OTHER BEES AND WASPS

Advanced Level Training
Texas Master Beekeeper Program

Introduction

- As a beekeeper, you are often treated as the expert on all things with wings or stings.
- The knowledge gained from this presentation should help you to confidently field questions from the general public, identify a few of the common bees and wasps of Texas and discuss their biology and importance as beneficial insects or as pests.

Bees and Wasps

**Bees**
- More body hair
- Flattened hindlegs, usually containing a pollen basket
- Feed on pollen and nectar
- Generally can only sting once

**Wasps**
- Very little hair
- Rounded legs
- Are predators of other insects, or will scavenge food scraps, carrion, etc.
- Can (and will) sting repeatedly
- Includes hornets and yellowjackets
Yellowjackets and Hornets

- General biology
- Colonies founded in spring by a single-mated, overwintered queen
- Constructs the paper brood cells
- Forage for food
- Lay eggs
- Feed her progeny
- Defend the nest

Yellowjackets and Hornets

- When the first offspring emerge they assume all tasks except egg laying.
- Workers progressively feed larvae
  - Masticated adult and immature insects
  - Other arthropods
  - Fresh carrion
- Working habits apparently are not associated with age as they are with honey bees.

Yellowjackets and Hornets in Texas

- Eastern yellowjacket
  - Vespula maculifrons Buysson
- Southern yellowjacket
  - Vespula squamosa Drury
- Baldfaced hornet
  - Dolichovespula maculata Linnaeus
Yellowjackets and Hornets in Texas

• Eastern yellowjacket (Vespula maculifrons)
  • Family: Vespidae
  • Mostly subterranean nests, but aerial nests do occur
  • Largest recorded nest:
    • 8 levels of comb with over 2800 wasps present
    (Herland, 1964)

Yellowjackets and Hornets in Texas

• Southern yellowjacket (Vespula squamosa)
  • Family: Vespidae
  • Construct both terrestrial and aerial nests.
  • A huge nest, about 5.5 m in height, was constructed around the end of a tree stump.
    A total of 74 layers of comb were found
    (Tissot and Robinson, 1954).

Yellowjackets and Hornets in Texas

• Bald-faced hornet (Dolichovespula maculata)
  • Family: Vespidae
  • Constructs aerial nests often a foot or more in diameter.
Yellowjackets and Hornets

- These wasps perform a valuable service in destroying many insects that attack cultivated and ornamental plants.
- Adept at stinging.
- Aroused if danger threatens the nest.
- Releases an "alarm pheromone"

Other Wasps

- Red Wasp
- Paper Wasp
- Potter Wasp
- Mud Dauber

Bee Phylogeny

- Phylogeny: the evolutionary development and diversification of a species or group of organisms, or of a particular feature of an organism.
- Kingdom: Animalia
- Phylum: Arthropoda
  - Class: Insecta
  - Order: Hymenoptera
    - Family
    - Genus
    - Species
Other Bees of Texas
• Several different families of bees in Texas
  • Andrenidae ("mining bees")
  • Colletidae (cellophane bees, polyester bees, plasterer bees)
  • Halictidae (sweat bees)
  • Megachilidae (leafcutter bees)
  • Apidae (bumble bees, honey bees, carpenter bees, orchid bees)

Family: Andrenidae
• Largest bee family under the order Hymenoptera
• Diverse in size and colors
• Diet: pollen and nectar
• Ground-nesters ("mining bees")
  • Nest depth range: 1 inch – greater than 1 foot
  • Line the nest with waterproofing substance

Family: Andrenidae
• Examples: Andrena clarkella, Andrena barbilabis
  • 1/4” – 1/2” in size
  • Color range: gray/brown – red
  • Diet: pollen and nectar
  • Ground-nesting
  • Influential in pollinating commercial crops
    • Blueberries, cranberries, apples
Family: Colletidae

- Colletes = “one who glues”
- Solitary bees
  - No evidence of sociality
- Some species nest in aggregations
  - Many nests in one area
  - Some may share a nest entrance
- Some species are ground-nesters
  - Secrete a waterproof substance to line nest cells
  - Looks like cellophane
  - Resistant to mold and water

Credit: Dana Atkinson

Family: Colletidae

- Examples: cellophane bees, polyester bees, plasterer bees
- ¼” – ¾” in length
- Some species are hairy
- Others are predominantly hairless, looking similar to wasps
- Diet: pollen and nectar
  - Some species only feed from one group of plants
  - Important pollinators of wildflowers

Credit: Encyclopedia of Life

Family: Halictidae

- Wide array of sociality
  - Solitary – primitively eusocial
- Many species have a queen and workers
- Diet: pollen and nectar
  - Some species are specialists, others are generalists
- Many species are ground-nesters
  - Consist of many, interconnected tunnels

Credit: Encyclopedia of Life
**Family: Halictidae – Sweat Bees**

- Genus: Lasioglossum
- 1/8” – 1/4” in length
- Color range: black – metallic blue
- “sweat bee” = lick sweat from skin surface
- Diet: pollen/nectar
- Ground-nesting
- Abundant during flowering season
- Important pollinators of sunflowers and other wildflowers

**Family: Megachilidae**

- “big-lipped family”
- Large mouthparts
- Cut pieces of leaves/petals to line nest cavity
- Diet: pollen and nectar
- Carry pollen on the underside of the abdomen (scopa)
- Pollinate important commercial crops
- Alfalfa, almonds, cherries, apples, blueberries
- Example: Leafcutter bees

**Leafcutter Bees in Texas**

- In Texas there are approximately 63 different species (plus 5 subspecies) within seven genera of leafcutter bees.
Leafcutter Bees in Texas

• Use pieces of leaves they cut from plants to construct cigar-like nests containing several cells.
• May be considered a pest of ornamentals (i.e. roses, azaleas, aml, redbud, bougainvillea).
• Each cell contains a ball or loaf of stored pollen and a single egg. Each cell will produce a single bee.
• These nests are constructed in holes in:
  • Soil
  • Wood
  • Plant stems

Leafcutter Bees in Texas

• Unlike honey bees and bumble bees, leafcutter bees:
  • Are solitary bees and do not live in large groups.
  • Don’t aggressively defend nesting areas.
  • Will only sting if handled.

Bumble Bees

• Bumble bees are large, social bees which produce annual colonies.
• Mated queens overwinter until early spring.
• Search for suitable location (rodent nest) to begin their colonies.
• The queen collects pollen and lays her first brood of worker eggs.
• Workers emerge (12 days after the eggs are laid) and take over the duties of pollen and nectar collection and colony defense.
Bumble Bees in Texas

- Bombus pennsylvanicus
  - American bumble bee
- Bombus impatiens
  - Eastern bumble bee
- Bombus ternarius
  - Tri-colored bumble bee
- Bombus vosnesenkii
  - Yellow-faced bumble bee

Bumble Bees

- These beneficial insects pollinate many native and ornamental plants.
- They can sting severely and multiple times.
- Family: Apidae

Carpenter Bees

- Bumble Bees vs. Large Carpenter Bees
- Carpenter Bee
- Bumble Bee
Carpenter Bees

- *Ceratina*: small carpenter bees
  - Excavate tunnels in pithy stems of various bushes.
- *Xylocopa*: large carpenter bees
  - Chew nesting galleries in solid wood and may become an economic pests if nesting takes place in structural timbers.

Carpenter Bees in Texas

- *Xylocopa virginica*: Eastern Carpenter Bee
- *Ceratina*: Carpenter Bees

Carpenter Bees

- After excavating the gallery, female bees gather pollen, mixed with nectar.
- The pollen mass is placed at the end of a gallery. An egg is laid, and the female places a cap over the cell composed of chewed wood pulp.
- Two generations occur per year, with brood produced in the spring and summer.
Carpenter Bees

- 4 types of damage caused by carpenter bees:
  - Weakening of structural timbers
  - Gallery excavation in wooden water tanks
  - Defecation streaking on houses or painted structures
  - Human annoyance

- Carpenter bees rarely attack painted or varnished wood.

A few other bee-like insects

- Robber fly
- Cicada Killer
- Potter Wasp
- Ichneumonid
- Flower Fly
- Zebra (or Flower) beetle

Cicada Killer

- Extremely large wasp
- Solitary
- Lives in dug out burrows
- Feeds on adult cicadas
- Often seen flying low over lawns
- Not very aggressive, but can sting.
Flower Flies (Hover Flies)

- Bee mimic
- Often seen hovering over flowers
- Large eyes, small antennae
- One pair of wings
- Adults feed on pollen and nectar

Velvet Ants (“Cow Killer”)

- Wingless wasps – can sting!
- Hair can be red or gold
- Feed solely on nectar
- Name comes from painful sting

Sources

- [http://eol.org/](http://eol.org/)
- The Bees in Your Backyard: A Guide to North America’s Bees
  - By Joseph S. Wilson and Olivia Messinger Carril
- Dr. Shalene Jha
  - Assistant Professor, Department of Integrative Biology, University of Texas at Austin