



Beekeeping

Session Three: The honeybee

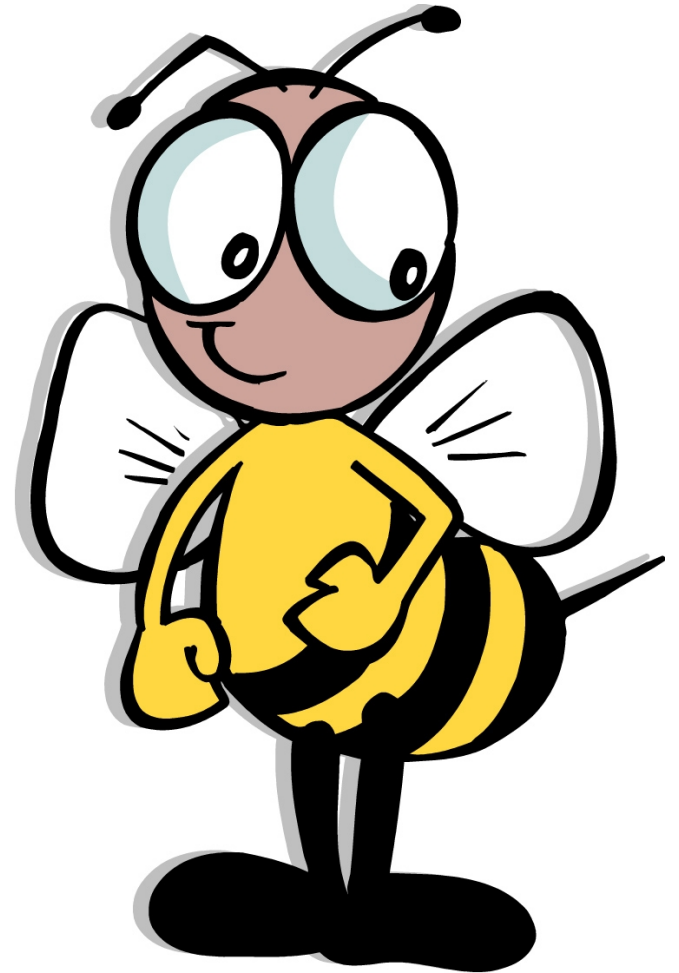
Tonight's Agenda

- Anatomy of the honeybee
- Life cycle
- Principal activities
- Supercedure
- Swarming
- Stings



Anatomy of the Honeybee

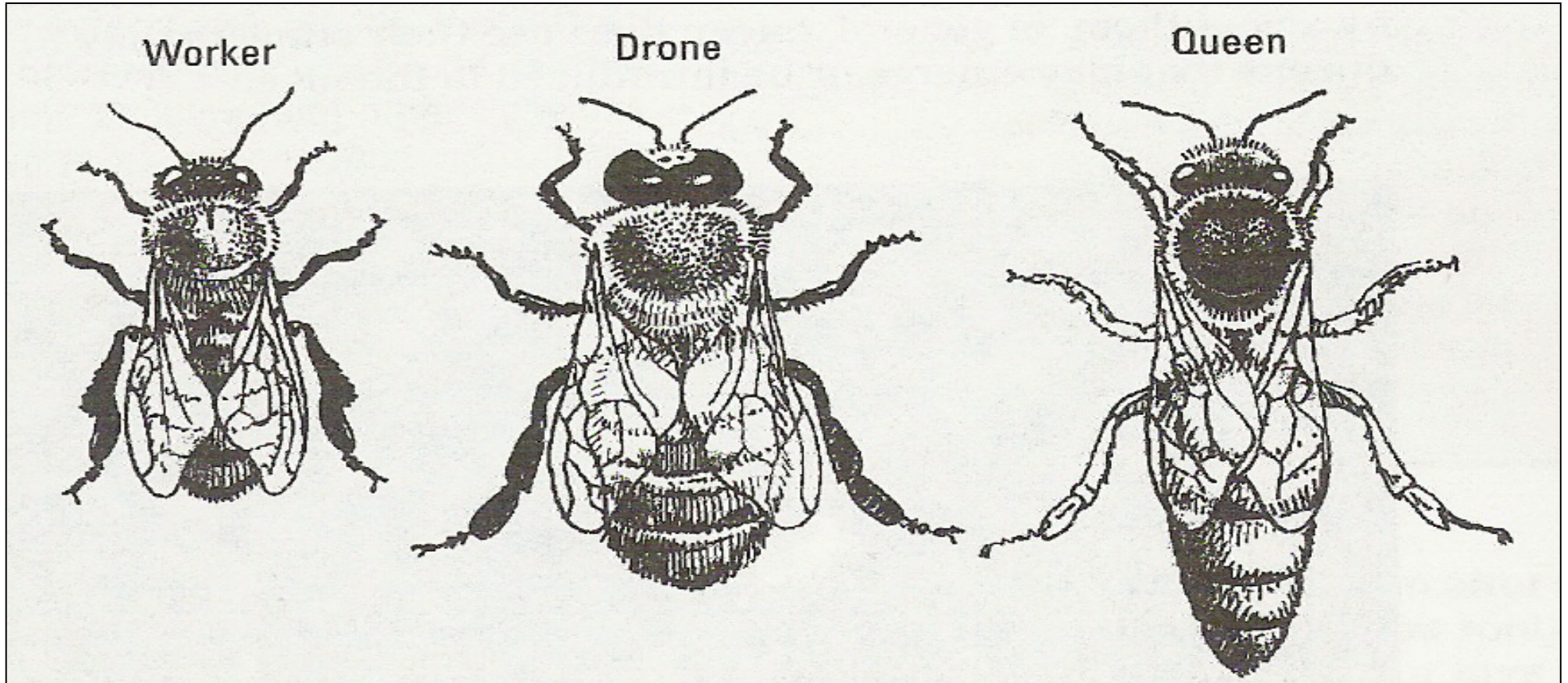
- Of the individual honeybee
 - Physical features
 - Life cycle
- Of the colony, as a social unit
 - The castes
 - Division of labor



Colony – Composition

- Castes
 - Workers, female, many thousands
 - Drones, male, a few hundred
 - Queen(s), female, usually one
- Population, bell curve
 - Object 1: prepare to forage
 - Object 2: prepare for winter
- Absence of leadership
- Dynamics
 - Environmental influences
 - Adjust and adapt

Members of the “Cast”



Life Span:
Six Weeks

Three months

Three to five years

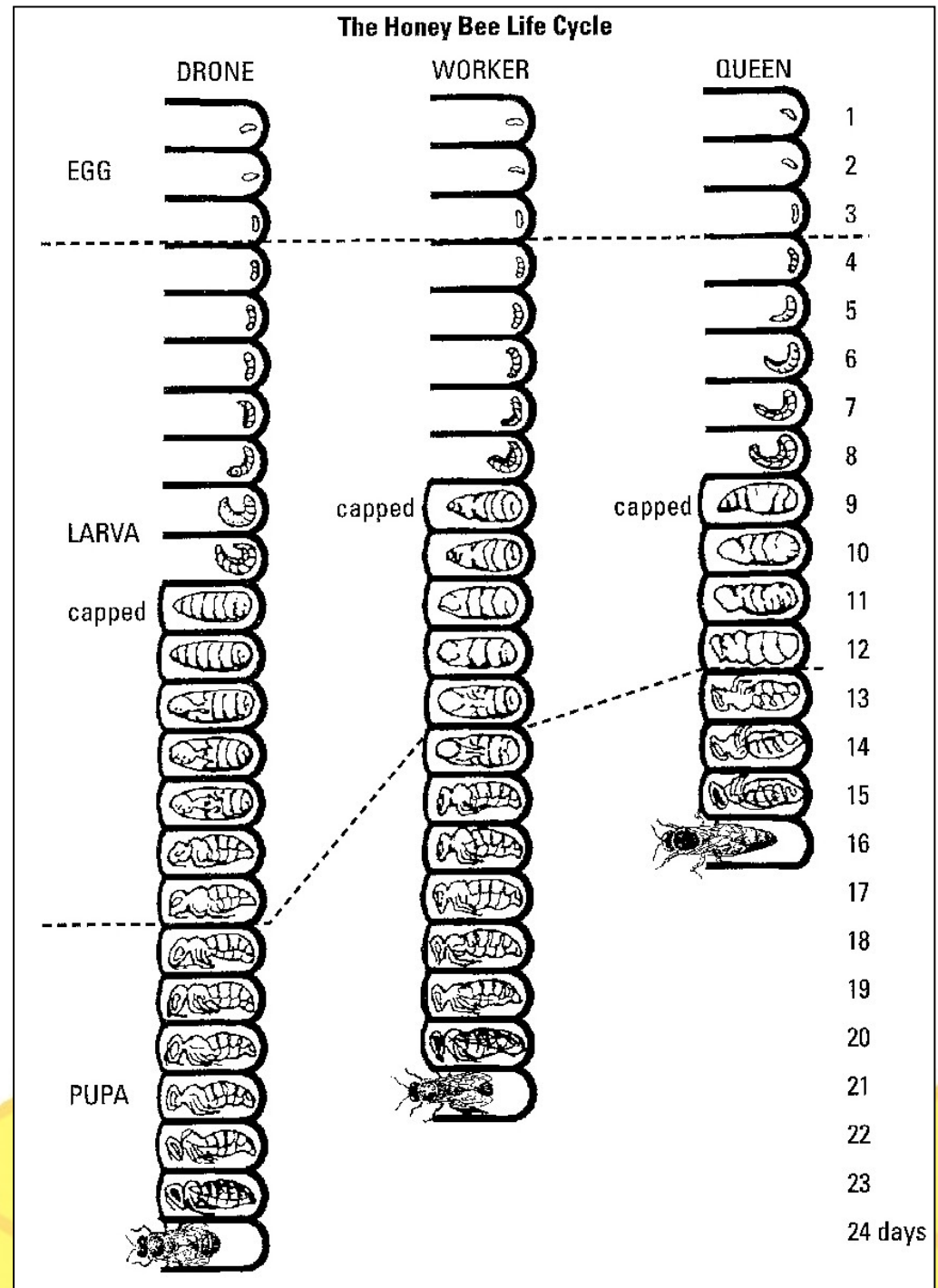
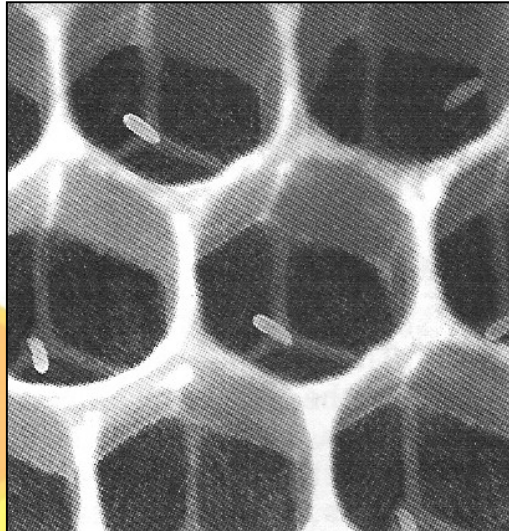
Contributions – Functions

- Queen
 - Egg laying
 - Pheromone production
- Workers
 - Multiple functions
 - Progression through life, physical abilities
 - Quite flexible, depending upon colony need
- Drones
 - Mating with virgin queens from other colonies
 - Take up space



Metamorphosis

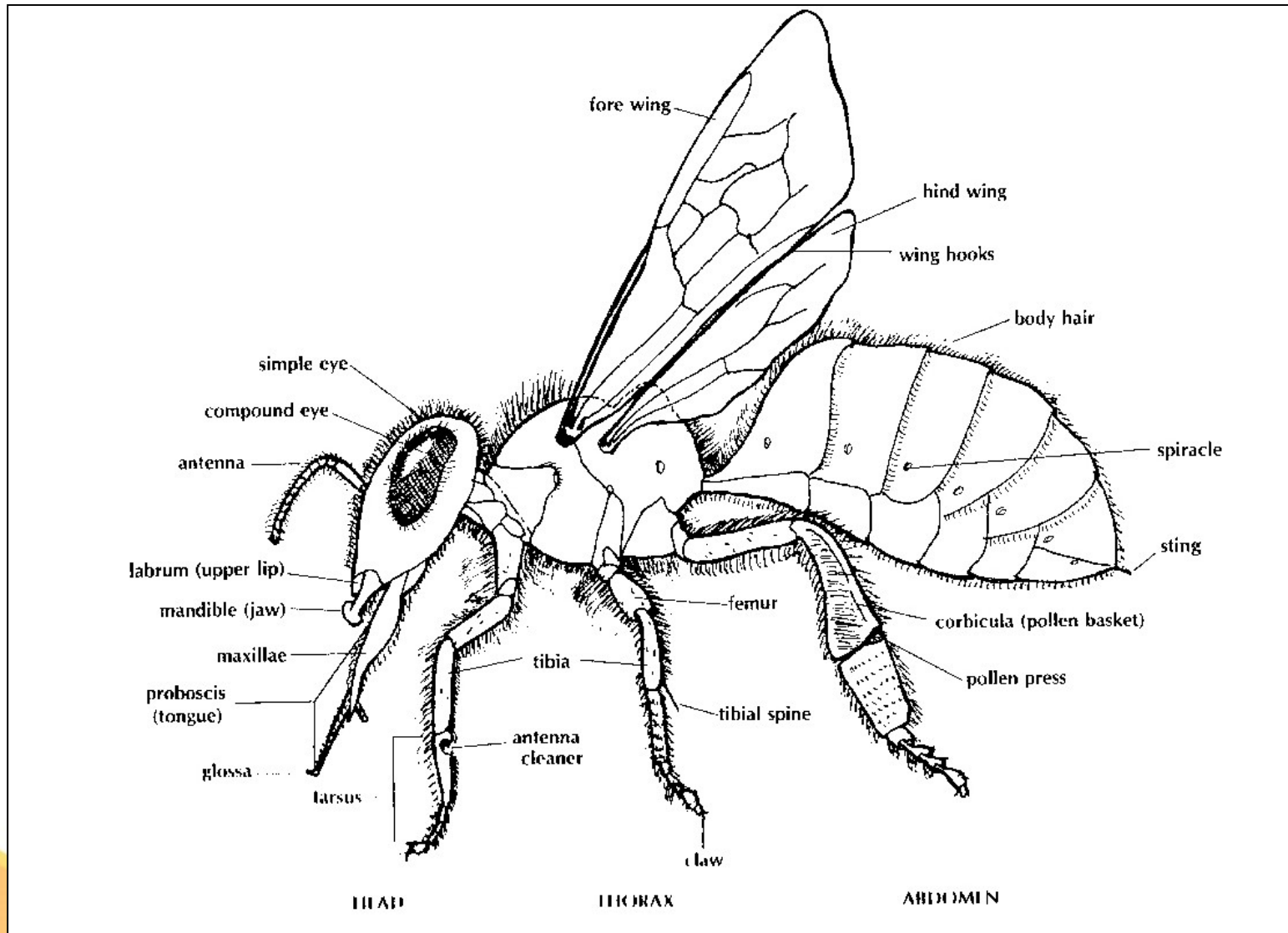
- Egg => Larvae => Pupa
- Differential length of development
- Fertilization
- Effect of feeding



The Life & Times of a Worker Bee

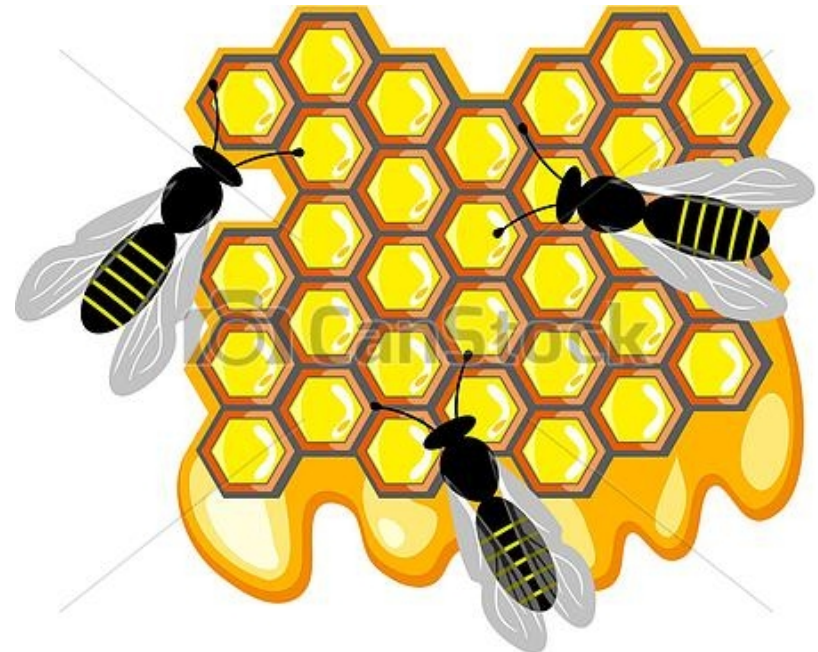
- **Part One:** metamorphosis
 - Egg (3 days)
 - Larva (10 days)
 - Pupa (8 days)3 weeks
 - **Part Two:** house duties
 - Cleanup
 - Feed Brood
 - Care for the Queen
 - Build Honeycomb
 - Store Nectar & Pollen
 - Make Nectar into Honey
 - Guard Hive EntranceAbout 3 weeks
 - **Part Three:** field duties
 - Forage
 - CommunicateAbout 3 weeks
- This process is similar to that of other insects like butterflies
- Begins immediately after emergence; as the worker bee ages she moves from one duty to the next; work is based on needs of the colony; **work is done without supervision**
- Begins with orientation flights; very efficient use of effort; “tell” other bees where to find forage; work themselves to death

Worker – Physical Features



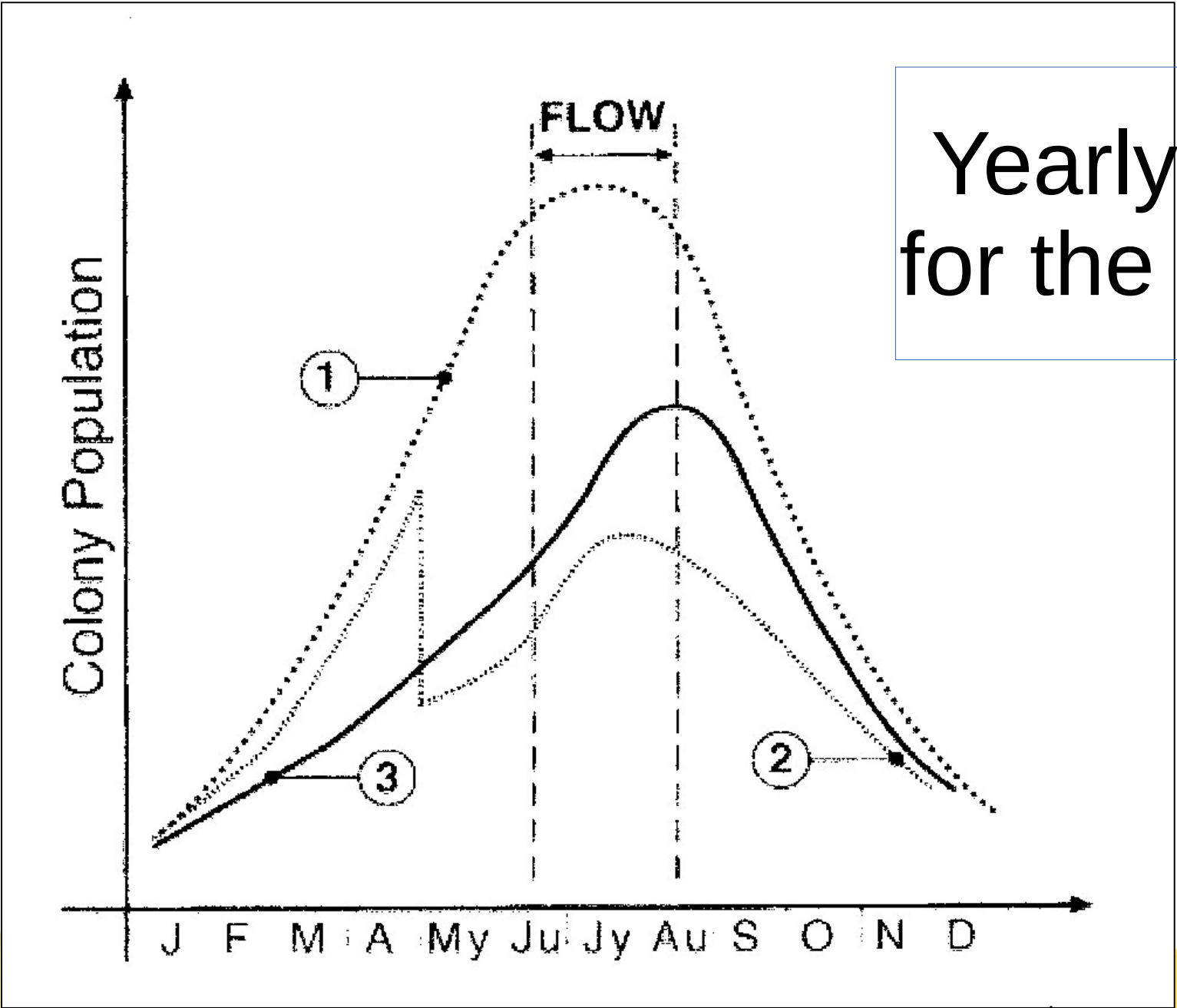
Principal Activities

- Seasonal urges
 - Spring build up
 - Swarming
 - Preparation for winter
- Foraging
- Climate control
- Sanitation
- Defense
- Construction of honeycomb



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Yearly Cycle for the Colony



1--Healthy, 2--Swarmed, 3--Diseased

Foraging

- Objects sought
 - Nectar (carbohydrate source)
 - Pollen (protein source)
 - Plant resins
 - Water
- Abilities of note: Communication, navigation, heightened sensory capabilities
- Fidelity

Environmental Control

- Cooling
- Ventilation
 - Processing nectar into honey
 - Bearding
- Heating
 - Incubation
 - Cluster
- Sanitation (propolis)

Defense

- Protective behavior
 - Brood
 - Stores
 - honeycomb
 - Not exhibited while in swarm state
- Variable depending upon several factors
- True, even for Africanized bees
- Many forms of provocation *

* poor weather conditions, fumes, vibration, predation, etc.

Production of Honey

- Discovery of nectar source
- Conveyance to hive, enzyme, honey stomach
- Transfer to house bees for placement
- Communicative dance—spread the word, recruit larger field force to tap source
- Concentrate plant sugars, reduce water content
- Airtight seal to protect honey from dilution
- Example of the abundance of nature

Honeycomb

- Built with wax biologically produced by bees
- Multi purpose vessel
- “Bee space”
- Typically parallel curtains, burr comb
- Suspended from horizontal surface
- Cells of two sizes
- Queen cells
- Architectural characteristics



Notes on Honeycomb

- Extremely high overhead cost for bees
- Consume 8# nectar to produce 1# wax
- Save/conserve wax when possible
- Brood comb is target of wax moths
- Brood cells diminish in size over time
- Contaminants accumulate, replace on cycle

Superscedure

- Object: replacement of an injured or unproductive queen
- Placement of queen cells
 - On face of frame – indicates superscedure
 - On lower edge of frame – signals intent to swarm
- Consequences
- Decision to allow/thwart superscedure



Notes on Queen Replacement

- Special feeding begins at hatching of egg
- Intercaste queen results if started late
- Seven to ten days after emergence, queen goes on mating flight
- Mates with 18-25 drones while in flight, genetic diversity is an object
- Seven days after flight, begins to lay eggs
- Will not leave nest again, except to swarm

Swarming

- Reproductive strategy
- Typically in the spring
- Survival through following winter is a challenge
- Inhibits honey production of parent hive
- Diminishes parent colony population by half
- Signals of the swarm urge
- “Control” measures

Stings



- Mechanical aspects
 - Pheromone release
 - Separation of stinger and venom sac from bee
- Usually fatal to the bee
- Pheromone acts as signal of alarm, apply smoke to site of sting
- More likely to occur near colony nest
- Use care in removal of stinger
- Many stings caused by bee getting squeezed in clothing
- Calm, slow, fluid movement will help to minimize stinging

Q & A

- Anatomy and castes
- Life cycle
- Bee activities and behavior
- Supersedure
- Swarming
- Stings

Closing

- Next session
- Thank you