Beekeeping

Learning Objectives

The learner will…

- Understand the basic life cycle of the honeybee
- Learn about beekeeping tools and equipment
- Learn to manage beehives for honey production and pollination
- Learn about bee diseases and pests
- Learn to harvest and market honey

INTRODUCTION TO BEEKEEPING

The first step in becoming a beekeeper is deciding if you actually want to be one. It would be a shame to commit your time and money only to discover that you really don't enjoy it.

There are several ways to figure this out:
(we recommend you do all of these)

- Read literature on the subject,
- Attending local, district or state beekeeping association meetings,
- Attending beekeeping educational classes
- Visit beekeeping websites
- Establishing a relationship with an experienced beekeeper.

Beekeeping Terminology

- Apiary: A bee farm is an apiary, and a bee farmer is called a beekeeper.
- Brood/ Larvae: Young bees before metamorphosis
- Brood chamber: The box in which the queen bee lives and lays eggs. Where young bees are raised.
- Colony: A large group of bees that live in a hive.
- Comb Cell: Where bees store honey and pollen and also where queen bee lays eggs.
- Drone: Small male bees. There are very few drones in a colony. Their job is to mate with the queen bee.
- Frame: As the name implies, each of these components “frames” a beeswax comb, giving it rigidity and strength and uniform shape.
- Hive: Home for bees made up of several boxes each box is filled with frames and has two covers that keep out rain, snow, dirt and animals. The bees make their combs on the frames.

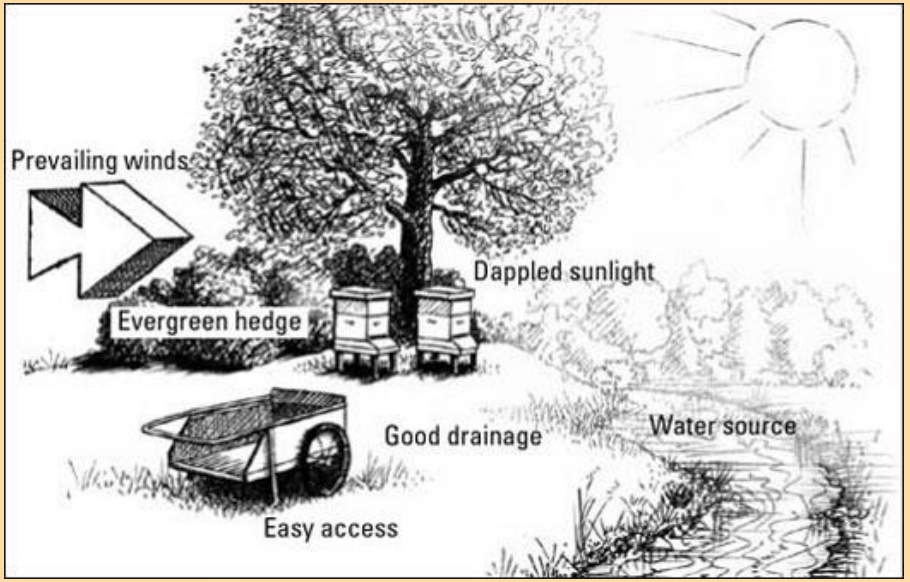
- Hive stand: Keeps the hive off the ground so that it does not get too cold or too wet.
- Hive Tool: Tool used to pull apart the sticky frames.
- Honeycomb: A wax structure built by bees, made up of six-sided cells.
- Honey Supers: Wooden boxes where the worker bees store honey.
- Queen Bee: Leader and mother of the bee colony. The only female that can lay eggs.
- Queen Excluder: Heavy gauge wire panel placed on top of honey supers that keeps the queen bee in the brood chamber and stops her from laying eggs in the honey supers.
- Smoker: A device used to spray light smoke into the hives. The smoke calms the bees so they don't sting.
- Swarm: A group of bees that have left the hive to form a new colony.
- Worker Bee: The majority of the colony are worker bees. Female bees that cannot lay eggs. Younger worker bees are called house bees. They clean the hive, make honey, and care for the younger bees. Older worker bees are called forager bees. They gather food for the colony and defend the hive from enemies.

Who's in a Beehive?

A Honeybee Colony or Hive consists of :

- Queen : Lays fertilized eggs reared in a special cell called a "queen cell" and fed royal jelly by nurse bees, only 1 adult queen per colony, hive cannot continue without queen, queen can lay worker or drone eggs
- Drones- Male bee, mates with queen, can not sting, develop from unfertilized eggs
- Brood- Young bee larvae
- Workers- Female bees, sterile, perform sequence of jobs as they age
  - first half of life: cleaning brood cells, cleaning the hive, feeding older larvae, feeding younger larvae, taking orientation flights with young bees, evaporating nectar, building comb, feeding queen & drones, keeping an even temperature in brood nest, and guarding entrance to hive.
  - The last half of life is spent foraging for nectar, pollen, water, and propolis materials (bee glue) outside hive.

The Apiary



- Honeybees are social insects.
- Colonies can grow to more than 60,000 bees.
- Bees pollinate fruits & vegetables, and produce honey & beeswax.
- Keeping bees is a specialized skill requiring familiarity with the seasonal rhythms of the honeybee life cycle.
- It is almost always necessary to spend time with a mentor beekeeper to learn what is involved.

Situate your beehives in a protected sunny location (they prefer eastern exposure) with source of clean water, nectar sources, and good drainage.

Startup considerations

What's in a beehive?

Beehive consists (from top to bottom) of outer cover, inner cover, honey supers, queen excluder, brood super(s), bottom board, and hive stand. Supers contain wax filled frames separated by bee space (1/4 inch – 3/8 inch).

Queen Excluder used to keep queen in the bottom of the hive.

Managing frames using a hive tool

Wax Filled Frames used by bees to store honey. These are plastic but you can construct your own wood frames:

Frame Assembly

Clothing: Bee Suits/Boots/Gloves

Choose loose-fitting, light colored, long pants and long sleeves with a smooth finish. Wear boots that come over the ankle. Secure the bottom of pants over the boots and the sleeve cuffs with straps, tape or rubber bands to prevent bees from entering.

Gloves should fit well otherwise they will make you clumsy and may increase stinging. Experienced beekeepers do not wear suits or gloves most of the time, but these can be valuable for the beginner beekeeper!

Veils/ Helmets

A veil should be worn to avoid stings on the face, especially near the eye, in the nose and in the ears.

- Types of veils: detachable including folding & round; worn over helmet & secured in place with drawstrings tied around the waist
- Zip on style, nylon or wire mesh that zip onto a coverall.

Tools

- Hive tool used to pry apart supers & frames
- Brushes used to brush bees off of the frames
- Scrapers used to open wax cells during honey harvest

Smoker

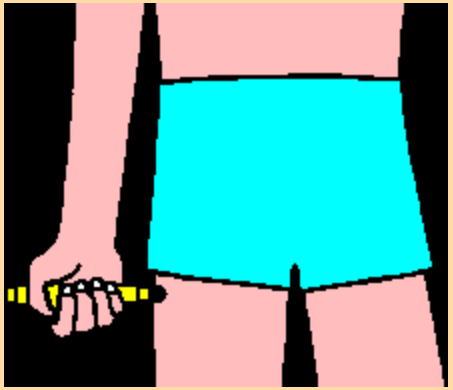
Smoke:
- Masks alarm pheromones
- Triggers instinct to retreat to hive
- Bees may believe hive is on fire & gorge with honey in preparation for leaving. This makes them slower and less able to sting.

When smoking a colony, position the smoker spout a few inches away and use small puffs of smoke.

Smoker fuel can include wood chips, bark, twine, or straw

EpiPen Auto-Injectors

In case of emergency, due to an allergy to beestings or multiple beestings, always have available EpiPen Auto-Injectors handy for both adults and children. Each pack comes with a practice pen and two live injectors.



Getting your bees

If you want a hive to be productive, start it in late spring or early summer. You can start by:

1. Ordering a Package- a 3 lb package is about 12-13,000 bees. There are a few different ways to install a package. Pierce the candy that plugs the queen cage with a nail, place her securely in the hive. Remove several frames before dumping in the bees, then replace frames.

2. Obtain a split or divide from another beekeeper (more later on this). There will only be a relatively small number of adult bees and a large number of brood cells; so make sure the temperatures are warm enough for the adults to cover (warm) the brood.

Types of bees- Russian Italian Carniolan Caucasian Buckfast

Working with Hives

- Put on a suit and light the smoker.

- Work with slow, steady movements.

- Come to terms with stinging insects flying around you; remain calm. If you get stung or get scared walk away from the bee area.

- Leave colony open for as little time as possible.

- Inspect the colony for appropriate activity dependent on the season.

- Pay close attention to your mentor beekeeper to learn the needs of the hive.

A Healthy Brood Frame

Inspect the brood frames for healthy larvae (they should appear white). Look for eggs standing in the bottom of cells and for cell caps which will be convex and tan. Also, look at the pattern of the cells with brood. The pattern should be compact and in a semicircle with very few skipped cells and usually on the bottom half of the frame.

Unhealthy brood are often concave and perforated with small holes because the worker bees chew them. Gray, yellow, brown or black larvae are diseased, chilled or injured.

Burr Comb

Remove burr comb as you work bees and save wax in a clean container to melt and sell.

Dividing Colonies: Making Splits

- Gain additional colonies to increase your apiary.
- Downsize a hive that has grown too large and become unmanageable.
- Prevent swarming- to almost completely eliminate the possibility do a walk away split
- Make splits in spring (usually early April) after bees replenish population but before becoming overcrowded.
- Use queen cells or eggs which workers will turn into queens.
- Include frames with brood, pollen, & honey, as well as adult nurse bees.
- Splitting/swarm prevention This video shows a pro in action but make sure you add a queen, queen cells, or eggs to your split

Swarms

Active swarm in tree

- Natural mode of reproduction in honeybees
- Usually consists of an old queen and 50-60% of the worker bees in swarming colony
- Great source of bees for a new hive
- Methods for collecting swarms vary

Hiving a swarm

Cutting down swarm

Hiving swarm

Honey Harvesting

- Look for capped frames- honey covered with thin layer of wax
- Gently smoke bees avoiding frames of honey
- Shake or brush bees from frames and transfer frames to an empty super
- Use heated uncapping knife to melt wax cappings, centrifugal turning extractor to spin honey out of frames. Filter & collect in clean containers
- Allow bees to clean frames then store. Protect empty, stored frames from wax moths.

•Honey Harvest

Overwintering Beehives

Insulated top

Entrance reducer

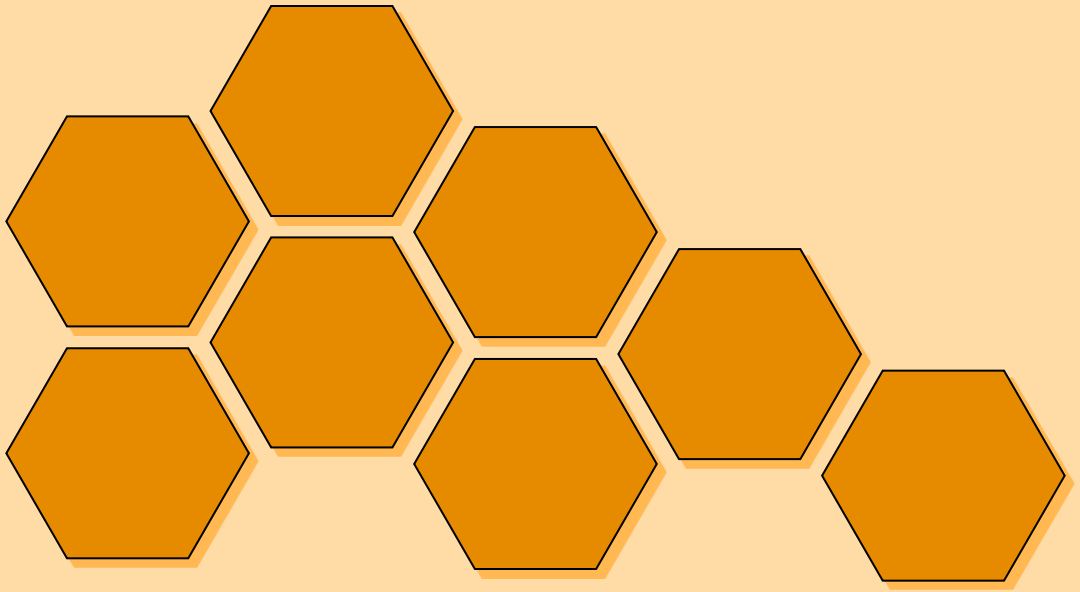
- Prepare colony for cold weather by ensuring bees have enough honey. At least 50-60 lbs of honey per colony is suggested.
- Place insulated top & surround with hay bales, bagged leaves, or tar paper.
- Protect from mice by placing entrance reducers.
- Minimize inspections during cold weather as bees go into their clusters.
- Manage air flow-air circulation is needed.
- Feed with sugar or honey during early spring if a very cold winter.

Pests & Diseases

American Foul Brood

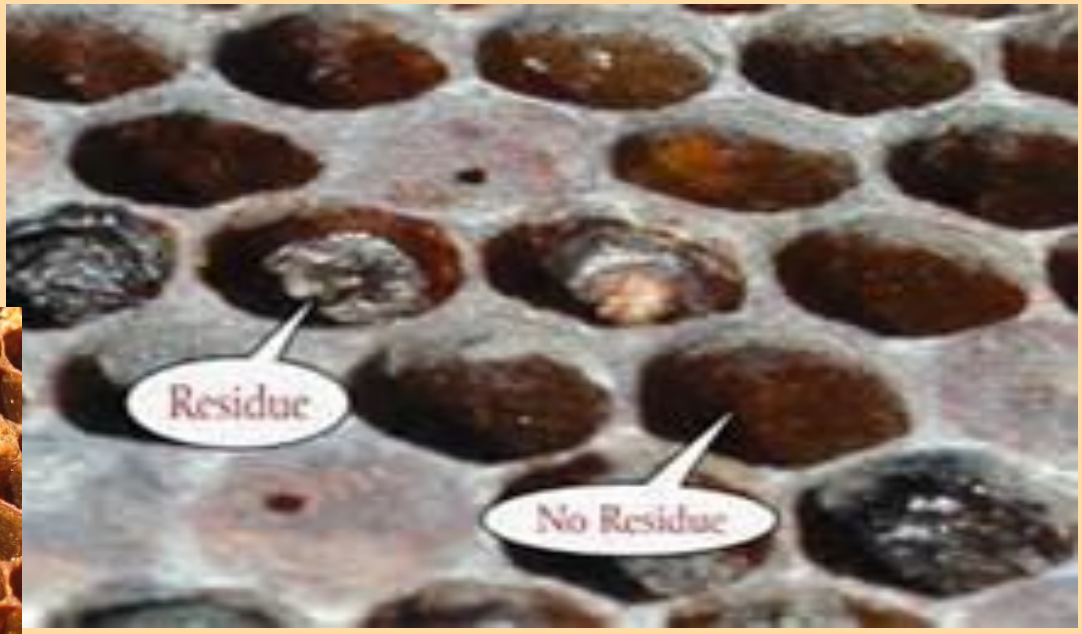
Varroa and Tracheal Mites

Small Hive Beetles



Small Hive Beetle

- Larvae destroy hives. Use oil traps in active hives; freeze stored equipment.
- Beetle Top Trap Bottom Trap
  - » Fill traps with liquid oil



American Foul Brood

- Spores can remain in wax, honey or in the wood of the hive box.

- While used hive equipment is economical, the danger of acquiring foulbrood must always be considered.

Varroa Mites

• Varroa Mites are external parasite of bees, European honey bee is a new host & so has no natural defenses
• Mites feed on the larvae especially drones
• Pesticide treatments have resulted in resistant mites
• Some bees have become resistant to mites, powdered sugar dusting forces bees to clean themselves, dislodging the mites. Can also use screened bottom boards.

Tracheal Mites

- Tracheal Mites live in breathing tubes of bees. Menthol & formic acid treatments are low toxicity treatments

Spotlight on Permaculture

Top Bar Beekeeping

Top Bar Beekeeping is an alternative/low cost method, suitable for home production. Not ideal for commercial production of honey because of the greater difficulty in separating the honey from the comb/wax**.**

Bee Poetry

“A swarm of bees in May is worth a load of hay. A swarm of bees in June is worth a silver spoon. A swarm of bees in July isn’t worth a fly.”

Self-Review Questions

- What needs to be done to keep beehives over the winter?
- What is the best way to learn how to work with bees?
- Where are other resources available?
- What safety and emergency equipment is important to use and keep on hand?

References

- Beekeeping in Indiana by Steve Doty
- Beekeeping organizations – Indiana State Beekeepers Association; Indiana Beekeepers Association; Michiana Beekeepers Association; Michigan Beekeepers Association
- Backyard Beekeeping- Kim Flottum, ed. of Bee Culture magazine
- First Lessons in Beekeeping- Keith Delaplane
- Hooray for Beekeeping! – Bobbie Kalman
- How to Keep Bees and Sell Honey – Kelleys
- The Hive & the Honeybee - Dadant