# Silent Hunters & Hidden Helpers: The Untold Story of Oregon Wasps

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Oregon State University

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# Brief intro to who I am:

- Ph.D. Candidate at Oregon State University
  - Work with Dr. Sandra DeBano
- Study insect ecology:
  - How insects interact with each other and their environment
- Study bees, wasps, and other beneficial bugs!
- Mostly work in Eastern Oregon (near La Grande), but also The Dalles


Photo by: Tucker Hoffman

# Brief intro to who I am:

- Outside of work: outdoors and photography enthusiast
- You'll see lots of my photos here!
- Side project – photographing invertebrate biodiversity in my yard (happy to talk about this later!)
- Gardening (and looking at bugs)

# Where we're going today:

- Why Care?
- What are Wasps?
- Misunderstood Creatures
- The Roles
- Species Spotlight!
- Observing Native Wasps
- Encouraging Wasps
- Photographing Wasps

What do you think when you hear the word “wasp”?

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# If you’re like most people, you probably thought “Yellowjackets! Paper wasps! Hornets! Stingers! Ouch!”

# Lots of bad press...



https://www.reddit.com/r/memes/comments/rh9fle/horne


https://www.facebook.com/photo.php?fbid=10155260191981541&id=125335716540&set=a.16946273654 0

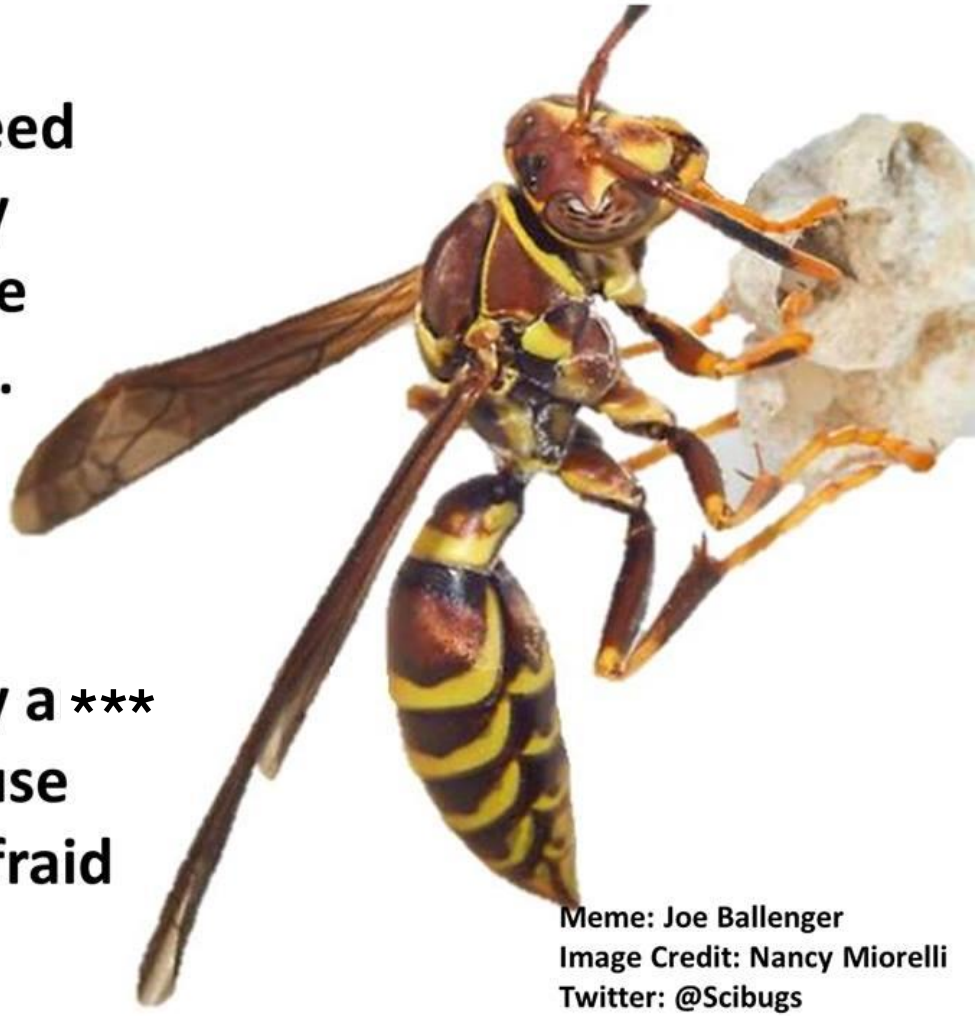
# What we should maybe think of instead…


https://www.reddit.com/r/insects/comments/1l6elie/fixed_this_meme_because_wasp_hate_makes_me_sad/

# What we should maybe think of instead…

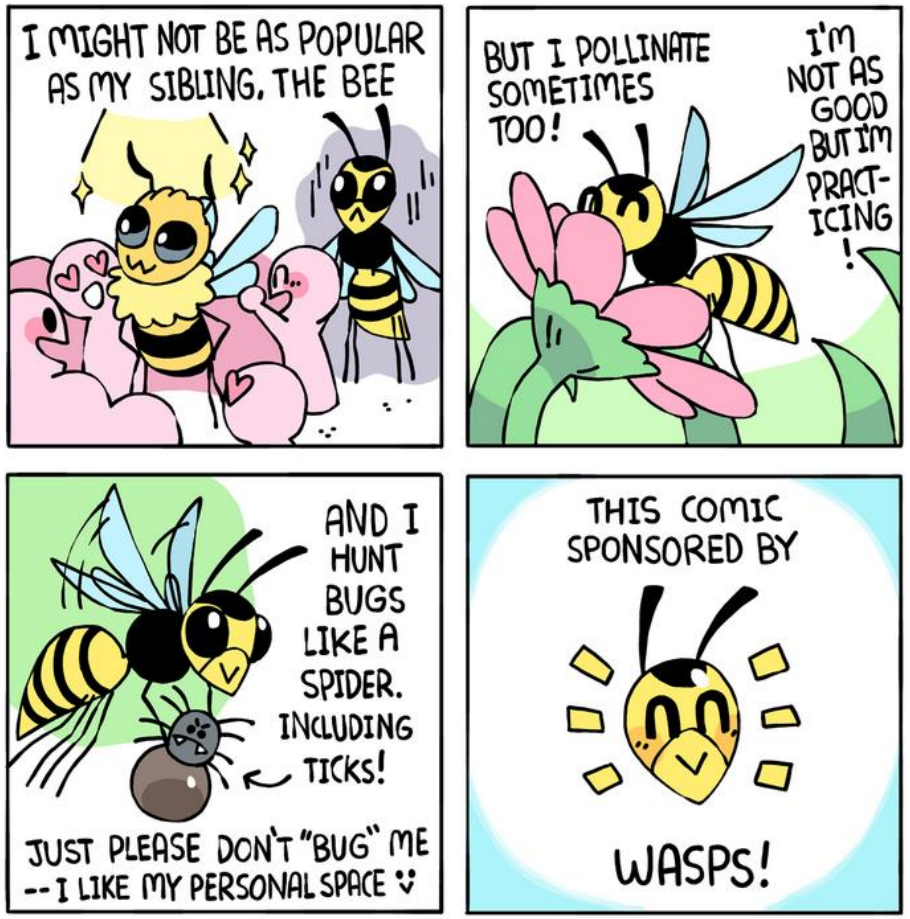
**Single mom, working to feed her babies by providing free pest control…**

**…has to carry a *** dagger because everyone's afraid of her.**



Meme: Joe Ballenger
Image Credit: Nancy Miorelli
Twitter: @Scibugs

https://bugeric.blogspot.com/2016/03/bee-vs-wasp-memes-perpetuate-ignorance.html




https://imgur.com/gallery/defense-of-meme-bug-2l4SoiY

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# Why should we care about wasps?

- Biologically interesting
- Ecosystem services
  - Pollination
  - Pest control
  - Nutrient cycling
- Medical applications
  - Recent research on wasp venom in cancer treatments and antibiotics
- Astounding diversity
  - Biodiversity is important to robust ecosystems
  - Conservation value

# Why should we care about wasps?

- More directly in our lives:
  - Can help control pests in our gardens
  - Some wasps are specialists on invertebrates like spiders (which you may or may not like)
- Beautiful, easily observed wildlife
  - (at least I think so)

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# What are wasps?

- Wasps are insects
- In the order “Hymenoptera”
- Beyond that, it gets a little complicated but let’s dive in!

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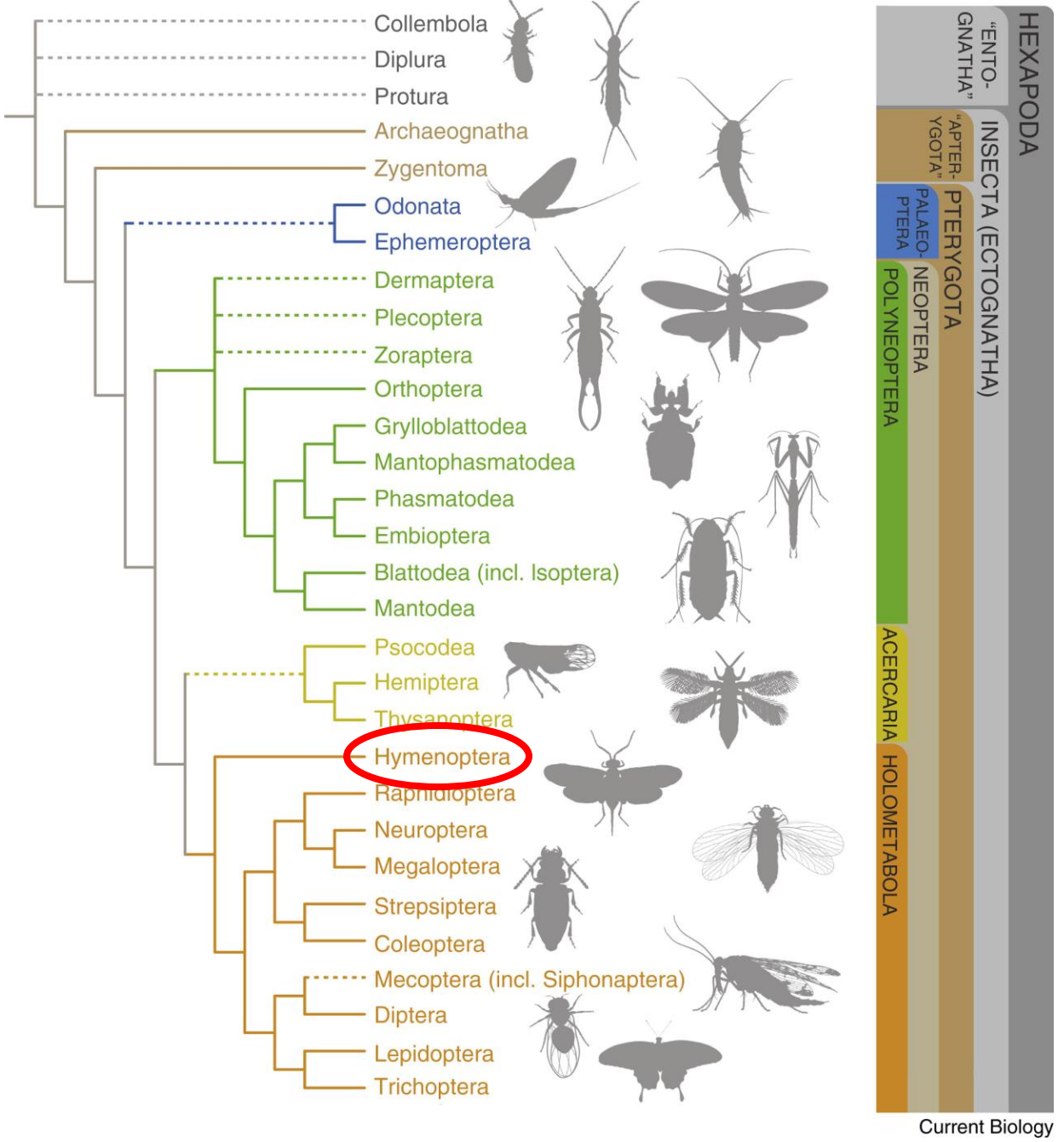


Tihelka, Erik et al. Current Biology, Volume 31, Issue 19, R1299 - R1311

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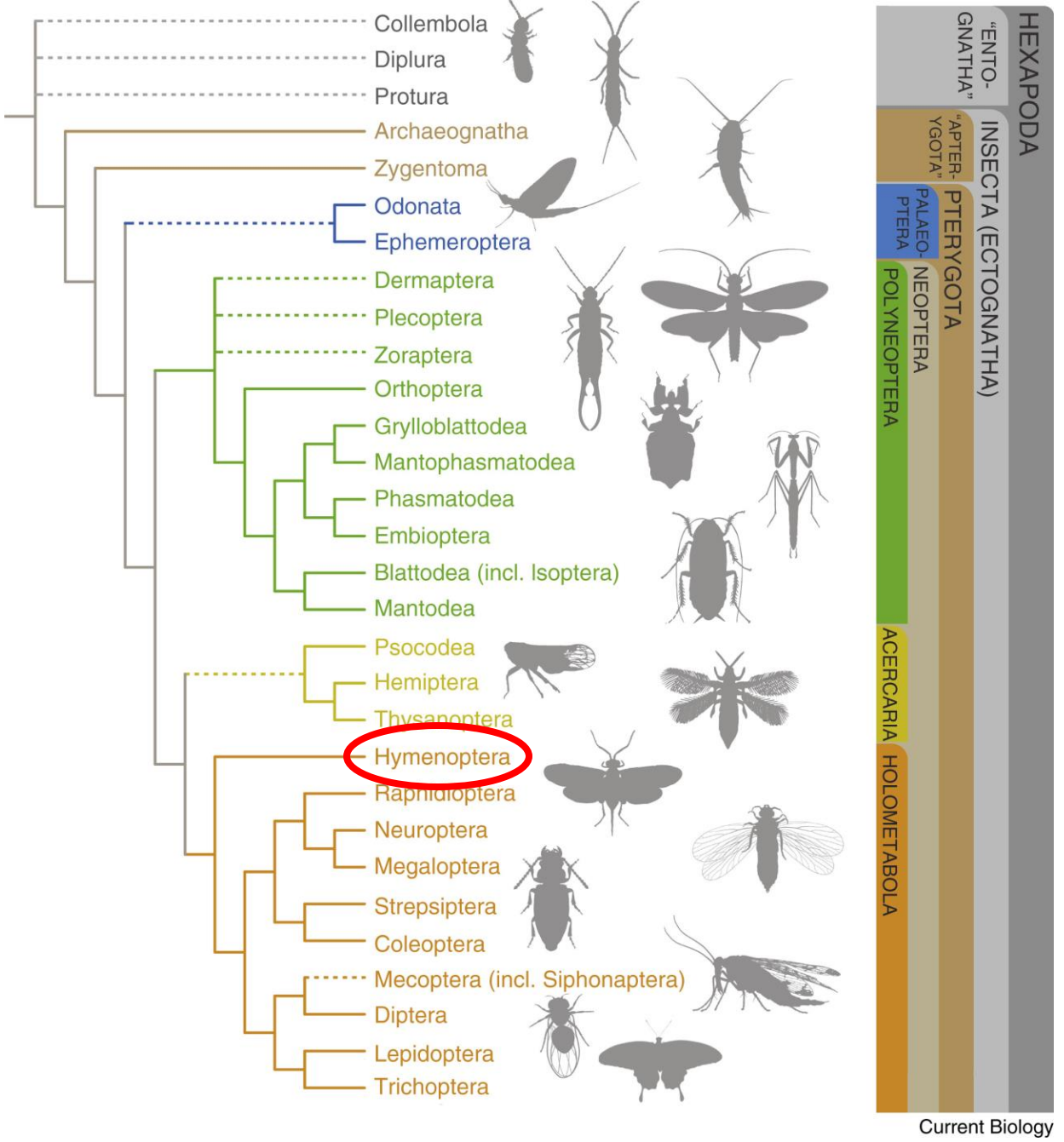


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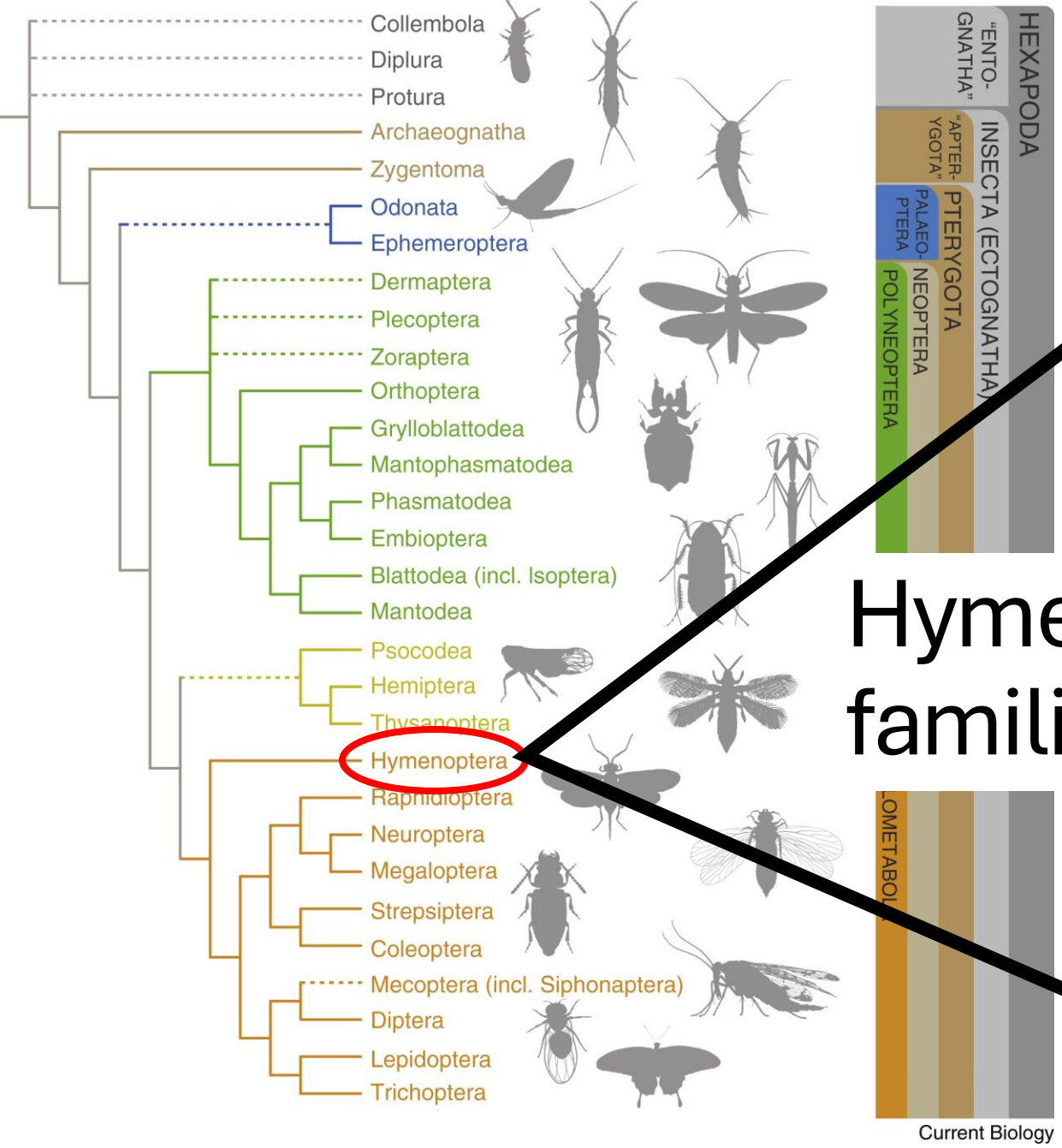
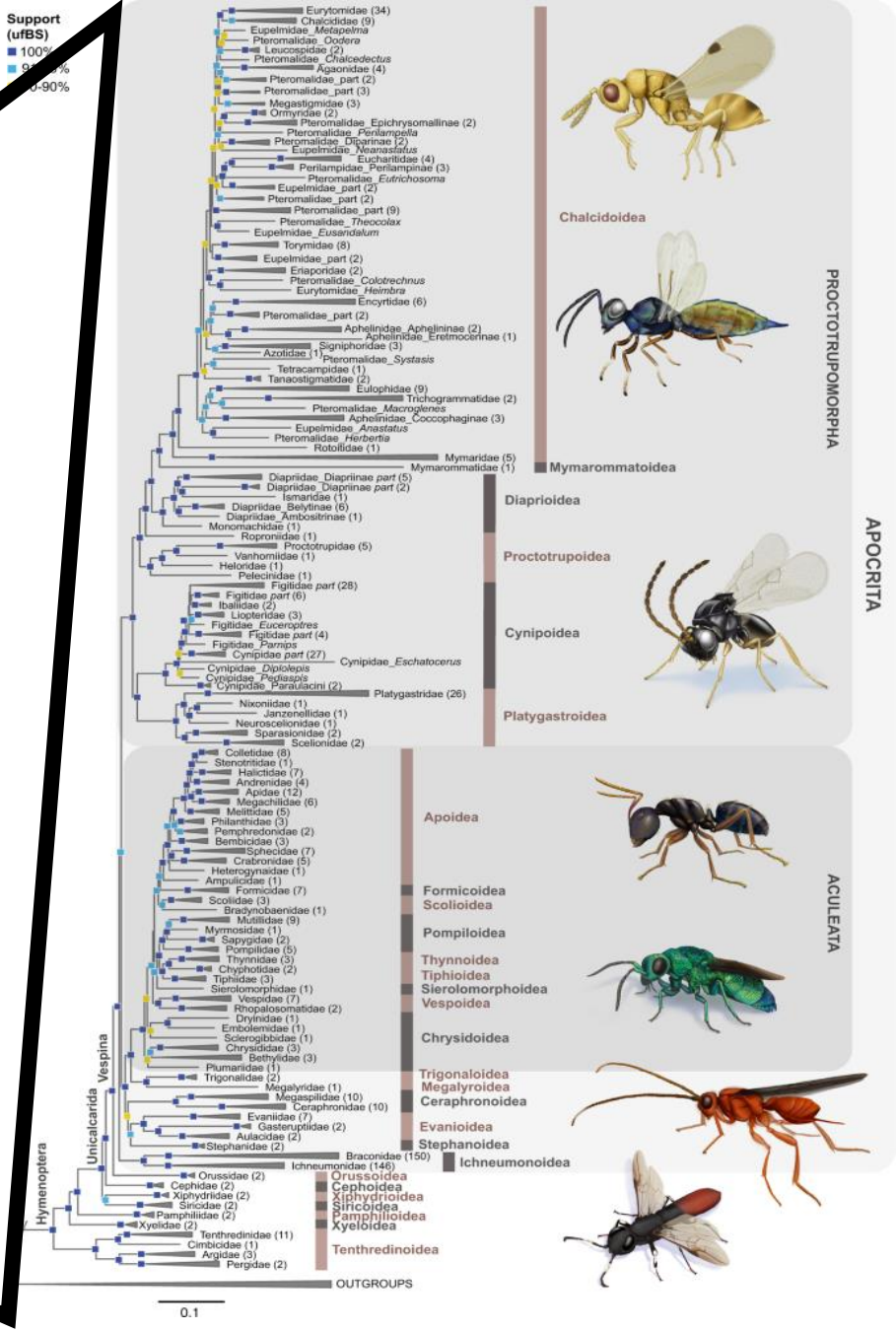



# Hymenoptera families

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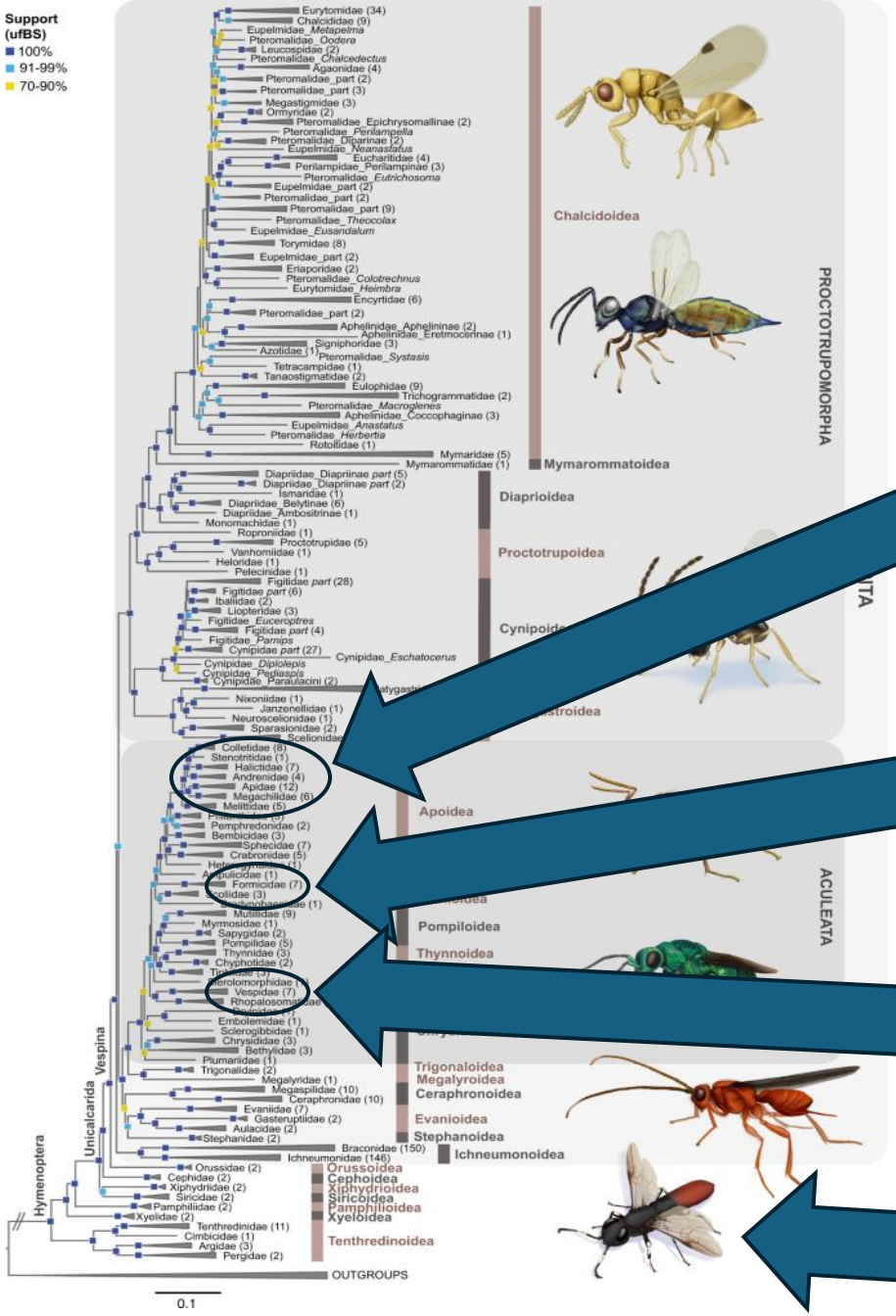
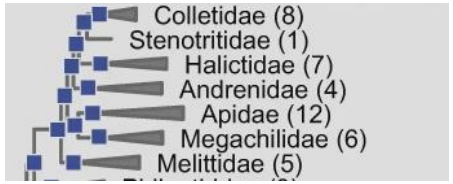
Blaimer, *et al. Nat Commun* **14**, 1212 (2023)

# A few highlights:



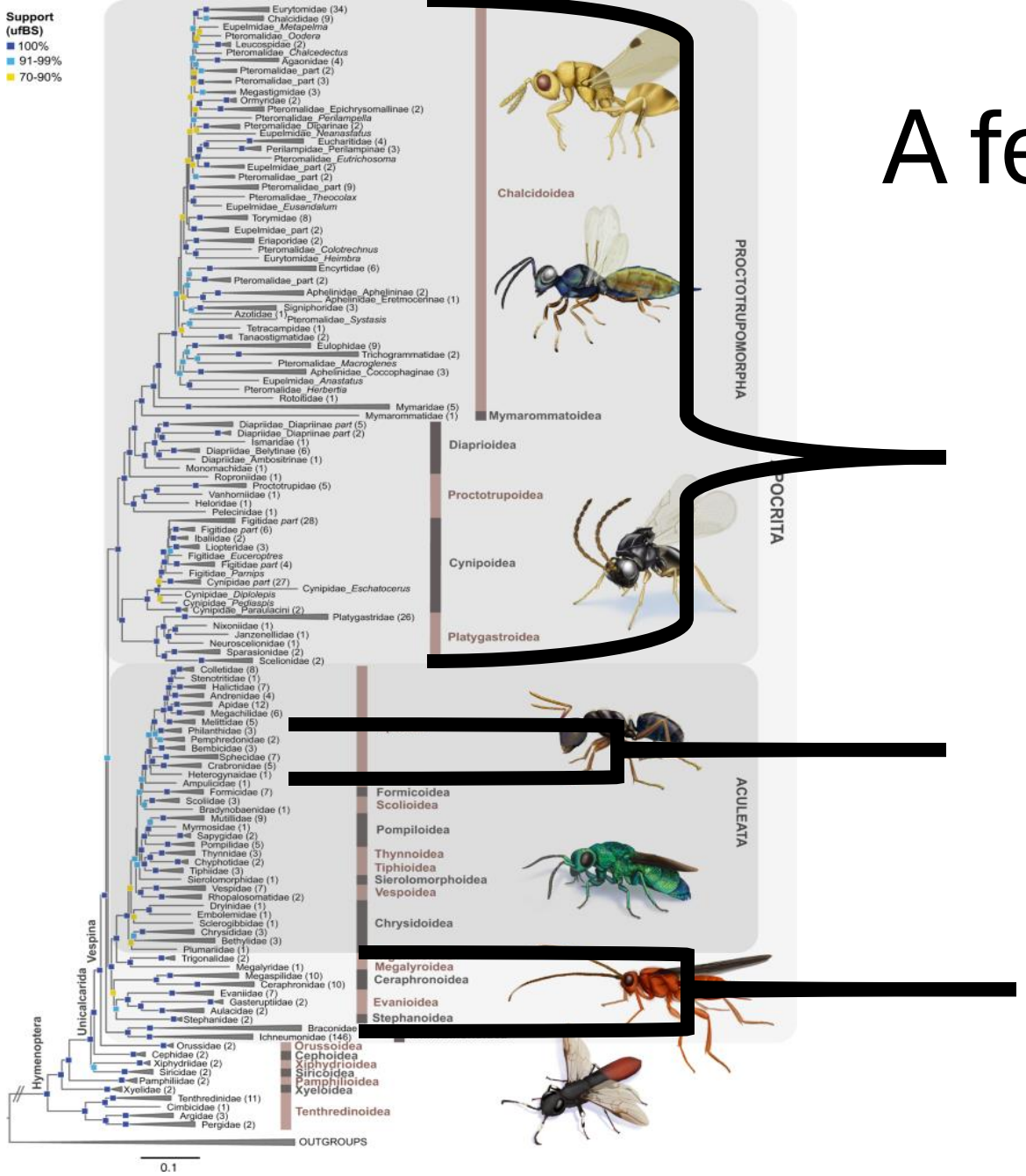

All bee families
(~20,000 species worldwide)


Formicidae: Ants
(~16,000 species worldwide)


Vespidae family:
(~5,000 species worldwide)
Includes virtually all “bad” wasps that are well known, including yellowjackets, baldfaced hornets, and paper wasps

Sawflies and a few others:
Won’t really discuss those today

Blaimer, *et al. Nat Commun* **14**, 1212 (2023)




# A few highlights:

- That means all the rest of these are “wasps”
- One of the most diverse groups of insects in the world
- Includes over ~109,000 described species
- Likely many, many, many yet to be discovered species
- Estimated to be more than 1,000,000 species worldwide!

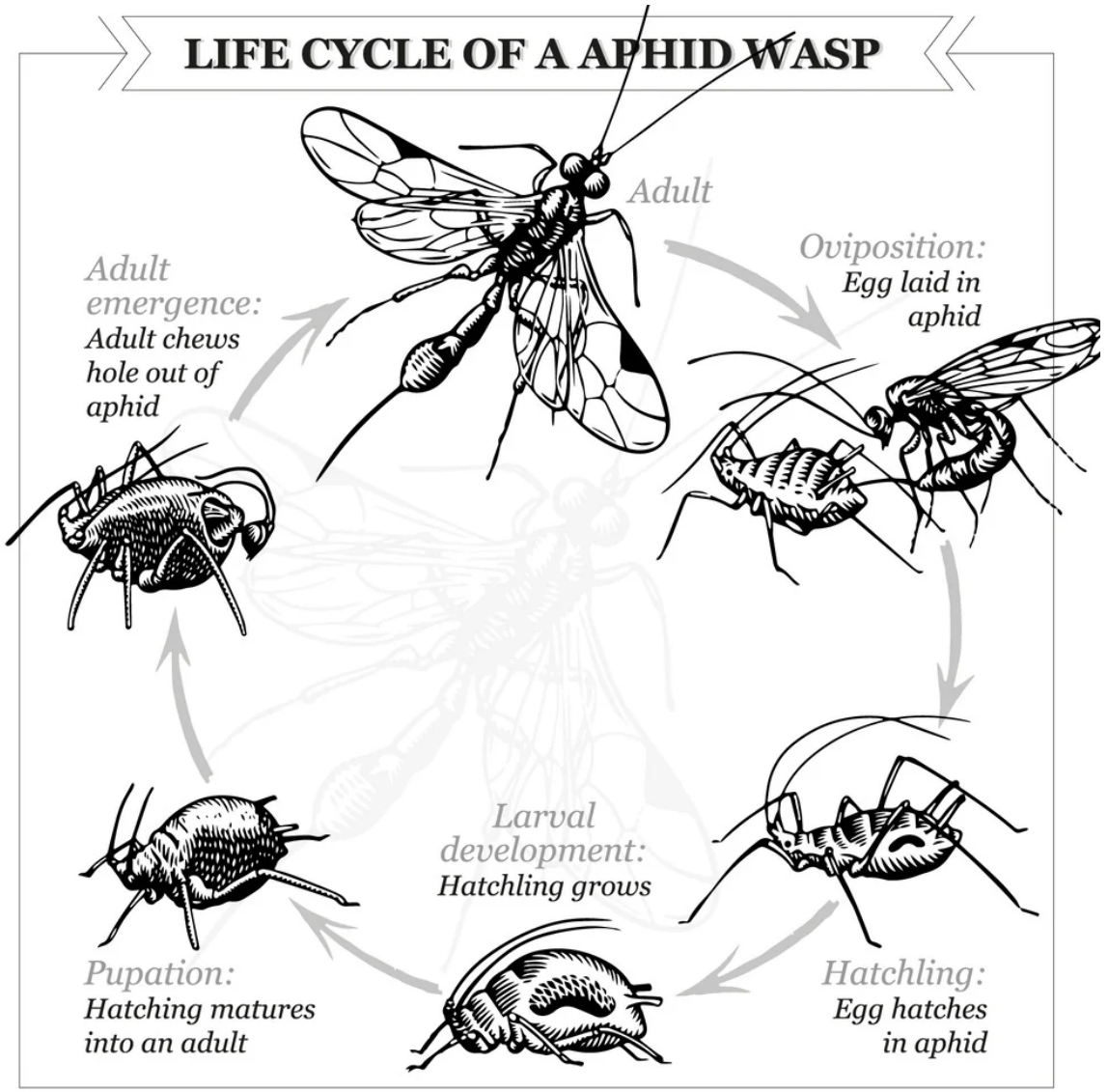
Blaimer, *et al. Nat Commun* **14**, 1212 (2023)

# Intro to Wasp Biology

- With such diversity, it is hard to generalize
- A few generalizations:
  - Have four wings
  - Use various social strategies ranging from solitary to highly social (think honey bees)
  - Undergo complete metamorphosis (like butterflies)
  - Adults generally forage on nectar for energy

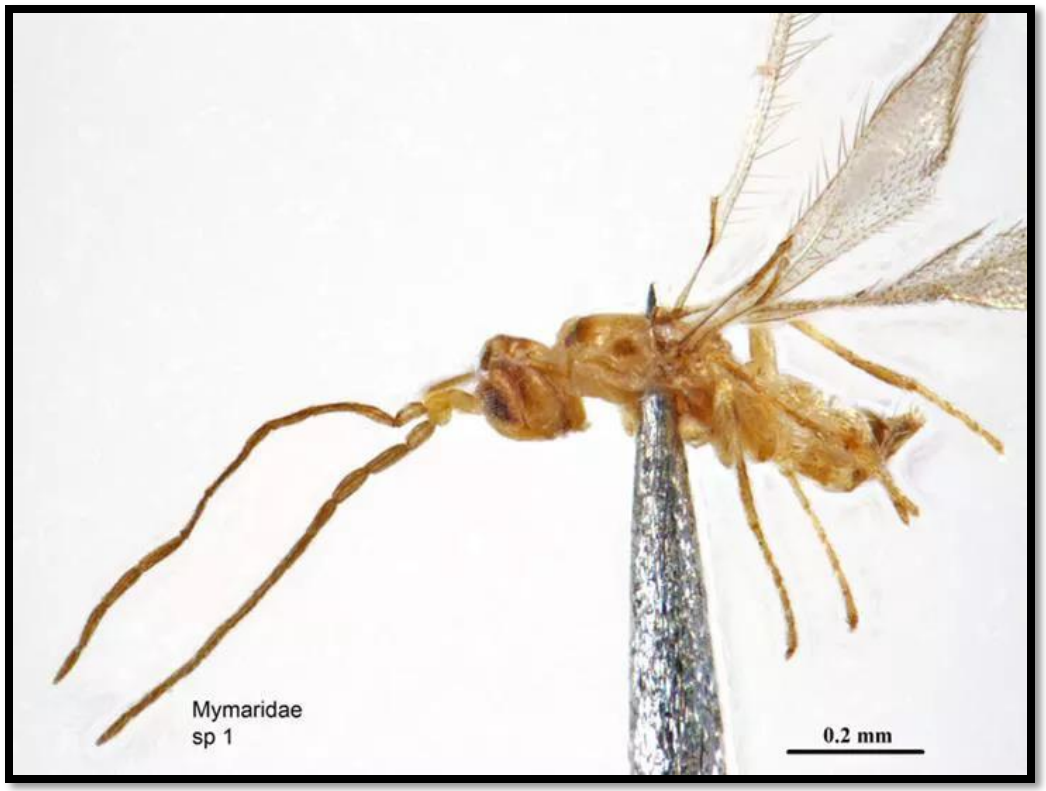
# General life cycle of a solitary wasp

- Adult lays an egg on host (parasitoid) or in nest provisioned with food (predator)
- Egg hatches into larvae
- Larvae pupates
- Adult emerges from host or nest, and cycle repeats



# Wasp Diversity

- Immensely diverse creatures: size is just one way they vary




https://www.thoughtco.com/smallest-insects-4161295


https://www.flickr.com/photos/131104726@N02/30227895615/in/photostream/


# Roughly to scale

https://www.thoughtco.com/smallest-insects-4161295

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# The Roles: Overview

- Immense diversity means variety of life strategies
- Parasitoids
- Cleptoparasitoids
- Predators
- Vegetarians (e.g., pollinators)

# The Roles: Parasitoids

- Lay eggs directly in or on host species
- Often have highly specialized relationships with their hosts
- Larvae develop on or inside of a single prey item
- Probably the most common strategy among wasps
- Fun fact: there are “hyperparasitoids” that are specialist parasitoids of parasitoids that are in turn specialists of certain species of insects!

# The Roles: Cleptoparasitoids

- Cleptoparasitoids are wasps that lay their eggs in the nests of other wasps or bees
- Often called “cuckoo wasps” similar to cuckoo birds or cuckoo bees
- Diverse groups of wasps use this strategy

# The Roles: Predators

- Predatory wasps hunt and paralyze or kill other invertebrates
- Use prey to mass provision larvae – solitary wasps
- Includes all social wasps (e.g., yellow jackets, paper wasps, etc.) who sequentially provision their young
- Often important pest control

# The Roles: Pollinators

- There are just a few groups of wasps that act like pollinators in the same way as bees
- Wasps in the subfamily *Masarinae* act in a similar manner as bees and collect pollen from plants to feed to their young
- Other wasps may accidently act as pollinators as many adult wasps use nectar


Photo credit: Daniel Horner

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# Species Highlights

- In this section, I'll highlight some prominent, easily observed wasps that you are likely to see in Oregon
- We'll highlight several native species here that interesting and relatively common
- This wasp is one particularly neat looking wasp – *Leucospis affinis*

# Species Highlights: Yellow legged mud dauber

- *Sceliphron caementarium*
- Spider specialist - predator
- Really distinct looking
- Creates neat tubular mud nests
- Look under eaves for their nests or for adults around flowers or hunting spiders
- Look near clay muds

https://pixahive.com/photo/black-and-yellow-mud-dauber/

# Species Highlights: Yellow legged mud dauber

# Species Highlights: Grass-carrying wasp

- *Isodontia mexicana*
- Pretty common in Oregon, I regularly see them foraging nectar on onion flowers
- Preys on grasshoppers, tree crickets, katydids - predator
- May see them carrying grass to line their nests with

# Species Highlights: Western paper wasp

- *Mischocyttarus flavitarsis*
- This is one of our native paper wasps, builds social nest, typically smaller than European paper wasp nests
- Much less likely to sting
- Generalist predators, will also forage on carrion
- Can be seen foraging on nectar as adults
- Interesting behaviors as social insects

# Species Highlights: Jewel wasps

- Not a single species (hard to identify), but readily observable group
- Beautiful blue, green, sometimes red colored wasps
- ~3,000 described species
- Other common name is “cuckoo wasps”
- Cleptoparasites of bees and other wasps
- No stinger! Can’t sting and as a result…
- Heavily armored – curl into tight ball to defend self, similar to a pillbug!
- Commonly seen on flowers

https://commons.wikimedia.org/wiki/File:Holopyga_generosa_%28Chrysididae%29,_Parc_de_Woluw%C3%A9,_Brussels_%28501135900.16%29.jpg

Species Highlights:
Jewel wasp

Curling defense mechanism

# Species Highlights:
# Giant ichneumon wasp

- One of our largest wasps in the region – *Megarhyssa spp*.
- Approx. 3 different species in our region
- Parasitoid of woodwasp larvae
- Use their highly adapted ovipositor to lay eggs in larvae deep under bark in trees
- Most likely to be seen in forests where trees are plentiful and their prey may live
- Although it looks like a stinger, they cannot sting with their ovipositor

# Giant ichneumon wasp – oviposition behavior

# Species Highlights: American sand wasp

- *Bembix americana* and related wasps
- Solitary, ground nesting wasp
- Commonly seen digging nests in open sandy soils or visiting flowers for nectar
- Specialist fly predator, provisioning each nest cell with 20-30 flies
- Could be important biological control of flies
- Well studied for nesting and mating behaviors

# Species Highlights: American sand wasp

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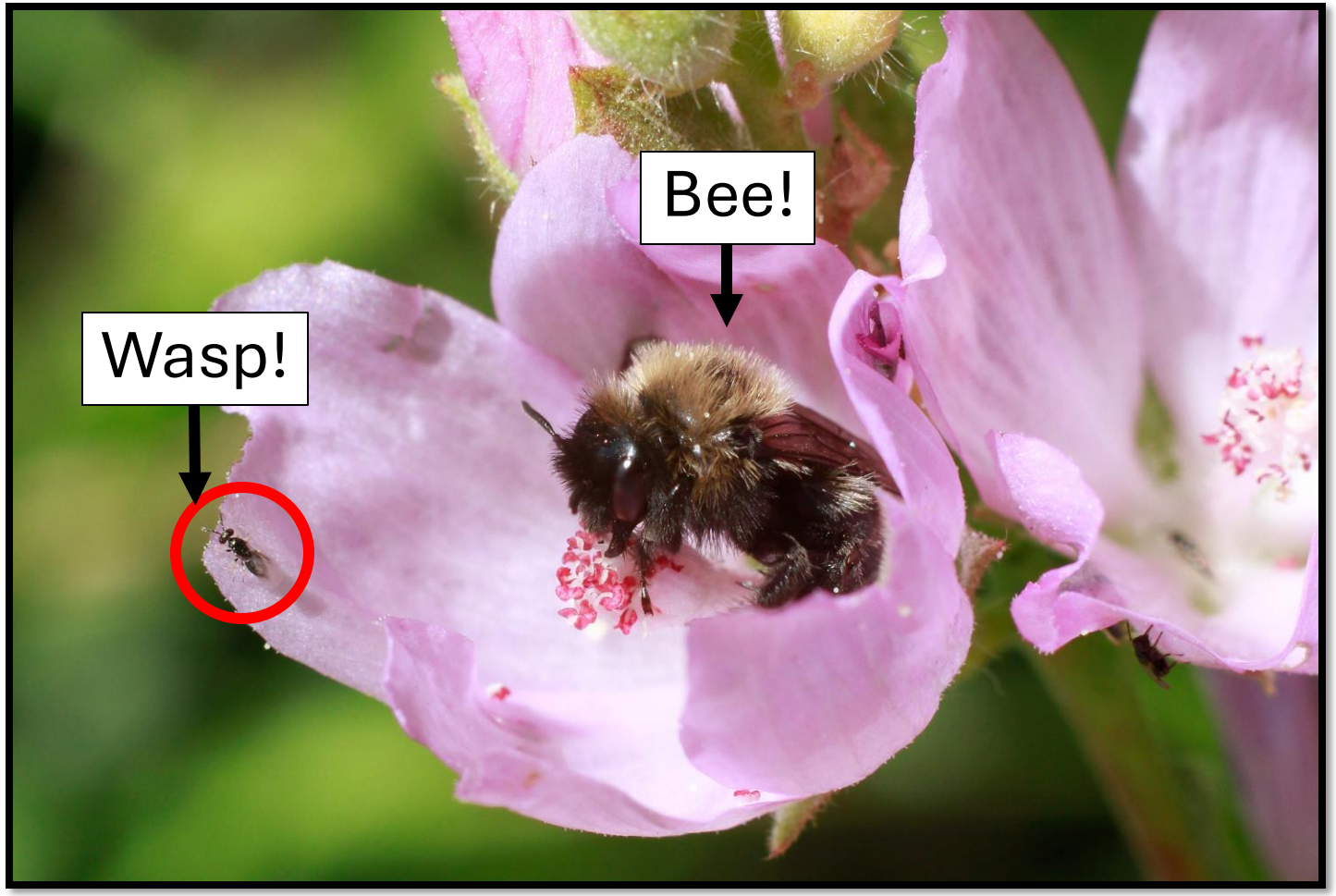
# Observing Wasps: Where to go?

- To observe wasps, you'll want to go where the wasps are!
- This means seeking out their habitats
- A good starting place is too look closely at what is visiting flowers – often near bees!

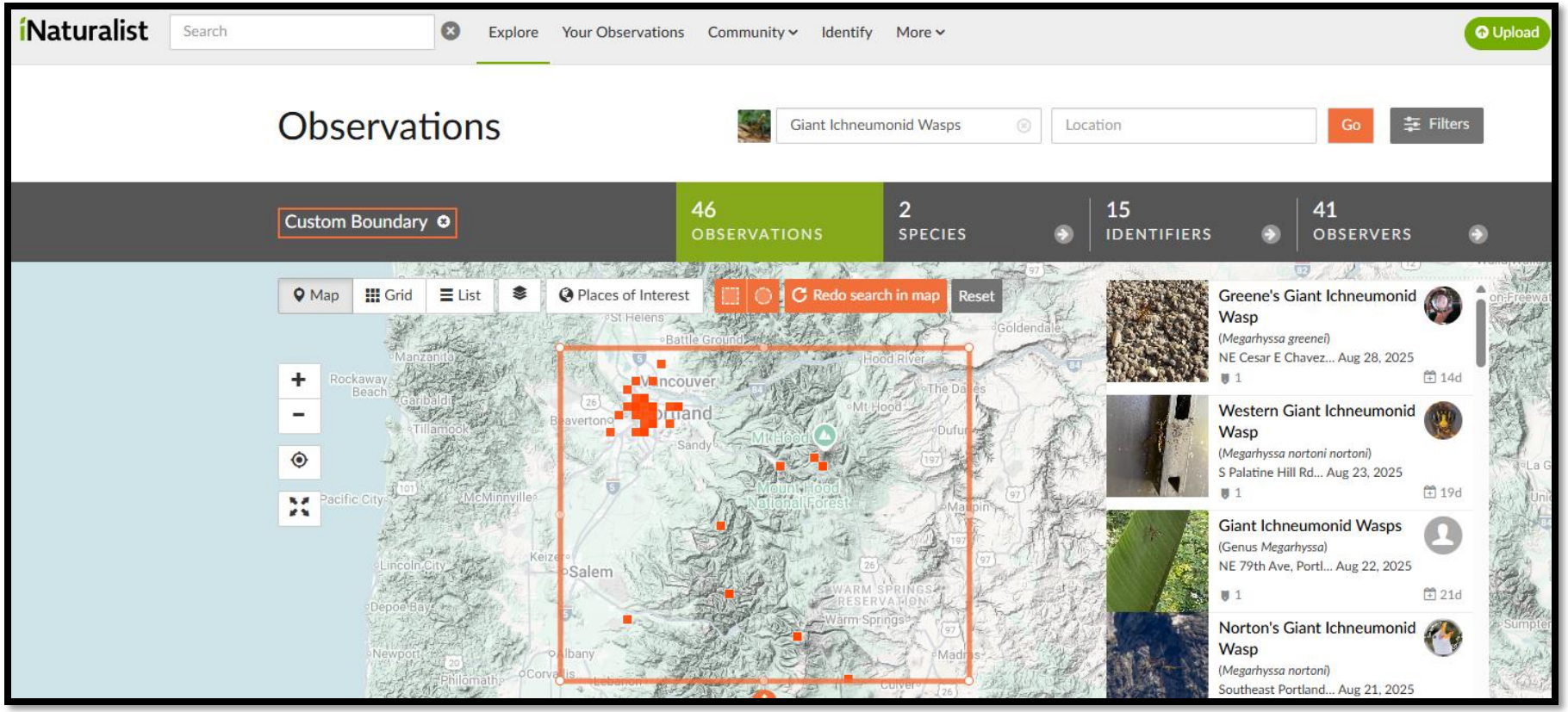


# Observing Wasps: Where to go?

- If you want to get a closer look, consider getting a net and a mason jar
- You can catch wasps, put them in a jar and observe for a little while, just be sure to release them when you're done!
- Be careful not to be stung when transferring from net to jar

# Observing Wasps: How to observe?

- Don’t be afraid of wasps when observing! Most are quite friendly
- Check out iNaturalist if you’re looking for specific wasps
- Often can find many wasps in your yard or in a local park



# Observing Wasps: How to observe?

- Examples of wasps from my yard

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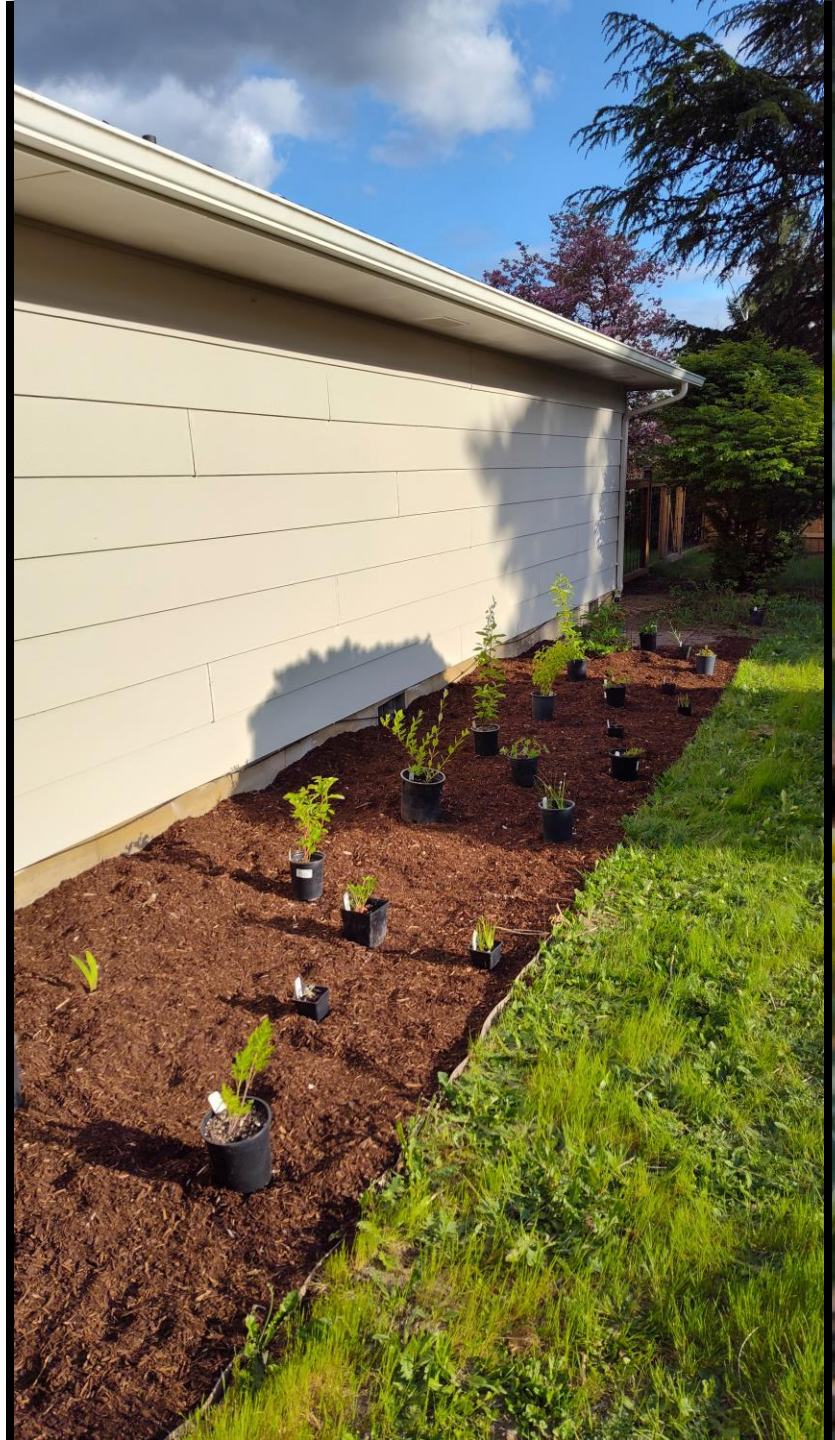
# Encouraging Wasps

- Easy to encourage wasps in your yard!
- Reduce pesticide use
- Increase habitat
  - Think about resources wasps need – nesting, prey, flowers
- Increase native plant resources
  - Flowers are great for bees and wasps!



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# Photographing Wasps

- Take pictures in-situ
- “Studio” style photos are easy at home too!
- Consider catching wasps in nets, putting in jars, and cooling in fridge for a few minutes for studio style photos
- Can be more complex or pretty simple
- Phones work great!