Bee Diversity and Ecology

Bee Common Characteristics

• Pollen and nectar make up 100% of diet (habitat!)
• Actively gather pollen to feed offspring (pollination!)
Bee Diversity and Ecology

- **Sweat bees**: Flowers

- **Andrena carlini**: Spring flowers

- **Svastra obliqua**: Asteraceae

- **Melissodes denticulata**: Ironweed

- **Melissodes agilis**: Sunflowers

- **Chelostoma philadelphi**: Mock orange

Pollen specialist  

Pollen generalist
Native Bee Nesting Characteristics

Solitary  Gregarious  Communal  Semi-Social  Social

Photos: Jennifer Hopwood (Xerces), Eric Lee-Mader (Xerces), Eileen Miller, MJ Hatfield, Bruce Newhouse
Native Bee Nesting Characteristics

Ground-nesting bees
• Primarily solitary

Tunnel-nesting bees
• Primarily solitary

Bumble bees
• Social

Photos: Matthew Shepherd (Xerces), Eric Lee-Mader (Xerces), SA Cameron
Native Bee Nesting Characteristics

70% of native bees nest underground

- Resemble ant-nests above-ground
- Intricate chambers below
- Prefer bare or semi-bare, lose soil

Photos: Jim Cane, Matthew Shepherd (Xerces), and Jennifer Hopwood (Xerces)
Native Bee Nesting Characteristics

70% of native bees nest underground
- Many nest chambers are lined with waxy glandular secretions
- Nests often resist flooding (*Nomia*)
- Provide nesting habitat by creating or conserving bare or semi-bare undisturbed soil

Photos: Jim Cane, Matthew Shepherd (Xerces), and Dennis Briggs
~30% of native bees nest in cavities

- Hollow or pithy plant stems, old beetle borer holes, man-made cavities, snail shells...
- Use mud, leaf pieces, or sawdust in construction of their nest
- Provide nesting habitat by conserving snags and brush piles and by planting pithy-stemmed plants.
Managed Tunnel-Nesting Bees

Managed cavity-nesting bees:
• Mason bees (*Osmia lignaria*)
• Leafcutter bees (*Megachile rotundata*)
Life Cycle of a Solitary Bee

Mining bee (*Andrena* sp.): a year in its underground nest as egg, larva, and pupa before emerging to spend a few weeks as an adult.
Native Bee Nesting Characteristics

- 45 Species in US
- Bumble bees nest in existing cavities such as old rodent holes, in overgrown areas, or under brush piles.
- Provide nesting habitat by planting bunch grasses and low growing shrubs or by creating brush piles.

Photos: Mace Vaughan, Nancy Lee Adamson, Edward Ross
Bumble Bees: Excellent Crop Pollinators

Bumble bees buzz pollinate
- Clover, tomato, pepper, etc.
- More efficient than honey bees for blueberry, cranberry, melons, etc.

Active in cool, wet, and windy weather

Photos: Eric Lee-Mader (Xerces), Steve Javorek (AgCanada)
Life Cycle of a Bumble Bee Colony

Fall: Mated queens seek overwintering sites, founding queen dies.

Winter: Hibernating queen

Spring: Queen establishes nest and lays eggs.

Early Fall: Males leave nest, then new queens leave to find a mate.

Early Summer: Worker females help grow the colony.

Summer: Colony peak.

Illustration: David Wysotski
Recognizing Bee Look-Alikes
Recognizing Bee Look-Alikes: Flies

**Flies vs. Bees**

- Short, thick antennae
- Large bulging eyes near front of head
- Little or no pollen, skinny legs
- 2 wings
- Usually not very hairy
Recognizing Bee Look-Alikes: Wasps

Wasps vs. Bees

Look tough: narrower bodies, pinched abdomen

Little or no pollen

Not very hairy

Colored patterns on exoskeleton

4 wings (sometimes folded)
**Key Characteristics of Bees**

Bees

- 4 wings
- Are hairy (usually)
- Eyes at sides of head
- Rounder bodies
- Eyes at sides of head
- Females carry large loads of pollen
- Long antenna
Important: Honey Bee vs. Native Bee

Photo: Sarah Greenleaf
Honey Bee vs. Native Bee

**European honey bee**
*Apis mellifera*
- Most honey bee come from managed hives
- Honey bee numbers depend on the location of honey bee hives nearby
- Wild / native bee numbers give information about the quality of the habitat
Key Characteristics of Bees: Pollen

Where? Wet or Dry?
Key Characteristics of Honey Bees

- Medium size
- Torpedo-shaped, striped abdomen
- **Females** carry moist pollen mass on hind legs (pollen basket or corbicula)
- Hairy thorax
- Orange-brown stripes, variable
Bee Diversity and Ecology

3,600 Different Species of Bees Native to United States.