Catskill Regional Ag Conference.

Introduction to Beekeeping.

Christina Mitchell
Delaware County Beekeepers' Association
Master Beekeeper Candidate

History of Honeybees and Beekeeping

- **Honeybees have existed for a few million years. For ten thousand years, records have survived of man's exploitation of honey.**

Economic Benefits of Bees

- We've all heard about California Almonds…
- Pollinators like bees, butterflies, and hummingbirds contribute substantially to New York's environment and economy.
- According to the US Department of Agriculture, pollinators provide approximately $344 million worth of pollination services to New York and add $29 billion in value to crop production nationally each year.
- New York's ability to produce crops such as apples, grapes, cherries, onions, pumpkins, and cauliflower relies heavily on the presence of pollinators.

New York State Program

- The New York State Pollinator Protection Plan was created in coordination with the Pollinator Task Force advisory group, which included a wide variety of stakeholders—including farmers, apiarists, pesticide applicators and environmentalists.
- Development of Voluntary Best Management Practices for all pollinator stakeholders, including beekeepers, growers, landowners, state agencies and the general public;
- Habitat enhancement efforts to protect and revive populations of native and managed pollinators;
- Research and monitoring of pollinators to better understand, prevent and recover from pollinator losses; and
- Development of an outreach and public education program on the importance of pollinators, engaging the public to be active participants to seek solutions to pollinator declines.

Dyce Lab at Cornell University

- Cornell University's Dyce Lab for Honey Bee Studies is New York State's hub for honey bee and pollinator research and outreach.

Why Keep Bees?

- To make honey for personal consumption
- For pollination and pollination services
- To protect pollinators
- As a side business to make money doing something they enjoy and market honey and related products.

Types of hives

- Langstroth hives are the most common type of hive used today.
- Top bar hives are not as common

Warre Hive is also a type of hive that is similar to Langstroth

Basics of Honey Bees

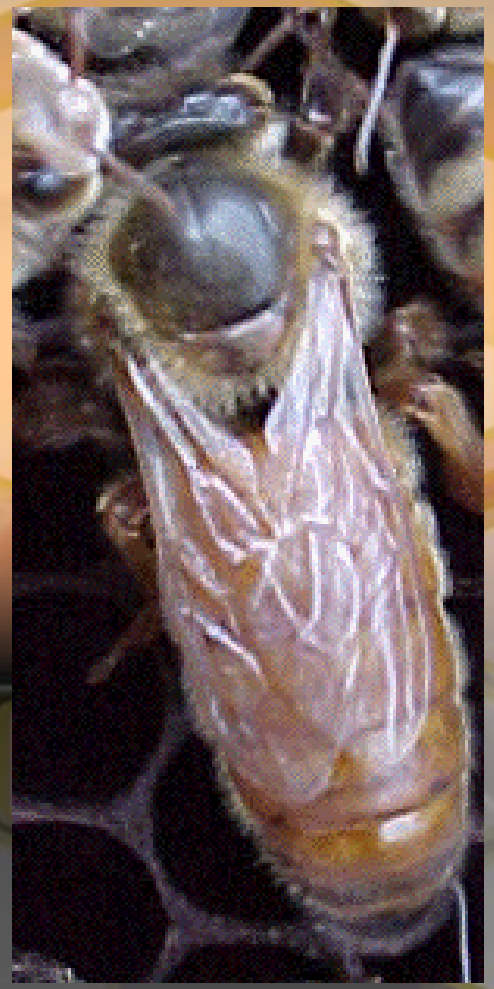
- **Honeybees live in a colony of many individuals whose joint effort is required for survival. Within this colony of bees are both females and males. The males are called drones and are necessary for mating with the queen. They gather no nectar or pollen for the hive. They also have no stinger. There may be 300 to 500 of these in a strong hive.**
- **Each colony will have a queen. She is the mother of all the bees in the colony. The queen is a female as are her daughters the worker bee. Both the queen and workers have stingers but only the worker bee is usually associated with stinging. The queen uses her stinger to kill rival queens.**

Races of Bees

BEE RACE	Italian	German	Caucasian	Carniolan	African	Cordovan SUBSET	Buckfast HYBRID	Russian HYBRID	Africanized HYBRID
PROS	• Good beginner bee • Readily builds comb • Unparalleled comb builders • Only moderate tendency to swarm • Relatively easy and calm to work with • Lower range propolis producer	• Well adapted to cold climates; • Overwinter long and cold winters exceptionally well; • Needs very moderate food supplies: • develop fertile workers more readily	• tolerant to a harsh winter environment; • not overly inclined to swarm; • calm behavior when on comb; • less prone to robbing • good resistance to some diseases;	• incredibly docile • explosive spring buildup • rank among the best for overwintering, • very good builders of wax combs, good honey gatherers. • Low tendency to rob other colonies	• Higher rates of colony growth and reproduction compared to European bees. • resistant to Varroa destructor mite and Nosema virus	• they appreciate warm weather; • More docile than their Italians; • Superb comb builders; • can be bred into any race of honeybee.	• Very gentle, productive • excellent housecleaning techniques • Very good overwintering ability • Excellent honey producers • Low swarm instinct • very small amounts of propolis	• highly resistant to parasites • overwinter well. • Adaption of brood in times of dearth • guard their hive vigilantly, • Good housecleaning • tend to have queen cells almost all the time	• Excellent honey producer: • Very defensive against predators; • Resistant to Varroa mites; • Well suited to tropical climates; • reproduce faster
CONS	• Continuous brood rearing continues after honey flow ceases • More likely to starve during long winters • Poor flight orientation, highly prone to drifting • Aggressive foragers, causing tendency to rob	• Less productive in terms of honey than some other races; • They are slow to build up the colony in spring; • nervous and excitable on the comb and aggressive to interference; • Moderate swarming; • Poor housekeepers,	• in spring, they build up the colony quite slowly • excessive propolis production • In some cases, they make makes wet capped comb, which is poor for honey comb sale; • susceptible to Nosema disease	• excessive swarming	• Preference for pollen not focused on honey production • Excessive swarming • Only for tropical areas • Highly aggressive and defensive behavior	• Consume large amounts of food in winter; • May perform poorly under cold wet conditions; • more prone to robbing than Italians.	• similar robbing tendency like Italians; • Moderate spring population buildup • If colonies are left unmanaged for one or two generations, they can become extremely defensive and aggressive.	•Brood rearing is highly dependent on forage availability •Increased swarming •Tend to propolize •Susceptible to infection by Nosema fungus •Aggressive	• Extremely defensive and highly aggressive, • Smaller nests; • Frequent swarming ; • Difficult to keep near to human habitations and livestock; • Overwinters poorly in temperate climates.
FUN FACT	*They are considered to be strong honey producers also because of their tendency to rob other colonies and take away their honey.*	*Despite developing worker bees more quickly than other races, the German bees are less productive.*	*They have a long tongue.*	*Some beekeepers say they neither have to use protective clothing nor smoke when inspecting the hives!*	*In Africa, managed honeybees can abscond from hives to become wild again, and therefore the wild and managed honeybees are all related.*	*It is not clear what caused the Cordovan bees to separate themselves from Italian strains and become their own race of bees.*	*When crossed with some different races, sometimes the second generation becomes an extremely aggressive colony.*	*They engage in "head butting" rather than stinging potential threats!*	*The media call them "Killer bees": If perceived as a threat, they are able to chase a person up to a quarter of a mile.*

The Queen Bee

- **The queen is a mature female. She lays thousands of eggs during her lifetime.**
- **A good queen may lay over 2000 eggs in a single day. A queen has the longest live span in the colony living for up to five years.**
- **She is larger than the other bees in the hive and has a slim torpedo shape.**
- **She does have a stinger, but only uses it to kill other queens.**
- **Under normal conditions a hive will have only one queen.**



The Queen Bee

The queen bee:

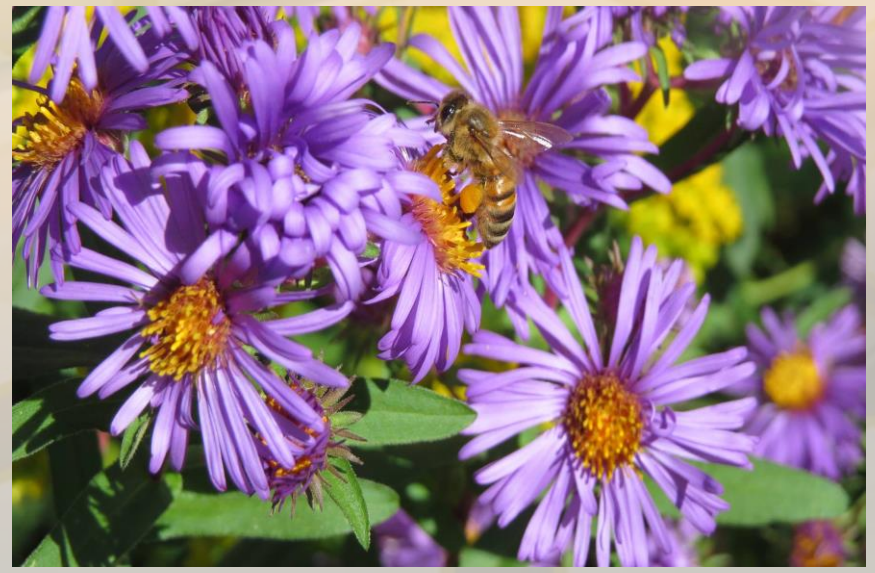
- She develops from a fertilized egg.
- She must mate with a drone to produce fertilized eggs.
- She is the mother of all the bees in the hive.
- Her role in the hive is to produce eggs and to release pheromone signals within the hive.

Worker Bees

- **Worker bees are sexually underdeveloped females. They may number as many as 60,000 in a colony.**
- **The population of a colony depends on a number of factors such as: the egg laying ability of the queen, the space available in the hive (area where the bees live) and the incoming food supply.**
- **They are called workers because that is what they do. They collect food and water for the colony, build wax comb, do the housework, maintain the interior temperatures of the hive and guard the hive against intruders [in other words: they can sting].**
- **Female worker bees under certain conditions can lay eggs but because they are not mated, they produce eggs that only develop into drones.**

The worker bee

- She is developed from a fertilized egg.
- The worker bee lives for a short period of time – usually a period of about 40 days.
- A worker bee spends its first 20 days in the hive performing various task – cleaning cells, feeding young larva, building wax comb, etc.
- The worker bee also has pollen baskets on her rear legs to gather and collect pollen while she is foraging for nectar outside the hive.



The Drones

- **Drones are the males in the colony. Note the general shape of the drone. Notice two things:**
- **1) the head is large and the eyes predominate the head and**
- **2) the rear-end of the drone is rounded --they have no stinger and can not sting.**

Drone

- **He develops from an unfertilized egg. Meaning he is passing on genetic material from his mother only.**
- **He provides ½ of the genetic material in worker bees. Although they are usually considered worthless, they contribute to the continuation of one generation to the next generation.**
- **His life span depends on the health of the colony. During poor honey flows and honey shortages, drones may be driven from the hive. This happens at the onset of winter as well.**
- **Drones can be created by laying worker honeybees.**
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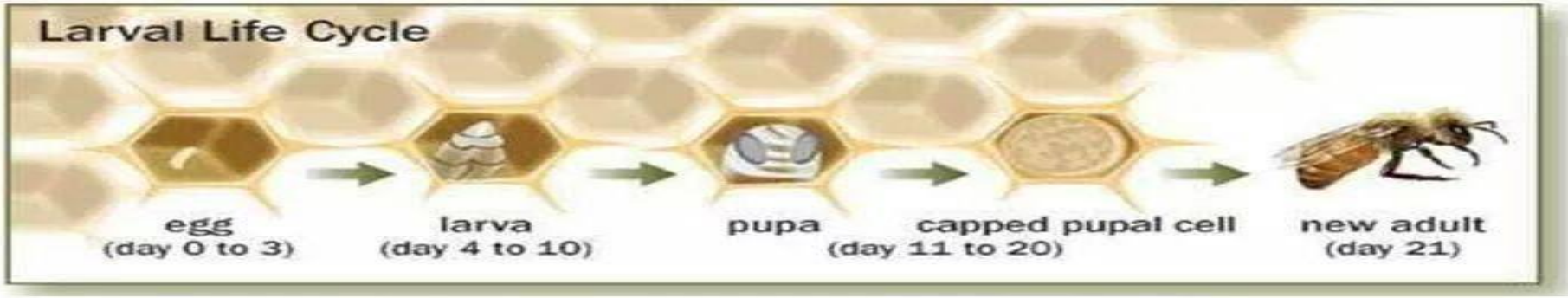
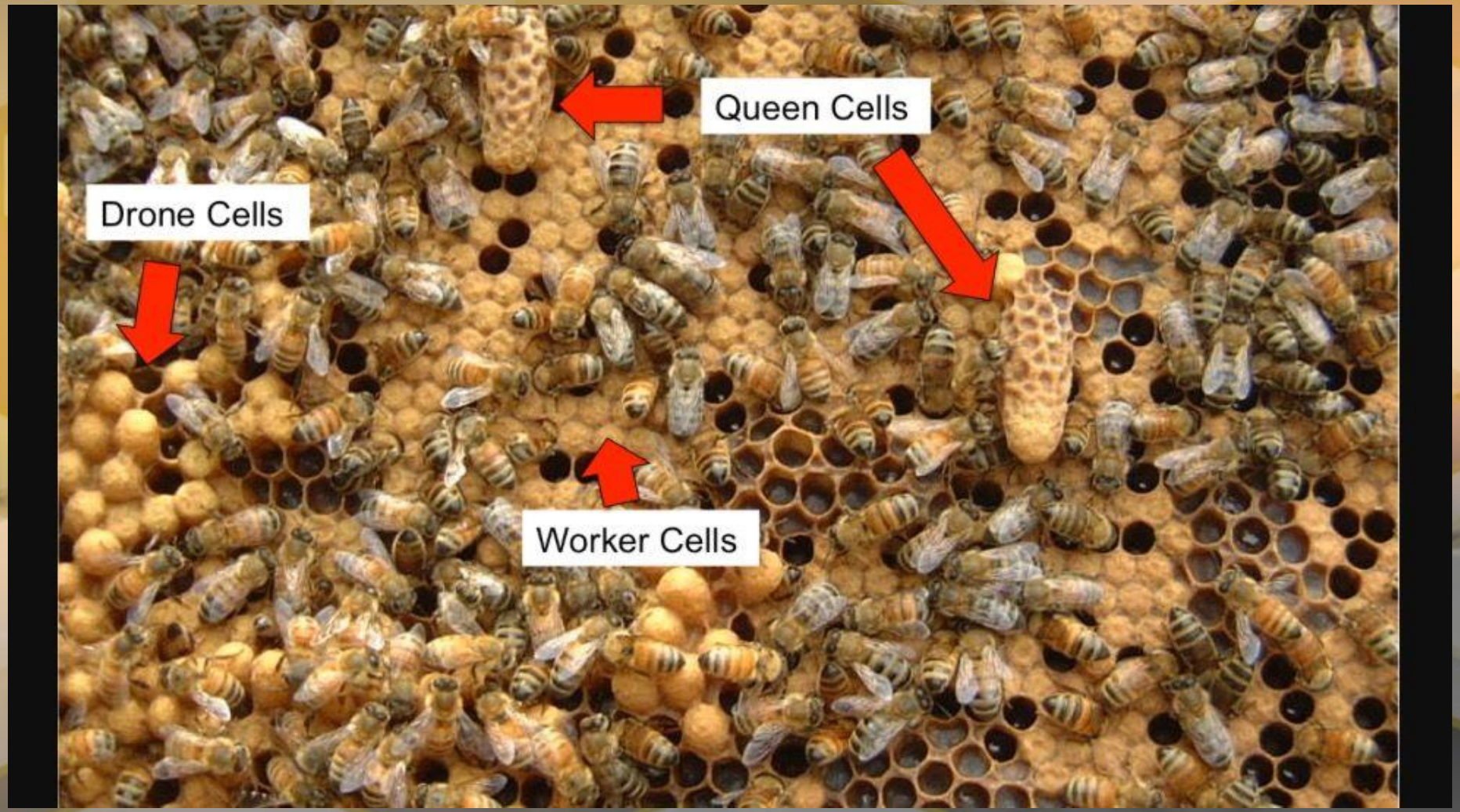
Bee Biology

- The development times for all honeybees differ by caste.

Type	Egg	Larva	Cell capped	Pupa	Emergence	Start of Fertility
Queen	until day 3	until day 5½	until day 7½	until day 8	from day 16 on	approx. 23rd day
Worker	until day 3	until day 6	until day 9	until day 12	from day 21 on	N/A
Drone	until day 3	until day 6½	until day 10	until day 14½	from day 24 on	approx. 38th day



Bee Caste System



Why do bees swarm?

- The population has grown too large and the hive is too small to accommodate all the bees.
- There's not enough room to build more honey stores.
- The temperature is too hot. With higher temperatures, more space is needed for each bee to maintain a cooler temperature.
- The hive does not have **proper ventilation** and drainage. If the bees cannot ventilate the hive properly, temperatures rise, and they will likely move out of the hive.
- High humidity and poor ventilation make the hive unbearable for the bees.

The value of a swarm

- **It is natural for a hive of bees to swarm. This occurs in the months of April, May, June and even later.**
- **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**

Is not worth a fly.

Many people have started beekeeping with a swarm!

Obtaining the Bees!

There are four general ways to begin a colony of bees.

- **Start with a swarm.**
- **Start with a package of bees.**
- **Start with a nuc hive.**
- **Start with an established hive.**

Swarms

Advantages of starting with a swarm

- **The bees are free! (no cost)**

Disadvantages of a swarm of bees

- **You cannot depend upon getting a swarm when you need it.**
- **You have no control over genetics (type of bees) you are getting.**
- **The bees may be carrying disease!**

Feral bees

A quick look at ….

- A colony of bees living in a tree cavity, or in a wild state is called a feral colony. Feral colonies can also be found in the siding of houses.
- Removing a feral colony from walls of houses
- can cause much damage to both
- the bees and the house.

Buy a Package of Bees

Start with a package of bees.

- **There are beekeepers who sell honeybees.**
- **The package of bees includes a queen, syrup to be used to feed the bees, and bees.**
- **The size of a package depends upon the number of pounds of bees put into the packages.**
- **A package of bees should not contain many drones.**
- **A package should reach you as quickly as possible from the date it was shook into the package.**
- **Package bees need a certificate of inspection from the state of origin.**

Disadvantages of a Package of Bees

- They take longer to develop into a production hive.
- The queen sold with the package is untested. That means you could face several queen problems such as: the queen not being accepted by the bees in the package; the queen may be a poor laying queen – poorly mated; supercedure problems (the queen is replaced by the bees during the current season); or she may exhibit aggressiveness in the bees she produces.
- If a queen fails, the beekeeper needs to quickly react before the new hive is lost. I recommend that the beekeeper should check to see if the new queen is laying eggs within the first week after the package is installed into a hive. No eggs means something is wrong.
- Usually a package of bees is not guaranteed for success by the seller.

Start with a Nucleus hive

This is called a nuc!

- It will cost more than a package of bees.
- It will contain at least two or three frames of capped brood, a laying queen, and eggs & larva in various stages of development.
- The nuc will have drawn comb rather than foundation.

- The queen shown here

Advantages of a nucleus hive

- It is already a miniature hive with a laying queen and brood. The bee population is growing because new bees are being added to the population every day.
- This hive should produce a good crop of honey the first year.
- Possible to make a split.

Disadvantages of a nucleus hive

- Because a nucleus hive has drawn comb, one must be aware that drawn comb may include AFB spores. This is a serious disease.
- Some sellers try to sell a nuc by using very old comb (dark), or start a nuc on new foundation which is not drawn out when you buy the nuc. Avoid paying a high price for such nuc's.

Starting with an established hive

- This is usually one way to assure yourself of a honey crop.
- The hive will contain drawn comb, some honey reserves, and a good population of honeybees.
- The hive will be most expensive if it is housed in like new equipment. Prices vary according to condition of equipment.
- Note: We are not discussing a new hive stocked with new frames, un-drawn foundation, and a newly installed package of bees.

Established Hives

Advantages of an established hive.

- This hive should produce a good crop of honey the first year.
- It could be split into two hives if it is strong enough.

Disadvantages of an established hive

- It is going to be the highest cost of getting into beekeeping.
- It may swarm early in the bee season. It will require honey supers quickly in the spring. Management of this hive will differ from other hives started with smaller populations – you will be on a quicker timeline.
- Because an established hive has drawn comb, one must be aware that drawn comb may include AFB spores. This is a serious disease. It may also have large populations of mites which will need to be controlled.
- It may have an old queen which needs to be replaced.

Managing Bees

Where a hive/ hives should be located.

Some general rules:

1. Your honeybees should not become a nuisances to your neighbors! If they do, you will face problems with their complaints.
2. It is often recommended that a hive of bees face toward the sun and away from prevailing winds preferably south facing.
3. It should be located within a short flying distance to a water source.
4. It should be protected from the heat of the sun during summer months. However, deep shade is not necessary.
5. Easy access to the hives.

Water for bees

Keeping bees in communities

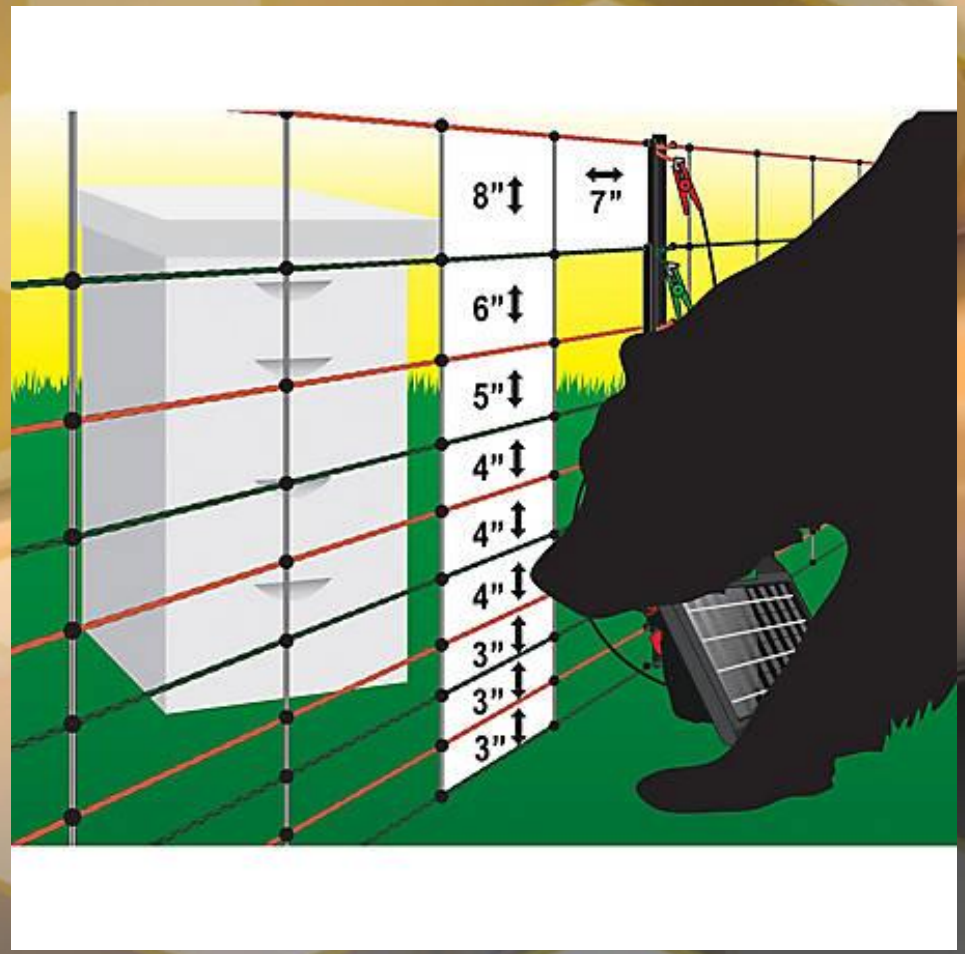
Most important:

- Are there any ordnances or restrictions on the use of your property in placing hives on the property?
- Do you have a water source near-by? If you have a neighbor with a swimming pool or hot tub near, problems can be encountered! Set up water sources near your hives. Float pieces of wood in birdbaths. Try to keep them near their home.
- Do you have enough property and space to locate hives on your property?
- Do you rent? Check with landlord for permission to place bees.

Bees are considered livestock…

- **Do not keep more than three or four beehives on a lot less than one-half acre. If more colonies are desired, find a nearby farmer who will allow you to keep your hives on his land in exchange for some honey.**
- **Do not work your beehives when close neighbors are in their yards.**
- **If you have a mean colony that may bother neighbors when you are working it, re-queen it.**
- **A pound or two of free honey each year to neighbors bordering on your property often makes bees much more acceptable to them.**

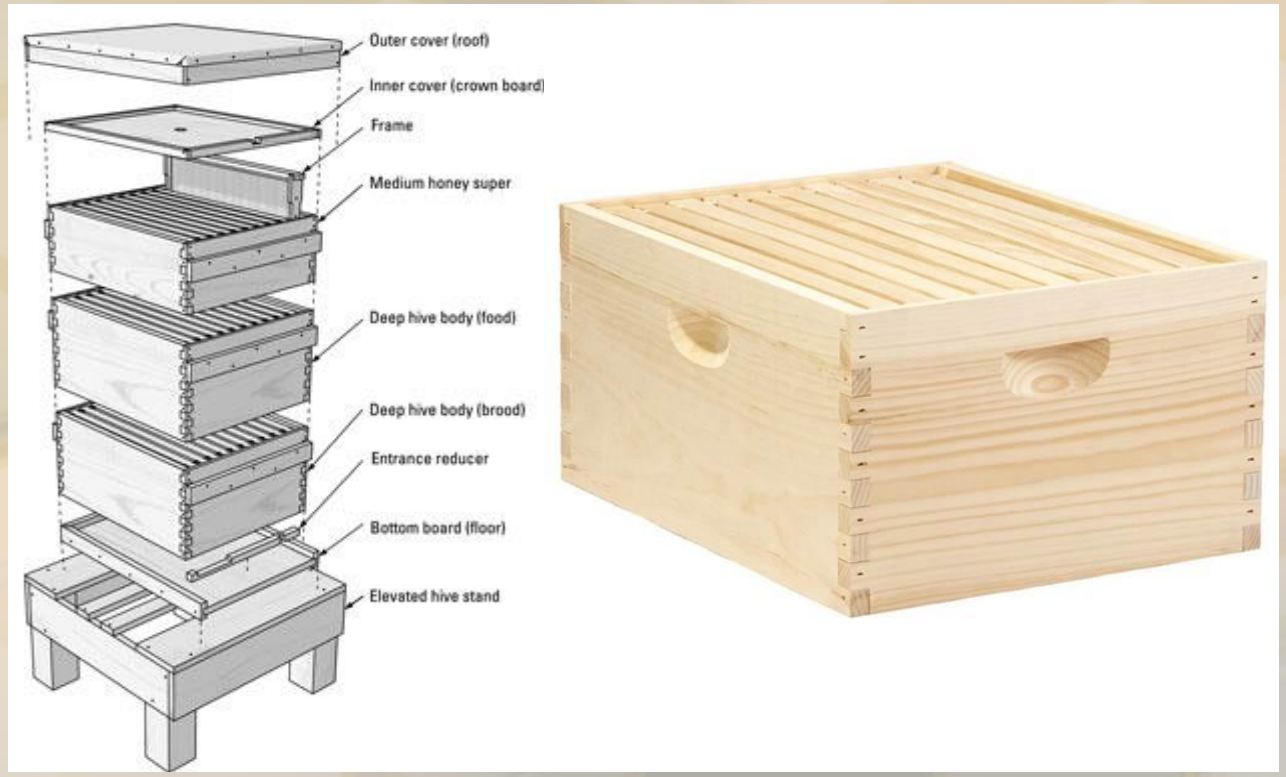
Predators



What did this?

Basic start-up equipment

- Langstroth hive
- Hive tools/smoker
- Protective gear
- A few good books.
- Notebook/pen
- Sharpie



Hive tools

Additional equipment “nice to have”

- Frame holders
- Frame grabbers

Personal Protective Equipment from Bees

A person or persons keeping honeybees need protection from bee stings.

- **So what do they need?**
- **A Bee veil,**
- **protective clothing,**
- **long gloves,**
- **Closed shoes with socks.**

Monthly inspection

- Bring everything that you need plus everything that you doubt you'll need but absolutely will once the hives are open!
- Start smoker and make sure it's going well. Bring extra fuel and matches.
- Standard for all inspections: Hive tool, Smoker, empty coffee can or other for debris. *Testing materials for pests and disease. Sharpie. NOTEBOOK/pencil.
- Honey supers
- Treatment materials
- *Toothpicks. Test kits. Jars, confectioners sugar, alcohol.

Managing honeybees

- When the hive is opened the bees will investigate and begin coming to the top of the frames.
- If the hive is very strong, the entire top will be cove
- This is the time to use a few gentle puffs of smoke coming up.

Work your hive from the side and not the front of the hive.

A few puffs at the entrance and a little on the top bars is enough.

Too much smoke will cause the bees to begin to run out of the hive.

Working with bees/hives

Smoke is a great help in controlling honey bees.

However, don't use too much.

Good fuel to use in your smoker…..

Wood shavings

Burlap

Pulk wood (decaying wood easy found in dead trees.

Pine needles

Working the hive

- Move slowly when working the bees. Fast rapid movement causes the bees to react to your actions.
- Work bees during the mid day in good weather.
- If the hive becomes uncontrollable, close the hive and wait for a better time of day.
- What should we be looking for when we begin to work the hive?
- First, a beekeeper's job is to do the least amount of damage to the bees.

What to look for…

You should see

A good population of honey bees.

Eggs, larva, and capped brood.

Honey and pollen.

You Might see:

Varroa mite that might be on bees.

Queen cells

Signs of fungal disease or bacterial disease, Foreign objects or critters such as mice, yellow jackets, wax moths, small hive beetles.

Bees

- What is a good population of bees?

- If the bees are covering the brood areas of the hive in spring, this is a good sign. The queen is working and the bees are building in number.

What else to look for…

- Honey and Pollen?
- Cells with pollen
- A hive needs food to survive during all times during the year. It is critical during times of brood rearing.
- If you have managed your hive well and they gathered some honey for you fine. But leave enough for the bees to survive the winter season!

Parasites. Varroa Mites

- Varroa mites are rapidly becoming the most problematic pest in the hive. Not only do the mites feed on the fat bodies of the bees, they also carry and spread several different viruses which can cause a hive to die.
- Monthly inspections should also include a mite count and appropriate treatment/action.
- Chemical treatments
- Cultural treatments/practices
- Natural/organic treatments.

Fungal and Bacterial Infections.

- Fungal infections include chalkbrood and stonebrood. Affects emerging bees.
- Bacterial Infections include European Foulbrood and American Foulbrood.

Wax Moths and Small Hive Beetles

Colony Collapse Disorder

- Colony Collapse Disorder. (2008) Much ado about a natural phenomenon. Or not. ??
- Natural phenomenon repeated over the years.
- Bees Abscond. Why? Unknown.

Continue monthly inspections

- After a couple of months of hive inspections, you should be getting the hang of it. You know what to look for and you can judge when the second deep hive body is getting full. Time to put on the honey supers! In good weather, with good forage, bees can fill boxes rapidly. Next comes honey extraction.
- You'll need some honey buckets, strainers, uncapping fork, knife or scraper.
- Extractor or queen excluder (or other mesh wire) if doing crush and strain method.
- Jars/labels.

Honey Extraction/Supplies

- By far, the most efficient way to extract honey is by using a drum-style honey extractor. But it may not be in the budget for your first year. A simple, manual extractor will run about $100 and up. Electric extractors start at $300 and can go into the thousands.
- Crush and strain method. Exactly what it sounds like. Honey is uncapped but extracting it involves crushing down the cells and letting the honey fall through a sieve.
- For all extraction, the basic tools include and uncapping fork or knife, strainers and buckets for honey. An uncapping tank is a bonus once you start to have more frames to extract.
- Jars to package liquid honey.

Manual Extractor

Manual or Electric Extractor

Overwintering

Source:
Betterbee

Risk Management

- THIS STATEMENT: (State Initiatives/apiary program) The growing number of hobbyist and sideliner beekeepers around the state and the risk that these operations pose in spreading parasites and pathogens to the whole apiary industry underscores the need for innovative inspection and outreach approaches for all members of the apiary industry.

Resources

- Dyce Lab, Cornell University
- Ohio Beekeepers Association
- Cornell Small Farms Program
- Empire State Beekeepers Association
- New York State Pollinator Protection

Thank You!

- Delaware County Beekeeper's Association for local residents is on Facebook