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

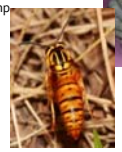
- Eastern yellowjacket
  - *Vespula maculifrons* Buysson
- Southern yellowjacket
  - *Vespula squamosa* Drury
- Baldfaced hornet
  - *Dolichovespula maculata* Linnaeus

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 (Haviland, 1962)


Yellowjackets and Hornets in Texas

- Southern yellowjacket (*Vespula squamosa*)
  - Family: Vespidae
  - Construct both terrestrial and aerial nests.
  - A huge nest, about 2.5 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).

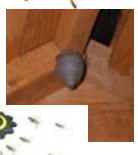

Yellowjackets and Hornets in Texas

- Baldfaced 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

- Phylogenesis: 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" – ½" in size
- Color range: gray/brown – red
- Diet: pollen and nectar
- Ground-nesting
- Influencial in pollinating commercial crops
  - Blueberries, cranberries, apples

Andrena clarkella
Credit: Bees, Wasps & Ants Recording Society (BWARS)

Andrena barbilabis
Credit: Steven Falk, BWARS

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

Credit: Encyclopedia of Life

- 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

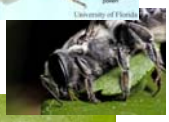
- Wide-array of sociality
  - Solitary – primitively eusocial
- Many species have a queen and workers
- Diet: pollen and nectar
  - Some species are specialists, others are generalists
- Many species are ground-nesters
  - Consist of many, interconnected tunnels

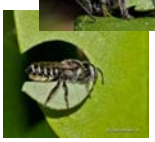
Family: Halictidae – Sweat Bees

- Genus: Lasioglossum
- 1/8" – ½" in length
- Color range: black – metallic blue
- "sweat bees" = lick sweat from skin surface
- Diet: pollen/nectar
- Ground-nesting
- Abundant during flowering season
  - Important pollinators of sunflowers and other wildflowers

Family: Megachilidae

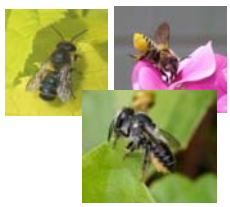
- "big-lipped family"
  - Large mouthparts
- Cut pieces of leaves/petals to line nest cavity
- Diet: pollen and nectar
- Carry pollen on the underside of the abdomen (scopa)
- Pollinate important commercial crops
  - Alfalfa, almonds, cherries, apples, blueberries
- Example: Leafcutter bees





Leafcutter Bees in Texas

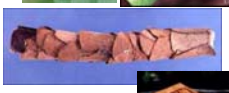
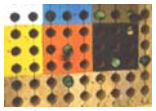
- In Texas there are approximately 63 different species (plus 5 subspecies) within seven genera of leafcutter bees.



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, ash, 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



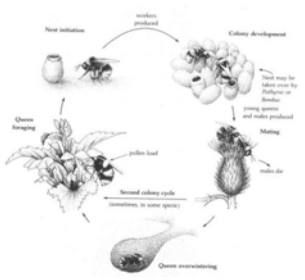




Leafcutter Bees in Texas

- 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 (21 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 impatients
Eastern bumble bee

Bombus ternarius
Tri-colored bumble bee

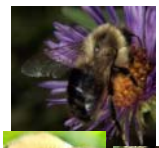
Bombus fervidus
Golden Northern bumble bee

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 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 cockerelli

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

Cow-killer or Velvet ant

Ichneumonid

Flower Fly

Zebra (or Flower) beetle

Cicada Killer

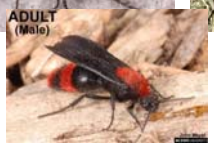
- Extremely large wasp
- Solitary
- Lives in dug out burrows
- Feeds on adult cicadas
- Often seen flying low over lawns
- Not very aggressive, but can sting.

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

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  - By Joseph S. Wilson and Olivia Messinger Carril
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  - Assistant Professor, Department of Integrative Biology, University of Texas at Austin