. Wasps

- Bees have 'split ends'
- Bees don't have silver on face



Wasp

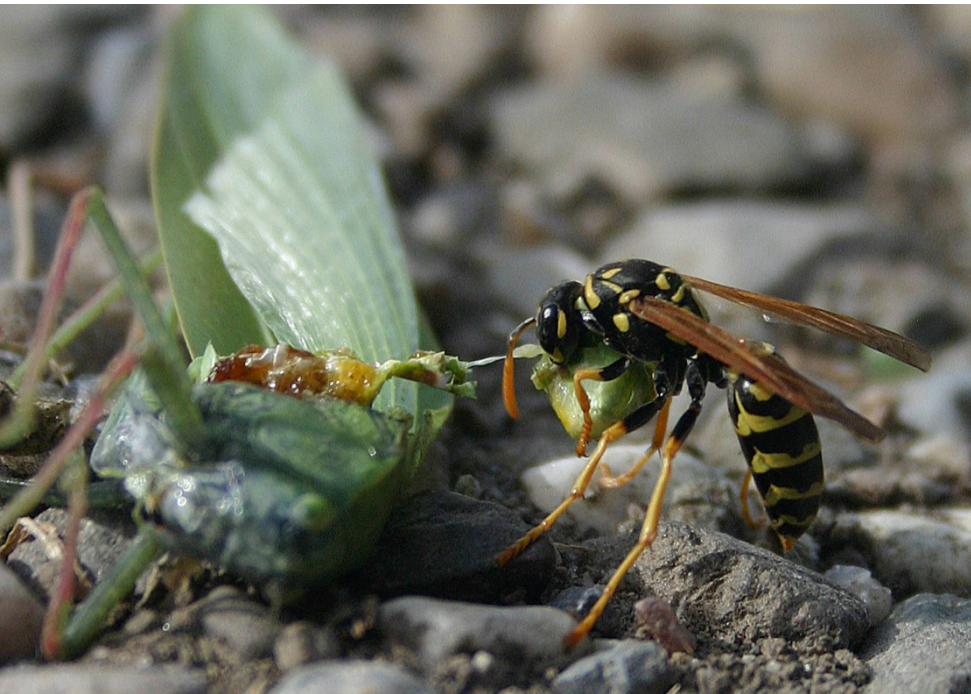
Bee



How To Identify A Bee

Bees vs. Wasps

- Bees have 'split ends'
- Bees don't have silver on face
- Bees eat pollen, wasps eat meat



Wasp

Bee







How is a native bee different from a honey bee?

Common misconceptions



- All bees live in hives
 - Queen & workers
- All bees make honey
- All bees have experienced colony collapse disorder

Most bees are solitary



All the single ladies..

Most bees nest in the ground



Bee nests in the ground...



...can get very deep!









Most bees are very short-lived



Early Spring

Bees emerge,
males first



Spring

Females forage,
build nests



Summer

Adults die,
larvae develop
in nests

Winter

Bees
overwinter as
'almost' adults



Many bees are specialists



Bees specialize on one genus or family of plants,
even when others may be available.
Consistent across geographic range, and
between non-overlapping generations.



Bees

Martinapis luteicornis

Osmia watsoni

Anthophora urbana

Centris cockerelli

Lasioglossum subcaeruleum

Flowers

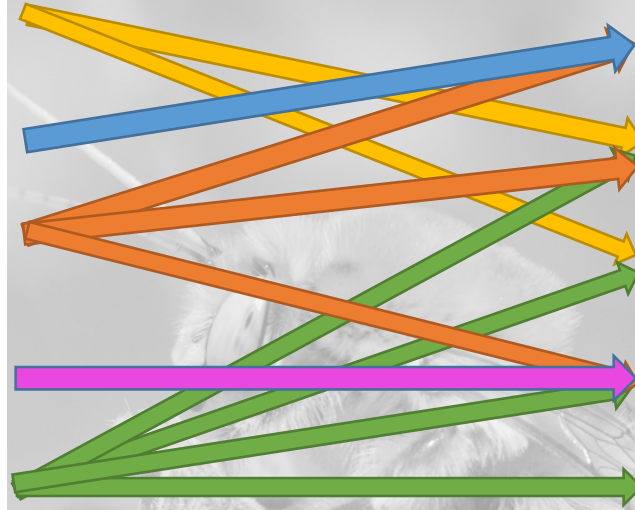
Astragalus missouriensis

Psoralea sp.

Dalea flavescens

Larrea tridentata

Cryptantha cinerea



Bees

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Anthophora urbana

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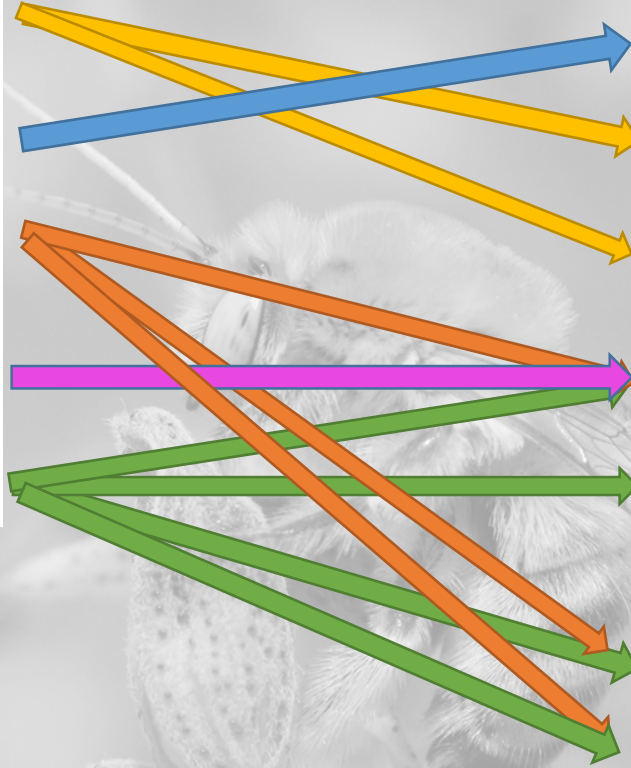
Dalea flavescens

Larrea tridentata

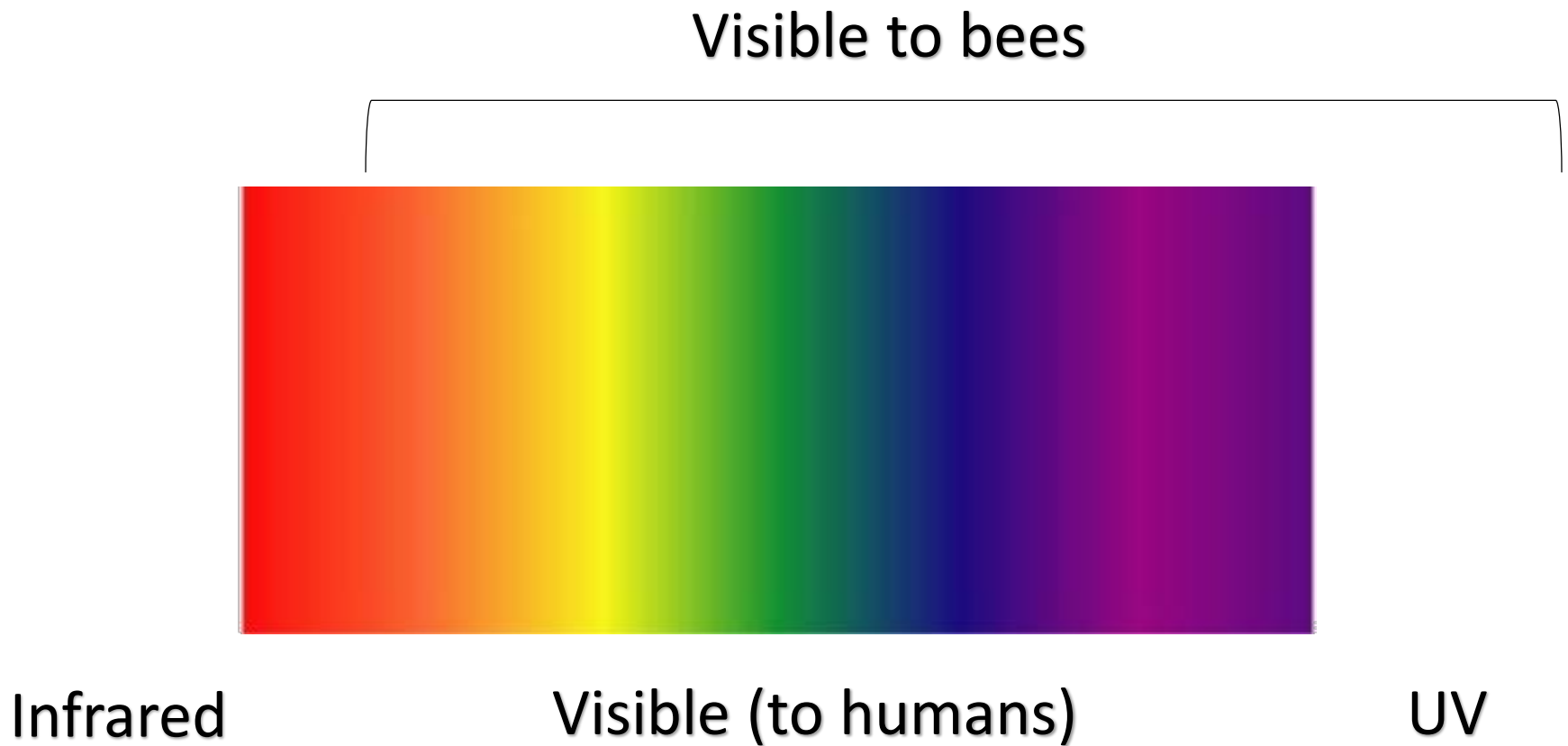
Cryptantha cinerea

Cirsium arvense

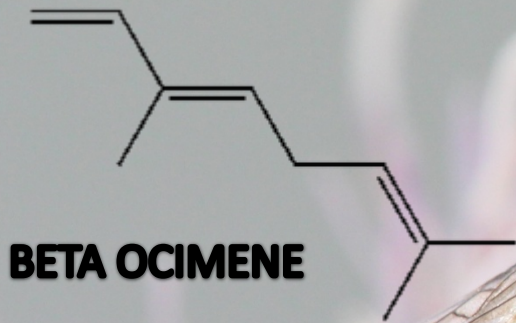
Tamarix ramosissima



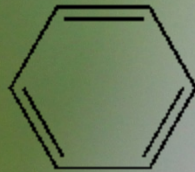
Bees see a slightly different range of colors than humans



Bees can detect a wide array of chemical compounds with their antenna

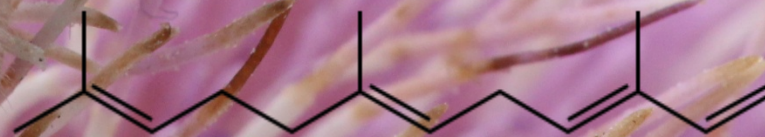


Produced by willow, and elicits a strong response in a willow-specializing bee



BENZALDEHYDE

flies,
butterflies,
honeybees



ALPHA FARNESENE

Produced by Kiwi flowers, which are entirely dependant on bees for pollination



Most bees don't fly very far



- Honey bees fly up to 6 miles distant from their hives.
- Many Perdita fly less than a football field in their entire lives.





Not all bees are good pollinators



**Not all bees are good
pollinators**



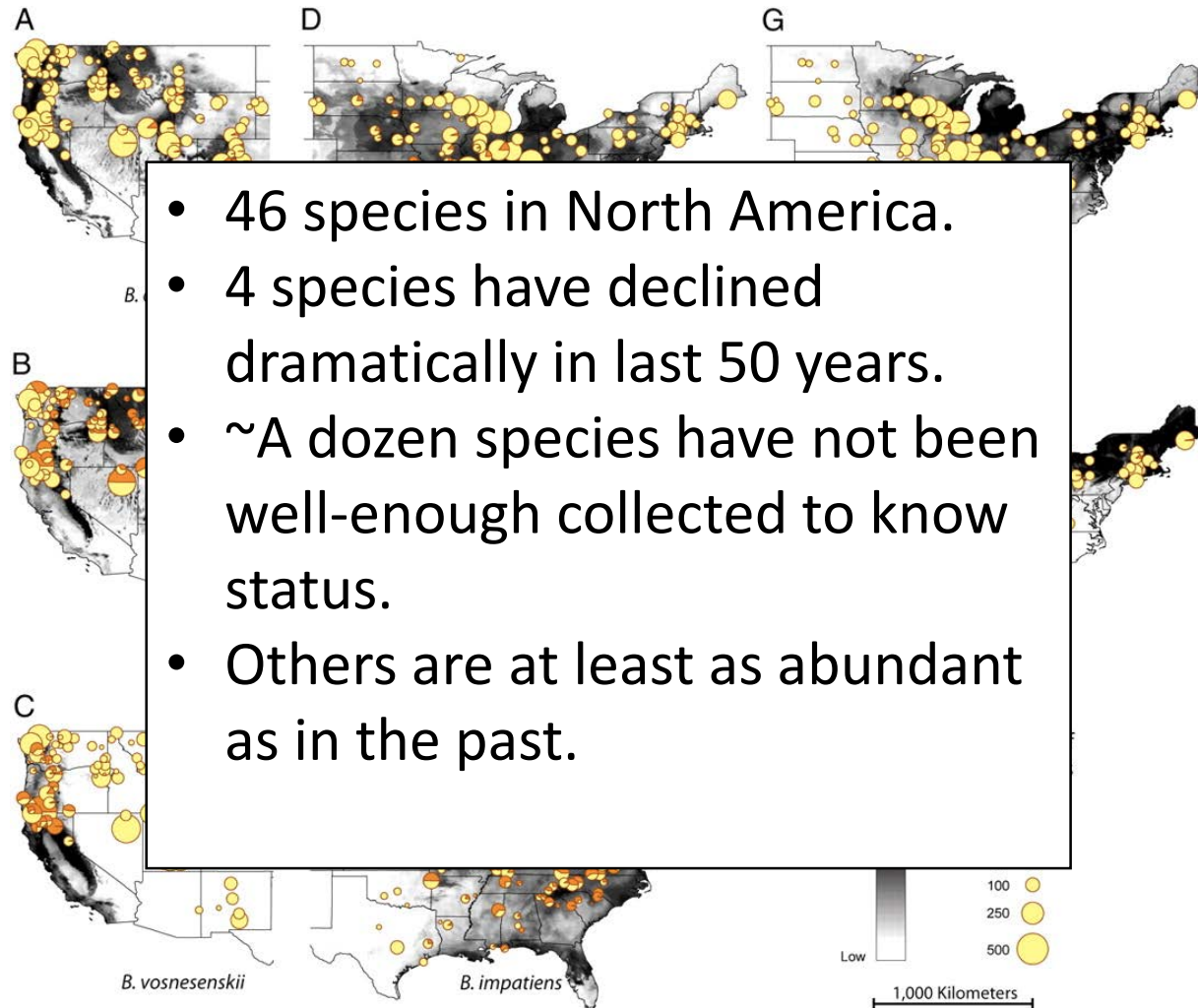
Are bees disappearing?



Are bees disappearing?



Bumble bee declines



Cameron
et al.
2011



Other wild bee declines

- Unknown
- Few community level datasets for comparing past and current populations.
- Bee populations naturally vary substantially year to year.



"You never can tell with bees..."
--Winnie the Pooh

Bee declines

Threats to honey bees (one species)

- Colony Collapse Disorder (CCD)
- Varroa mites
- Pesticides

- A combination of these and other factors

Threats to native bees (4000 species)

- Habitat modification
- Honey bees
- Pesticides
When? Which ones? Amount? Etc.

- A combination of these and other factors

If you want to see native bees in your yard

Provide a home

Undisturbed earth

Limit the weed barrier

Cavities (logs, twigs, bee houses, bamboo, bricks with holes)

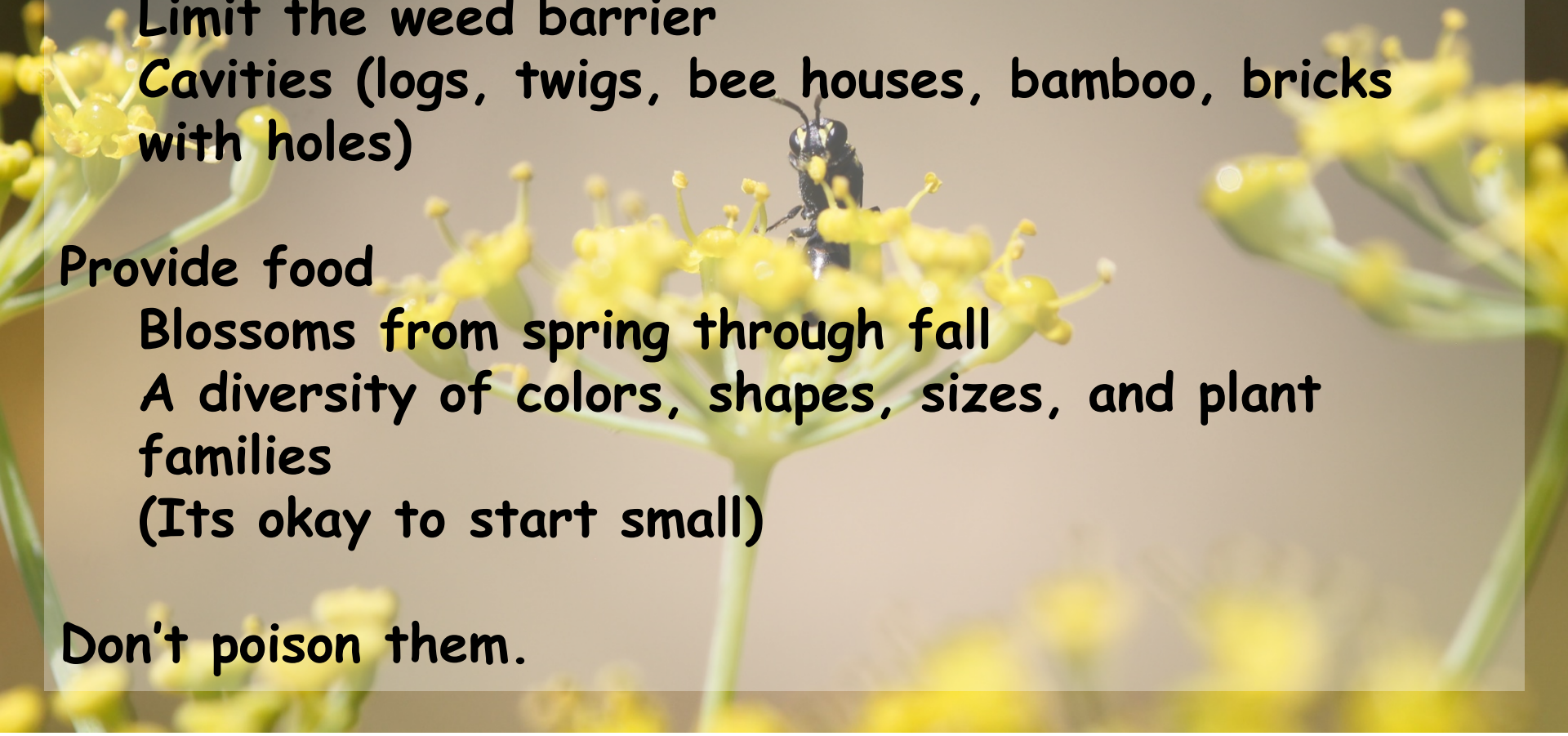
Provide food

Blossoms from spring through fall

A diversity of colors, shapes, sizes, and plant families

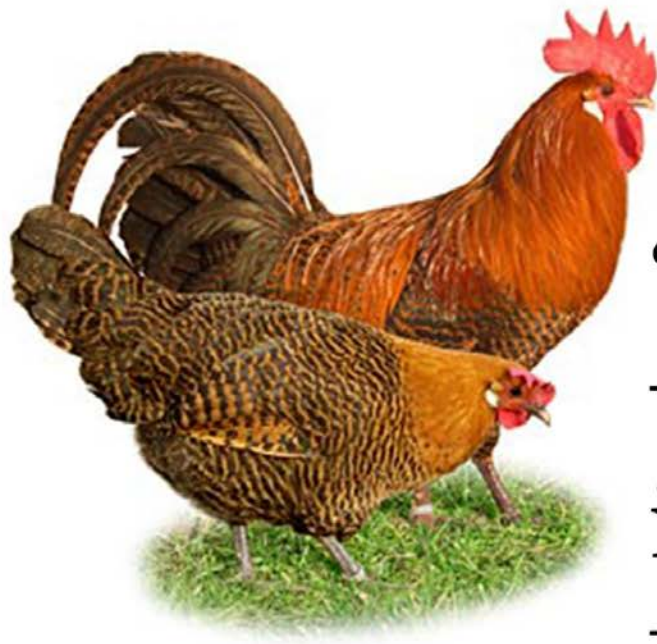
(It's okay to start small)

Don't poison them.



Questions?





“Raising honeybees
to save pollinators
is like raising chickens
to help birds”

