LIFE CYCLE OF THE HONEY BEE

From egg until death

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Three Castes of Bees in a Colony

• A honey bee colony is an organized society of three adult castes of bees:
  – Queen,
  – Workers, and
  – Drones.

• Each caste has its own certain specialized responsibilities for the ongoing operation, maintenance and preservation of the colony.
Three Castes of Bees in a Colony

Two castes are female, the queen and the worker, and only one caste is male, the drone.
Queens

• Queens, responsible for producing and laying eggs, live an average of 2-3 years, but some can live up to 5 years.

• Domesticated queens may die earlier, as beekeepers “re-queen” the hives frequently.

• A single queen can potentially lay millions of eggs throughout her life.
Queens (Continued)

- In order for a colony to survive, the queen needs to lay a massive number of fertilized eggs throughout her productive life.
- Young, vigorous queens are desirable because they have a higher capacity for egg laying.
- Queens who experience diminished egg laying ability will be superceded by the colony.
- The workers, produced from the fertilized eggs, will forage for food, build a strong and well-insulated hive, take care of larvae and defend the colony from enemies.
Queens (Continued)

• The queen mates **only one time in her life** but she mates with as many as two dozen drones, to assure genetic diversity in the colony.

• After mating, a queen can lay up to **2,000 eggs in a single day!**
• Queens also produce unfertilized eggs that hatch into drones, or male honey bees.
• The sole purpose of drones is to mate with a queen, and their life span relates directly to this task.
• Should a drone succeed in mating, he soon dies because his penis and the associated abdominal tissues are ripped from the drone's body after sexual intercourse.
• If he is unsuccessful in the mating flight, the drone will be ejected from his hive at the end of the active summer season and will eventually die of cold or starvation.
Drones (Continued)

- The drones spend their days flying out to drone congregation areas (DCAs) in the early afternoon and flying home just before dark.
- They spend their entire lives in hopes of finding a queen to mate with.
- Dr. Keith Delaplane, of the University of Georgia, describes drones as “flying sperm”.

Workers

- Worker bees are the smallest members of the colony, but they comprise the largest number:
  - A hive can contain from 20,000 up to 80,000 workers.

- The life span of worker honey bees ranges from five to seven weeks, during their active spring and summer months.

- The first few weeks of a worker’s life are spent working inside the hive as house bees, while the last few weeks are spent outside the hive as field bees, foraging for nectar and pollen.
Workers (Continued)

• After **3 days**, eggs hatch into worker larvae.
• During this stage, each larva will be fed about 1,300 times a day!
• They are fed by young worker bees that have the specific task of tending the brood, and are referred to as the “brood nurses”.
Workers (Continued)

• The food is made from pollen, honey and secretions of enzymes produced by the brood nurses. This food is called “bee bread”.
The Four Stages of Metamorphosis

Honey bees go through four stages, from egg to adult.
Duration of the Metamorphosis

• The life cycle of honey bees begins when an egg hatches.
• During the first stage of its development, the offspring form a digestive system, a nervous system and an outer covering (the exoskeleton).
• Each member of a colony develops, after hatching, as an adult over varying durations:
  – Queens become full-grown adults within 16 days,
  – Workers develop into adults in 21 days,
  – Drones require 24 days.
Larval & Adult Life Cycle of a Worker Bee
The cycle for a worker bee is approximately 9 weeks from egg to death.
Egg Stage

- The first stage of physical development in the life cycle is the egg stage.
- The queen determines, each time, whether she will lay a fertilized or an unfertilized egg, based on the cell size.
- Eggs are very minute and have the appearance of grains of rice in size, shape and color.
- Hatching of the egg normally occurs after **three days** from the egg being laid.
Larval Stage

• Generally lasts up to ten days.

• Larvae are fed on a diet known as royal jelly for the initial 2 days.

• Royal jelly is produced by the hypopharyngeal gland in the head of the workers.

• As the 3rd day progresses, larvae destined to develop into queen bees continue to be fed on royal jelly, while worker larvae feed on honey, pollen and water.

• Larval stage duration:
  – Queen: 5.5 days,
  – Worker: 6 days
  – Drone: 6.5 days.
Pupal Stage

- Massive reorganization of bodily tissues takes place during the pupal stage.
- The worm-like body has now three distinct parts:
  - Head,
  - Thorax, and
  - Abdomen
- This stage usually lasts for:
  - **7.5 days** for the queen,
  - **10 days** for the worker, and
  - **14.5 days** for the drone.
Adult Stage

• All three castes of bees are now fully mature and they are ready to accomplish their biologically pre-determined tasks.

• A typical colony of honey bee consists of:
  – **50,000 to 60,000** worker bees,
  – **600 to 1,000** drone bees, and
  – **Only 1** queen bee (ordinarily).
From Egg to Adult Field Bee

Three weeks (21 days) from egg to adult then six weeks as a worker.
Yearly Cycle of the Colony

- Honey bee colonies perform very differently depending on the season that they are experiencing:
  - Spring
  - Summer
  - Fall
  - Winter
Spring

• By spring the colony is building up well. They should have raised at least one turnover of brood by now.

• They will really take off with the first bloom. This depends on what is flowering in your area.

• Between early spring and mid-May the colony will be intent on making swarm preparations.
Spring (Continued)

• They will try to finish building up and then start back-filling the brood nest with nectar so that the queen can't lay. This sets off a chain reaction that frequently leads to swarming.

• If they decide to swarm, then the old queen leaves the hive with a large number of the young worker bees and they go off to start a new home elsewhere.

• Meanwhile the new queen emerges in a couple of weeks and starts laying after her mating flight is accomplished.
Summer

• Nectar flow occurs mostly in the spring and early summer. This is usually followed by a late summer lull.

• Depending on the area, the primary nectar flow runs from mid-spring until it ends when blooming ceases in late summer.

• Beekeepers need to be aware of flowering plants that create nectar flows in their area.
Fall

• We sometimes get a fall nectar flow.
• It's mostly goldenrod, aster and chicory with some sunflower, along with partridge pea and other weeds.
• Some years it's not enough to get the bees through the winter and they have to be fed.
• Usually around mid-October, queens stop laying and the bees start settling in for the winter.
Winter

- The colony should go into winter with sufficient stores, not only to survive the winter, but to build up enough by spring for the colony to reproduce. To do this the colony needs lots of honey and pollen.

- The bee colony appears to be dormant all winter. They don't fly unless the temperatures get up to around 50° Fahrenheit.

- Once a brood nest is established, the cluster must maintain a constant temperature between 94.1°-98.0° Fahrenheit inside the cluster all winter.
Winter (Continued)

- The cluster takes a lot of energy to maintain brood temperature.
- As soon as there is any supply of fresh pollen coming in, the colony will begin buildup in earnest. Usually the early pollen is from the Maple and Poplar trees.
- Beekeepers often put pollen patties on at this time so the weather won't be a deciding factor in the buildup.
Enjoy your exciting new hobby - keeping honey bees.

There is much for you to learn so take advantage of every opportunity.

Join your local and state beekeeper associations and get involved!
Thank you for your time and attention!

QUESTIONS?
If you would like to have a copy of this presentation for review, it is available on my website www.RoseHillFarmLLC.com along with other presentations of mine.
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