



Let's Talk Honey!

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The UF Honey Bee Research and Extension Laboratory (HBREL)



- Built in August 2018
- Took 5 years of prior planning
- 4.5 million dollar state-of-the-art facility
- Estimated return ~89 million dollars back in research and services to FL taxpayers in its lifetime.
- We give tours to the public the first Thursday of every month!



#ufhoneybeelab

- **Our website:** UFHoneyBee.com
- **Our blog:**
<http://entnemdept.ufl.edu/honey-bee/extension/melitto-files-blog/>
- **Coming soon: our Podcast**

Overview of The Honey-Makers: Bees

Honey bees are small, fuzzy insects that are known throughout the world for their sweet honey! Honey bees are **Eusocial** insects, meaning that they live together in a highly cooperative group, which we refer to as the colony. Honey is just one small aspect of the complex life of honey bees. Lucky for us, humans have mastered the practice of harvesting and enjoying this sweet substance!



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Female honey bees, called workers, do everything in the colony, including making the honey. You'll rarely ever see a male bee, since female worker bees run this honey show.

Honey Bee Castes

There are three different types, or castes, of bees in a honey bee colony:

- Workers (Female)
- Queens (Female)
- Drones (Male)

Castes differ in colony function, anatomy and development.



Okay, so what is honey?



Honey is dehydrated, concentrated **nectar** from flowers, which honey bees collect over time and store as a food source in the honeycomb of their hive. Bees eat from stored honey in winter to survive the cold months when floral food sources are scarce.

- It is an essential carbohydrate in the honey bee diet
- It is antibacterial, and true honey does not spoil-ever!
- It can come in different flavors, depending on what floral source the bees are foraging nectar from, such as orange blossom (citrus) or Tupelo.

Bees on honeycomb. Photo Credit UF/IFAS Honey Bee Lab, Mike Bentley.

The Honey Making Process

Honey-making is a complex process that takes time and precision. Understanding this process may give you a new respect for honey bees!



- Honey starts with the flower. **Nectar** is extracted with a special organ called the proboscis, which acts as a long tongue.
- Nectar is stored in the bee's honey stomach, or crop. Here, an enzyme is mixed with the nectar.
- Once back at the hive, the nectar is regurgitated into cells in the honeycomb. It is here that the dehydration starts.
- Although bees can make honey as quickly as 4-6 months, it may take up to a year to appropriately harvest honey from a new colony



Honey stomach highlighted in yellow, digestive stomach in green. Photo Credit UF/IFAS Honey Bee Lab.

Honey Making Process

- Without dehydration, nectar would ferment quickly. Worker bees utilize **active dehydration** by blowing bubbles in the nectar, which pulls water out.
- **Passive dehydration** is also used. After blowing bubbles, the worker deposits the nectar back into the cell, where other bees fan the comb with their wings. This increase in airflow encourages evaporation of moisture.
- At this point, the mixture can now be called **honey**. When complete, workers cap the honeycomb to seal it, so it appears covered in the hive. This honey is ready to harvest.



Worker bee using proboscis, and honey comb frame. Photo Credit UF/IFAS Honey Bee Lab, Mike Bentley



How we harvest honey: it starts with the hive

Honey has been extracted for thousands of years using an array of techniques. Indigenous peoples would rob honey from feral hives, until we eventually learned how to rear bees in order to get honey continually.



Beekeeper lifting frame from the hive for inspection. Photo Credit UF/IFAS Honey Bee Lab.

- The **Langstroth Hive**, invented in the mid 1800's, was an extremely important innovation in the world of beekeeping and honey extraction. It allowed for removable hive sections that could give us honey without destroying the honey comb.
- The wooden **frames** of the Langstroth design allow us to easily remove honey by centrifugal force, then return the comb to the bees. It is also extremely helpful for managing the bees and moving them around to ensure health.

How We Harvest Honey

- First, **frames** with mostly capped honey (honey ready to harvest) are removed from the hive and the bees are brushed or shaken off.
- The cappings of the comb must be scraped off, which can be done two ways. Some beekeepers use a **scratcher** to pierce and remove the cappings. A **hot knife** can also be used to slice the cappings off entirely.
- Next, the frames are placed in machines that spin at controlled speeds. This slings the honey out of the comb, and it flows down to a spout at the bottom of the barrel. These machines are called **extractors**.



*Hot knife in use,
and honey
extractor. Photo
Credit UF/IFAS
Honey Bee Lab.*



How We Harvest Honey

- After the honey is extracted, it needs to be **filtered**. The honey often contains bits of comb and debris. A mesh strainer works well for this function.
- After filtration, the honey is ready to be bottled and enjoyed!



*Honey dripping into bucket and then bottling.
Photo Credit UF/IFAS Honey Bee Lab.*

Hive Products: Going Beyond Honey

You may not realize how many different products can actually come from the beehive, but the truth is there's so much more than honey! Here are some examples.



Mead, pollen, and honey products. Photo Credit UF/IFAS Honey Bee Lab.

Wax:

Can produce candles, lip balms, ointments, and lotions

Royal Jelly:

A secretion of the worker bee that provides nutrition to bee larvae and the queen bee. It is considered by many to be a beneficial dietary supplement.

Pollen: Also considered a dietary supplement and source of protein, pollen can be collected from the hive and added to smoothies or other foods.

Mead: Also called Honey Wine, is an alcoholic beverage fermented with honey, water, and yeast.

Various Recipes:

Many breads, cakes, cookies, and other recipes can be made with honey

Cottage Food Laws: What's That?

Cottage Food Operation is when someone produces or packages cottage food products at their primary residence and sells those products in accordance with Florida Statutes regarding Cottage food.

- Cottage food **cannot** be potentially hazardous, according to the FDACS rule. For example, any food that requires a time/temperature control, foods that are raw, and many other foods whose natural state promotes the growth of pathogens.
- Cottage food examples are breads, candles, pasta, jams, popcorn, vinegars, cakes, and herbs.
- Cottage foods are required to use specific labelling which makes the products' origin clear
- The sale and creation of hive products, such as honey, creamed honey, candles, and wax balms fall under Cottage Food Laws for many beekeepers.
- Cottage food can be sold directly to the buyer, but not to other businesses, and cannot be sold in restaurants or stores.

What Cottage Food Laws mean for you:

For the sideline or hobbyist beekeeper, here's what your cottage honey business might look like:



*Colorful hives in a bee yard. Photo Credit
UF/IFAS Honey Bee Lab.*

- 2-10 hives or so
- You extract your honey in your garage or yard, and you bottle the honey in your kitchen.
- Your honey is clearly labelled as a cottage food item, and you sell your products at the local farmers market
- Your extra or finished products are stored in your home
- Your product sales do not exceed \$50,000 annually

Our Floridian Beekeepers

Here are some interesting statistics on our Florida Beekeepers:

- There are nearly 5,000 registered beekeepers in FL
- 89% are backyard/sideline beekeepers
- The remaining 11% are commercial beekeepers, with >100 colonies
- There are over 650,000 colonies in Florida – commercial beekeepers manage over 90% of these



Beekeeper and instructor, Cameron Jack inspecting a hive. Photo Credit UF/IFAS Honey Bee Lab.

It's Great To Be a Florida Bee (here's why)

Florida is an ideal place to keep bees, and a unique set of factors make it somewhat of a bee-oasis.

1. General Characteristics

- Hot, humid summers and mild winters. Bees can lay eggs year-round.
- Sporadic rainfall
- Longer days of sunlight than other regions



*Worker on orange blossom and workers surrounding a queen.
Photo Credit UF/IFAS Honey Bee Lab.*



It's Great To Be a Florida Bee (here's why)

2. Nectar Plants

- Major land resource areas (non developed areas) which bees forage from
- In addition to spring, there is often another nectar flow in fall
- Just a few examples are goldenrod, Mexican clover, tupelo, saw palmetto, and many more



Various native pollinator flowers. Photo Credit UF/IFAS Honey Bee Lab.

Some of the other unfortunate scenarios...

Inevitable Hazards

- Warm climate also allows pests to thrive, such as *Varroa mite* and small hive beetle
- Bears reside in many areas of the state
- Africanized bees are present in Florida



Bear caught on trail cam. Hives strewn by bears. Hives destroyed by wax moths. Larva with Varroa mite. Photo Credit UF/IFAS Honey Bee Lab.

What's Killing the Bees in Florida?

You may have heard about the “Save the Bees” movement. So what’s killing the bees?

- Bee populations are on a 1% yearly decline. We want to understand this decline before that number grows.
- No single factor kills the bees. It’s actually a recipe of multiple things that we call “stressors”

Primary
Stressors
Reported by
Beekeepers:

- Varroa
- Starvation
- Queen quality
- Climate

How to Support Local Beekeepers and Bees

In recent years, the general awareness of honey bees' importance has grown. This is good because we've seen improvements in honey bee wellness, partially because of this general awareness. Many people are interested in how to help the bees or support local beekeepers.

How to Support Your Beekeeper:



Buy Local Hive Products,
Like Honey



Buy Local Foods, Involving
the Pollination of Bees



Refrain From Using
Pesticides/Chemicals



How to Support Local Beekeepers and Bees

Many people want to help the bees, but don't consider themselves experts. That is okay! There are so many easy ways to help pollinators from your own home and backyard. Here's a few examples:

How to Support Your Local Bees



- Plant pollinator gardens where bees can feed
- Make a bee-friendly watering source
- Refrain from using pesticides
- “Bee”come a beekeeper

What if we receive calls about feral bees?

Feral bees and bee swarms are common in Florida when bee colonies are trying to reproduce. Bees are friendly... until they are not. Here's what to do if you find a swarm or receive a call:

- Find a licensed bee removal expert in your area (a list is on our website– yes, this costs \$\$)
- Africanized bees pose a risk. To the eye, you can't tell the difference between an Africanized (highly defensive) and European honey bee. Africanized bees will sting more quickly and follow victims. To avoid this, stay away from any feral colony until an expert arrives.



*Bee removal from a wooden outbuilding.
Photo Credit: UF/IFAS Honey Bee Lab.*



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HONEY BEE RESEARCH &
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