

Honey Bee Basics

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Ag Madness
Virtually Presented



Objectives

- Lifecycle notes for the beekeeper
- Pheromones in the hive
- Obtaining bees
- Foraging and nutrition
- Bee types/breeds/races/strains
- Bee diseases

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Honey bees


- Non-native insect
- Social Insects – cooperative brood care, reproductive division of labor and overlapping generations.

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Apis mellifera

- Females divided in a Caste system
 - Worker bees and the Queen
- Drones (males)
- Differences in
 - Biology
 - Division of labor
 - Brood cycle



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Lifecycle of all honey bees



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Drones

- Males
- Key differences
 - Larger eyes (2x)
 - Larger, barrel body
 - Longer, thicker antennae
- Raised for reproduction



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Drones

- Domed caps
- Found on edges
- 6.5 days as a larvae
- 24 days to fully develop
- Drones cannot:
 - Produce wax
 - Forage
 - Clean house
 - Guard the hive
- They are an expense



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Drones

- Start eating and flying
- Begin mating - Drone Congregation Areas (DAC)
- Number fluctuates during season

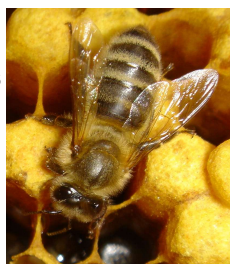


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Worker Bees

- All female
- Underdeveloped reproductive structures
- Can lay eggs in the absence of a queen

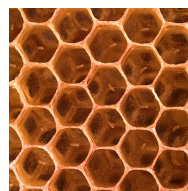


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Worker Bee Development

- Size of cell determines fertilization
- 95% should be fertilized
- Eggs will remain upright for 3 days



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Worker Bees

- Complete metamorphosis
- Days as larva = 6
- Days pupate = 12
- Days as egg = 3



Total is 21 days of [development](#)

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Worker Bees

- Lots of hive tasks that change with age

– Nurse Bees

- Clean, feed larvae and queen

– House Bees

- build comb, take nectar from foragers, guards, ventilate the hive

– Forager/Field Bees



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Worker Bees

- Guards
 - Inspection by odor
 - Drawn to your face
 - Defend against intruders
 - Defense position
 - 100 +/- on duty at one time

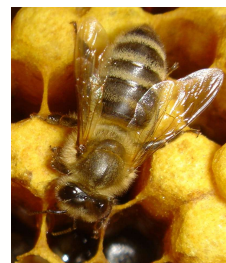


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Worker Bees

- Foragers
 - 3-4 weeks old
 - Scout bee or recruited
 - Gather
 - Nectar
 - Pollen
 - Water
 - Propolis
 - Total lifetime about 6 weeks



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Queen Bee

- Days as egg = 3
- Days as larva = 5.5
- Days pupa = 7.5
- Queens are different = 15.5-16 days



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Queen cells

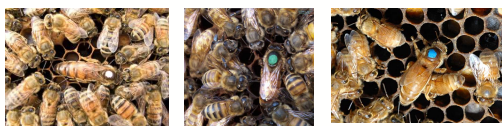
- Can be found on both sides of frame
- 2-3 or 20+ developing at one time
- First to emerge is the winner!
- Fight to the death, often with help from sisters

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Queen Development

- Virgin queen continues to mature
 - Eats and then takes orientation flights to prepare for mating flight
 - Identifies landmarks near hive



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Mating

- DAC – 30' to 300' above open fields or forest clearings
- Same place every year – how do they know?
- Emits pheromone to entice drones

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Pheromones

- Virgin queen produce some
- Colony uniting scent after mating
- Signals queen is present
- “Queen substance” = 17 different chemicals produced in queen glands
- Reduced over time

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You're outta here!

- Crowding, egg laying ↓



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Supersedure

- Queen becomes lost, injured, crushed, diseased
- Workers choose youngest larvae < 3 days



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Buying Bees

- Buy an established colony
 - Market value
 - Disease, pests
 - Condition of equipment
 - Full strength colony difficult to manage for beginners (swarm prevention, disease management, pests, etc.)
 - Not recommended for beginners

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Collection Bees

- Acquire a swarm



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Buying bees: Nucs

- Nucleus
- 5 frame boxes
- Consists of mated queen, bees, drawn frames of foundation with honey and pollen
- Queen laying minimum of one month
- Usually from a local breeder
- Equipment compatibility

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Buying bees: Packages

- Come in pounds usually 3#
- Come from Southern breeders
- Queen is mated, caged
- Cheap option - \$110 - \$150
- Get what you pay for



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Buying bees

- Nucleus (nucs)
 - Most sold out Jan/Feb, possibly sooner
 - Find a local breeder
 - Availability depends on winter survival
 - More expensive
 - Potential for increased disease
- Packages
 - Generally never sell out
 - Come from southern states
 - Several associations place group orders

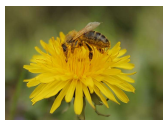
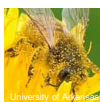
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Foraging and Nutrition

The big three...

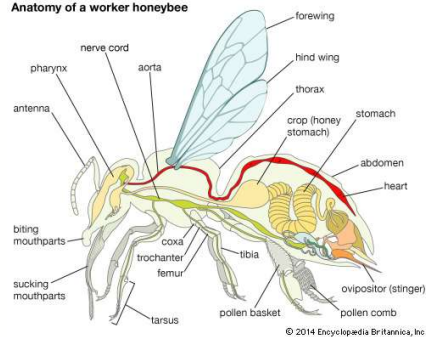
*propolis



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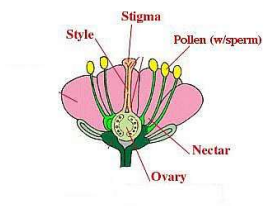
Anatomy of a worker honeybee



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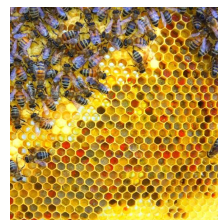
Foraging: Nectar

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Foraging: Pollen

- Protein, starch, fat, vitamins and minerals
- Varies in color
- Produced by flower anther
- Covered with layer of honey to preserve it



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Foraging: Pollen

- Use pollen baskets to transport



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Foraging: Propolis

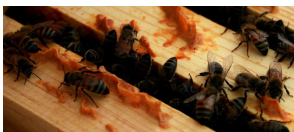
- Microbially active resinous substance
- Gathered on warm, dry days (77 < degrees)
- Alders, birch, willows, conifers



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Foraging: Propolis



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Bee Breeds

- German Black Bee/Northern European bee
 - First imported bee
 - Flourished along east coast
 - Stung a lot
 - Prone to serious disease

On the look out for another bee

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Bee Breeds

- Italians (1850s)
 - Most popular
 - Yellow in color
 - Overwinter well
 - Build up quick in spring
 - Prone to robbing b/c of large populations



*Cordovans

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Bee Breeds

- Caucasians
 - Caucasus Mountains (Black & Caspian Seas)
 - Lead gray color
 - Very gentle
 - Swarm infrequently
 - Poor overwintering
 - Slow spring buildup
 - Susceptible to Nosema
 - Propensity to gather large amounts of propolis



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Bee Breeds

- Carniolans
 - Austrian Alps (Yugoslavia)
 - Gray/brown
 - Conservative with winter food storage
 - Construct new comb slowly
 - Build up quickly in spring
 - Swarm frequently



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Bee Breeds

- Buckfast
 - Hybrid of many breeds of bees
 - Fairly gentle
 - Highly resistant to tracheal mites, chalkbrood
 - Very hygienic
 - Good beginner choice



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Bee Breeds

- Africanized
 - East Africa
 - Imported by Brazil



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Bee Breeds

- Russians
 - Some resistance to varroa mites
 - Highly resistant to tracheal mites
 - Darker than Italians
 - Only raise brood during periods of pollen availability



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Bee Breeds to Fight Disease

- Indiana Leg chewers (Purdue Leg Chewers)
 - Minnesota Hygienic Queens
 - Italian bee
 - High hygienic behavior
 - American Foulbrood, chalkbrood, mite
- Other breeds out there include: Starline, Midnite, Yugo, All American, Pol-line

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Bee Breeds

Other breeds out there include: Starline, Midnite, Yugo, All American, Pol-line

Very few TRUE purebreds exist

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Quiz



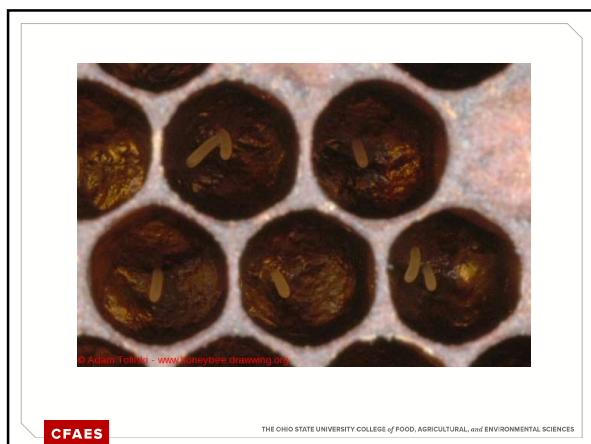
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Brood Diseases: AFB

- American Foulbrood Disease (AFB)
- State Bee inspection programs
- Easily spread by bees and keepers



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Adult Diseases: Nosema

- *Fungus Nosema apis* or *Nosema ceranae*
 - Feces on entrances and inner parts
 - Periods of confinement or stress
 - Symptoms are subtle

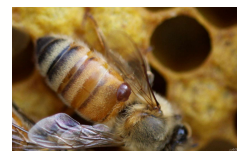


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Parasites

- Varroa mite
- See without microscope
- Thresholds 2-5%
- Sampling
 - Cap scratcher
 - Sugar shake
 - Sticky boards



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Hives Pests: Wax Moth



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Hives Pests: SHB

- Small Hive Beetle



- Many marketed products

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Predators

- Bears – not in this part of OH-IO
- Ants
- Skunks
- Hornets
- Mice, moles, shrews, rats



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Thank you!

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