

BEE



Honey Bee and Hive Biology

Denny Gorman

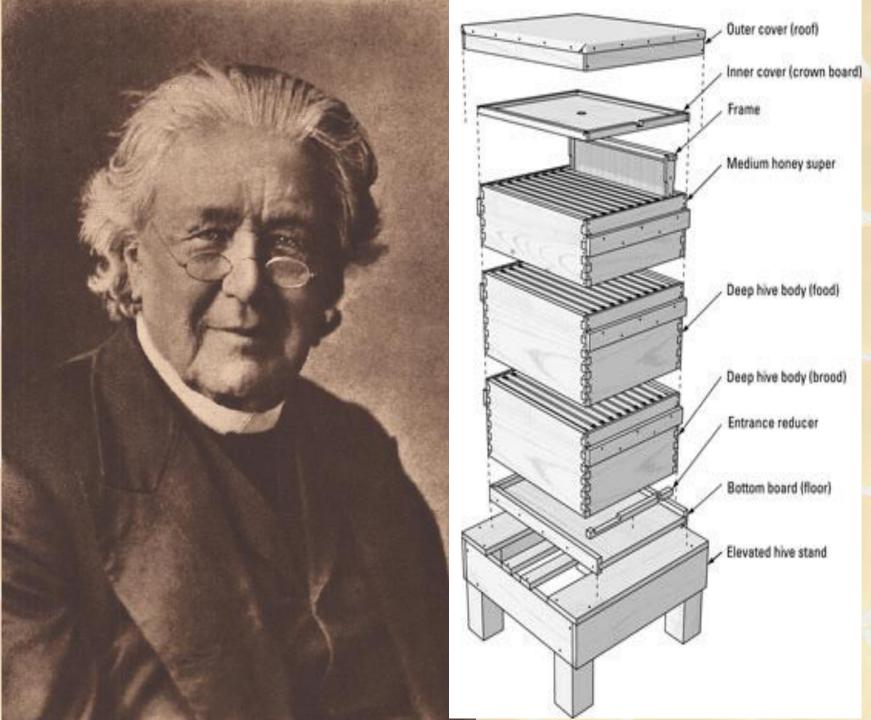
Certified Master Beekeeper (Cornell) Vice President, LCBS

Rev. LORENZO LANGSTROTH 1810 - 1895 Father of American

Beekeeping



Discovered the **BEE SPACE 9.5mm** (3/8 inch)



Domain (Domains)

Kingdom (Kingdoms)

Phylum (Phyla)



Order (Orders)

Family (Families)

Genus (Genera) Species (Species)

Taxonomy

Animal Arthropod Insect Hymenoptera Apoidea / Apidae

Apis mellifera



Subspecies of Apis mellifera (races) in U.S.

- GERMAN A.m. mellifera (black bee), Virginia 1622 (white man's fly)
- ITALIAN A. m. lingustica, Southern Italy, US, 1859
- CARNIOLAN -- A. m. carnica, Slovenia, late 1800's
- CAUCASIAN A. m. caucasica, Caucasus mountains near black sea, early 1900's
- AFRICANIZED A. m. scutellata, Sao Paulo, Brazil, 1960, US, 1990
- RUSSIANS A.m. artemisia, Ukraine, recent.
- HYBREDS Buckfast, VSH, Ankle Biters, Pol-Line



Apis mellifera

Eusocial Altruistic Super Organism

Communication and Control

- Antennal Touching
- The Waggle Dance
- Pheromone Producing Glands
 - Queen (QMP/ 9 ODA) Pheromone, prevents worker ovulation
 - Brood Pheromone, keeps nurses on brood
 - Royal Jelly, Hypopharyngeal and Mandibular Glands
 - Come to me pheromone, Nasonov Gland
 - Nestmate recognition, Dufours Gland
 - Sting, Alarm Pheromone, isoamyl acetate



Reading Frames

Capped Honey

Pollen

Capped Brood

Capped Honey

08

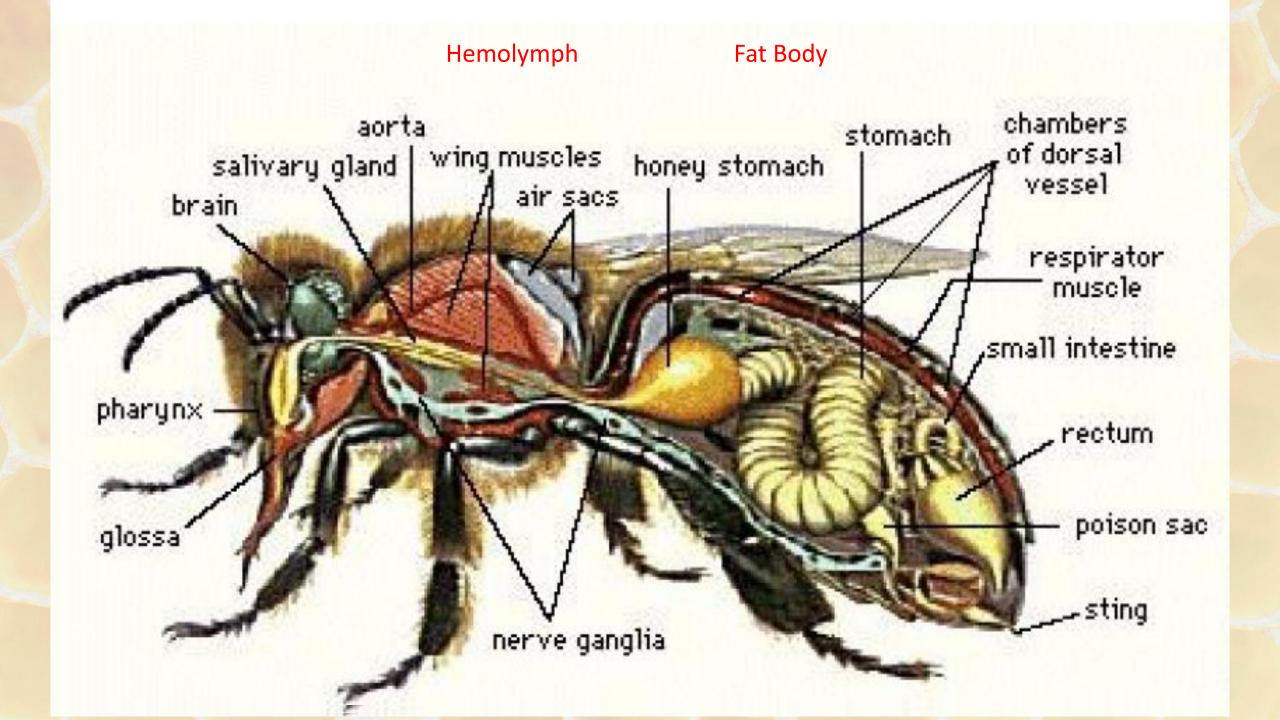
Capped Brood 🧈

-1

1:1.

backfilledfilled with Nectar

beinc

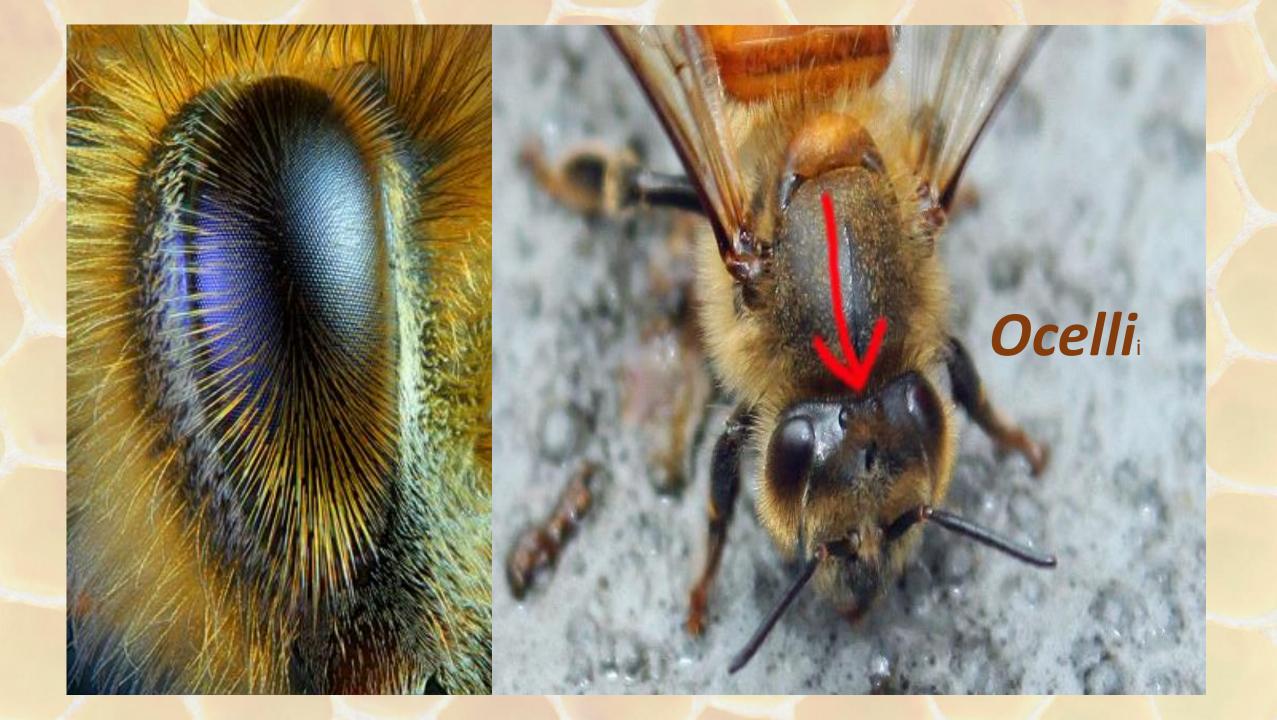


Varroa Destructor

Bee Senses

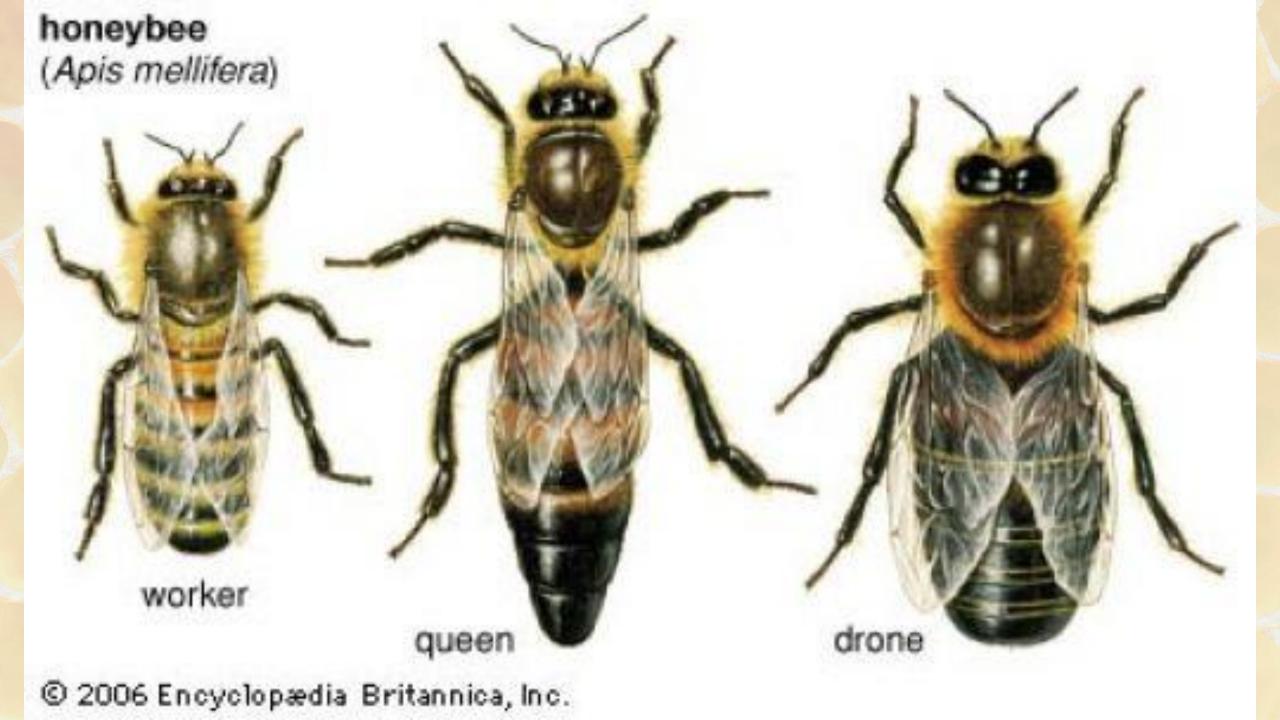
Cherrer

CALOS



BEE VISION – UV Polorized light





Honey Bee Gestation

QUEEN	EGG 3 DAYS	LARVA 6 DAYS , bathed in ROYAL JELLY	PUPA 7 DAYS QUEEN CELL	TOTAL 16 DAYS + -
WORKER	EGG 3 DAYS	LARVA 6 DAYS	PUPA 12 DAYS CAPPED BROOD	TOTAL 21 DAYS + -
DRONE	EGG 3 DAYS UNFERTILIZED EGG	LARVA 6 DAYS	PUPA 15 DAYS DOME or BULLET SHAPED CAP	TOTAL 24 DAYS + -

THIS TIMING IS CRITICAL FOR USE IN COLONY MANAGEMENT !

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The Queen

- Will lay up to 1500 eggs per day
- Exudes Pheromones to control hive
- Lives about 2-5 years
- Mates with up to 30 Drones
- Stores Sperm in Spermatheca
- Can choose sex by laying fertilized or unfertilized egg



• Usually will swarm after 1 year with half of original hive

VIDEO : Denny Gorman

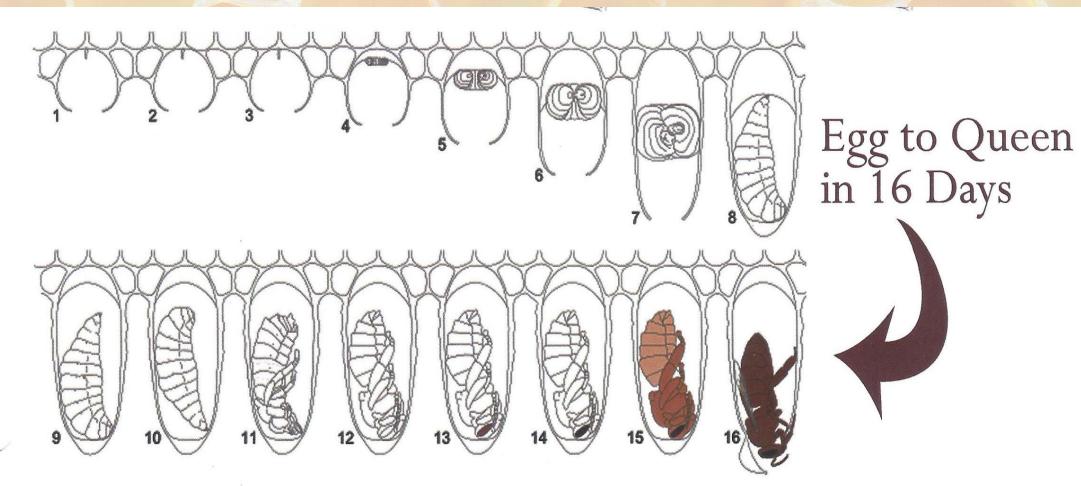
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Y .7

Queen Cup

Development of a Queen

16 days



Images used with permission Tofilski A. (2012) Honey bee. Available from http://www.honeybee.drawwing.org.

Empty Queen Cells.

ergency Queen cel ED R

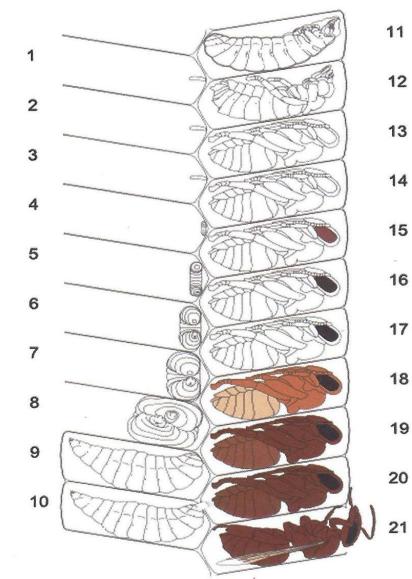
Em

VIDEO: Denny Gorman



Development of a Worker

21 days





5 Day Old Larva

Copen Brood ->

1 Day Old Egg →

Worker Bee Life Span

- Spring and Fall Bees -- 4 to 8 weeks
- Summer Bees -- 2 to 5 weeks
- Winter Bees ---

16 to 20 weeks

 Worker Polyethism First half of life as a HOUSE Bee Second half of life as a FIELD Bee

Nurse Bees tend brood

Eggs

Queen's retinue

Workers 11 to 16 days old produce wax, wax mirrors

Photo: Matt Libhart



Guard Bee

VIDEO: Denny Gorman

Trophallaxis

Nectar transfer

Nectar Foraging

Video by Denny Gorman

The Waggle Dance

Waggle Dance

Direction danced on comb is relative to direction of the sun

Number of waggles indicates distance

 \mathbf{c}

Scent identifies crop



Pollen Baskets CORBICULA

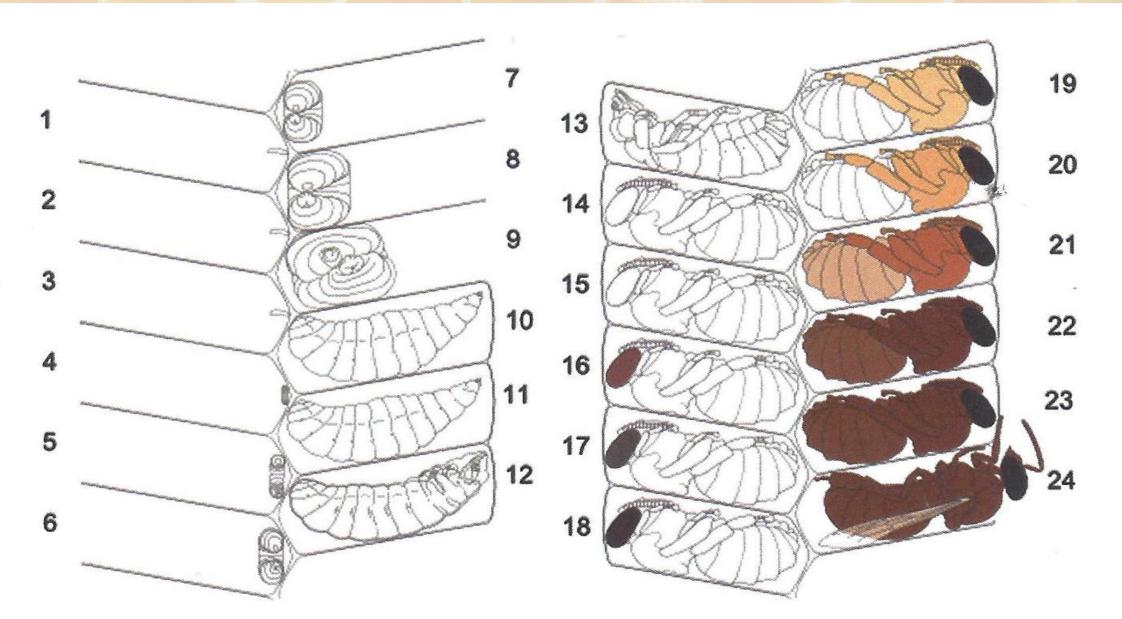
Bee Bringing in Pollen ->

Pollen Filled Cells

rec

Development of a Drone

24 days



Drone Comb

Capped Worker Cells >

Capped Drone

Drones

- Emerge from drone comb after 24 days
- From Unfertilized HAPLOID egg
- No sting, ENDOPHALLUS
- Does no work in the hive
- Will fly to DCA to mate with Virgin Queen
- Successful Mating is fatal
- Big Eyes, Barrel shaped

Drone Comet in DCA



Drone Endophallus

Queen Spermatheca

Spermatheca From a Virgin Queen Spermatheca From a Mated Queen

Trachael Net



TIPS FOR A SUCCESFUL FIRST YEAR

- **KEEP RECORDS** at **EVERY HIVE VISIT**
- ATTEND CLUB HIVE CHECKS
- STAY ACTIVE WITH THE CLUB, CONTINUE TO LEARN
- SUBSCRIBE TO ABJ OR BEE CULTURE
- FIND A MENTOR
- ASK QUESTIONS
- READ

THANK YOU FOR YOUR ATTENTION
DENNY GORMAN 717 368 2050 bethdennyllc@yahoo.com

On-Line resources



his Photo by Unknow

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- www.Lancasterbeekeepers.org
- <u>http://honeybeehealthcoalition.org</u>
- <u>http://beeinformed.org</u>
- https://extension.psu.edu/
- <u>https://ento.psu.edu/pollinators</u>
- kroccasecc@pa.gov 717-346-9567

Apiary Site Selection

Table of Contents

- Considerations related to neighbors, regulations, and avoiding trouble
- Considerations related to the honeybees
- Considerations related to the beekeeper

Neighbors, Regulations, Avoiding Trouble

- Regulations and Zoning
 - No more than 4 colonies per quarter acre lot
 - Post your name and phone number so it can be read
 - Colonies within 20 feet of a property line need a 6 foot tall flight barrier (such as a hedge).
 - Re-queen each year
 - If no one sees them, no one will complain

Neighbors

- Neighborly Relations
 - Out of sight of neighbors, walking paths, or roads.
 - Sweeten the neighbors with a jar of honey
 - Away from domestic animals, child play area, kennel, patio, laundry drying line
 - A professional lawn service will not mow near colonies.

Written Understanding with the Landowner

- Ownership of colonies
- Contact information
- How much time you will have to remove colonies in case of trouble
- Who will mow and trim brush
- Time of day to enter to attend them
- Response time to remove a swarm
- A legal contract would be alarming

Neighbors, Regulations, Avoiding Trouble

- Avoid Nuisance in Advance
 - Before you place colonies, provide mildly salty water closer than horses, swimming pool, bird bath, dog's water dish
 - Before you place colonies, provide flower pots of potting soil. Bees will gather minerals from them.
- On a Continuing Basis
 - Re-queen if your colony is aggressive
 - Manage your colonies to minimize defensive behavior, and swarming.
 - Check your apiary regularly for evidence skunks

Considerations Related to the Honeybees

- Avoid Dampness
 - Full sun to combat dampness and for bee morale
 - South or East exposure gets them flying early in the morning
 - Against a south wall for extra sun
- Avoid Windy Areas
 - Wind funnels between buildings
 - Tops of hills are windy
 - Cold air pools at night at the bottom of hills
- Dry Ground and Dry Air
 - On a hive stand with airflow underneath

More Considerations Related to the Honeybees

- Suburban settings usually have good forage
- Orchards have 2 wks of bounty, and 50 of little
- Non-drowning source of water. Stones in a poultry watering fountain.
- If any chance of bears, put up an electric fence in the fall
- Not where likely to be sprayed with pesticides
- Don't place too many colonies for the local forage

Considerations Related to the Beekeeper

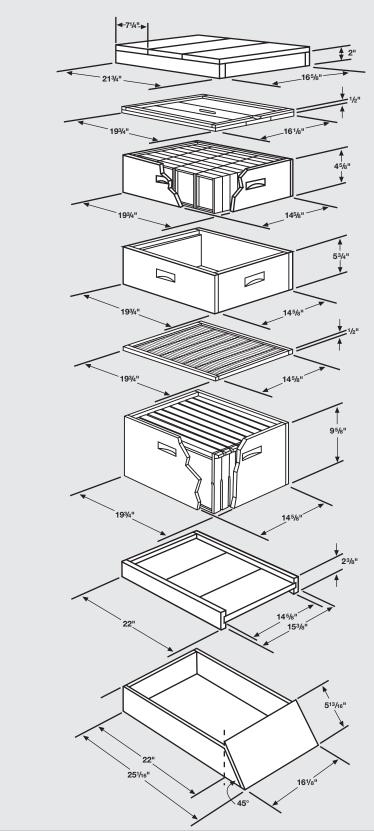
- Close to home or work so you visit them regularly
- Access
 - Vehicle access, if possible
 - If no vehicle access, hand truck or garden way cart
 - Avoid ground that become soggy

More Considerations Related to the Beekeeper

- Amenities
 - Have an alternate apiary site, even if not currently used
 - Covered bucket of sand or shovel for fire suppression
 - A hive working stand
 - Electricity if possible power tools
 - Piped water if possible clean up
 - How will you move the mower to it?







Outer Telescoping Cover

3 pieces 71/4" X 3/4" X 181/6" (top) 2 pieces 213/4" X 3/4" X 2" (sides) 2 pieces 163/8" X 3/4" X 2" (ends)

Inner Cover

2 pieces 1/2" X 3/4" X 161/8" 2 pieces 1/2" X 3/4" X 181/4" . 2 pieces 6" X %" X 19¾" 1 piece 41/8" X 3/8" X 193/4"

Section Comb Super

2 pieces 19¾" X ¾" X 4%" (sides) 2 pieces 14%" X 3/4" X 4%" (ends)

Shallow Extracting Super

2 pieces 193/4" X 3/4" X 53/4" (sides) 2 pieces 145%" X 3/4" X 53/4" (ends)

Queen Excluder

2 pieces 193/4" X 3/4" X 53/4" (sides) 2 pieces 145/8" X 3/4" X 53/4" (ends)

Full Depth Hive Body

2 pieces 19¾" X ¾" X 95%" (sides) 2 pieces 14⁵/₈" X ³/₄" X 9⁵/₈" (ends)

Bottom Board

3 pieces 71/8" X 3/4" X 15%" (floor) 2 pieces 23%" X 3/4" X 22" (sides) 1 piece 23/8" X 3/4" X 145/8" (end)

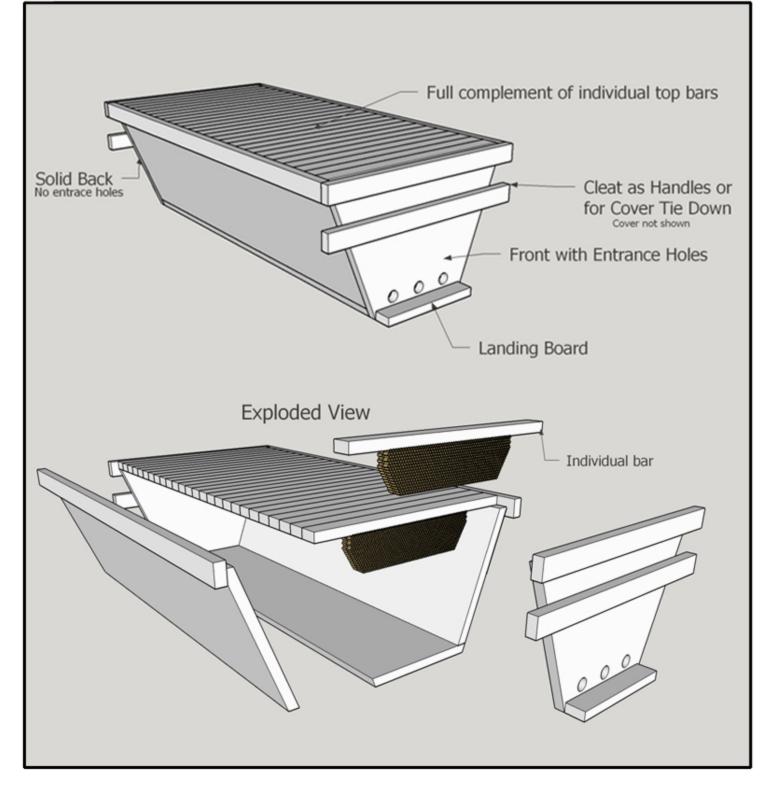
Hive Stand

1 piece 3" X ¾" X 14%" (back end) 2 pieces 3" X ¾" X 251/16" (sides) 1 piece 53/16" X 3/4" X 161/8" (front end)

ILLUSTRATION BY PETER KAUFFMAN

Figure 9. Equipment and dimensions for a standard Langstroth hive.

EXAMPLE TOP BAR HIVE



Where To Get Your Bees

Sources Of Bees





3 Swarms

Each has its pros and cons

Nucs

A nucleus hive is simply a hive made up of only a few frames, usually 3-5. It is complete in every other way.

Advantages

- Working hive with all parts in motion
- Drawn comb
- Could be winter survivors (if assured by an honest seller)

Disadvantages

- Not shippable, must find a local supplier
- Equipment size must match yours
- Can be costly, so shop around
- Not always reliably delivered
- New beekeeper should know, and may not know, how to inspect a nuc prior to purchase to ensure it's healthy and a fair sale



Packages

A package is just bees and a queen and sold by the weight of the bees, usually 3lbs. The queen is among the bees but protected in a queen cage.

Advantages

- Available to be shipped, more sources
- Most reliable way to get bees
- Generally very gentle bees
- Generally arrives earlier than a nuc would be available
- Less expensive than a nuc
- Just bees, so your equipment is your own, put them in any size equipment you choose

Disadvantages

- Although fairly rare, packages are more likely to abscond
- You must introduce the queen
- No brood, so 3-4 weeks until new bees appear
- No drawn comb, so bees must be fed more overall



Swarms

A swarm is a group of bees that has split from its parent colony and most likely has a mated queen amongst the bees

Advantages

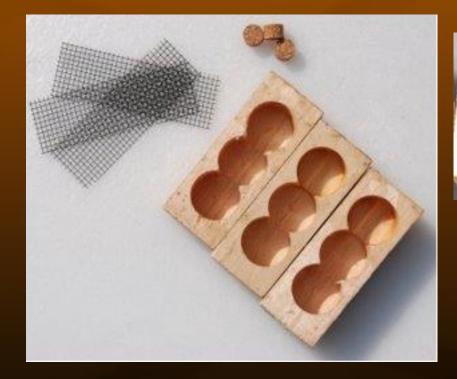
- Free Bees!
- Most likely winter survivors
- Can set bait hives (swarm traps)
- Draw comb extremely quickly, usually without being fed

Disadvantages

- Unreliable, you're waiting for a call
- Could be difficult to retrieve
- No brood or comb
- No guarantee they won't simply leave their resting place or your hive once you get them home



Queen Cage Changes Traditional 3-Hole Cage





Queen Cage Changes



You may not get one of these candy tubes.

Then what...?

Queen Cage Changes





Be sure to bring some mini marshmallows

Launch Video 1 Launch Video 2

Installation Tips

- You can use a flat thumb tack or tape to secure the queen cage to the package at first and then to an undrawn frame via the plastic/metal strip that held it in the package
- BOTH ends of a 3 hole queen cage will have a cork. <u>Look</u> for the candy first before deciding which cork to remove
- Use the small lauan lid to your advantage, keeping it close by and covering the package opening when dealing with the queen cage
- If you're using a screened bottom board, close it up until the bees are well established. An "airy" hive is a major cause of absconding packages/swarms

Feeding Your Bees

When Do We Feed

- Feed syrup when...
 - The bees must build a lot of new comb, as when a package or nuc is first installed
 - Any time the bees are low on nectar stores and there is no nectar coming in
 - In autumn, if your bees need stores for the winter

What To Feed

- During warmer months, the main food recommended is sugar syrup
- During cold months, fondant, granulated sugar, or 'candy' can be fed.
- Pollen or pollen substitutes are fed to help stimulate brood rearing (most used by commercial beekeepers)

How To Make Syrup

Syrup is mixed/described by *sugar:water* ratio

- 1:1 Feed during spring and summer
- 2:1 Feed in the fall (2 parts sugar to 1 part water)

Ratios are by weight or volume, they are very close.

So what's the recipe

- "A pint's a pound the world around"
- 4lbs of water is 8 cups
- 4lbs of sugar + 8 cups of water = 1:1 syrup ...OR...
- 4lbs of sugar + 4 cups of water = 2:1

Making Syrup

- 1:1 recipe above will make a little under 1 gallon of syrup
- Warm the water first, then mix with the sugar off the heat
- No need to boil water (get water fairly hot if making 2:1)
- Never boil the syrup
- Allow syrup to cool completely to room temperature before putting it on the hive

Delivering The Syrup

Lots of feeder designs

- Boardman (front) feeder
- Division Board (frame) feeder
- Top Feeder
- Bucket Feeder
- Zip Top Bag
- Others

Feeders Boardman Feeder



- + Can see level and refill w/o opening the hive.
- Can cause robbing

Division Board Feeder



- + Syrup is right at the bees
- Need to open hive to see and fill
- Drowns some bees

More Feeders

Top Feeder



- + Large volume
- + Just lift cover to see and fill
- Can drown some bees
- Can get moldy

Bucket Feeder



- + Cheap
- + Large volume
- + No drowning
- Must lift to check level
- Requires extra box to surround and protect the bucket

Yet Another Feeder

Zip Top Bag Feeder



- + Cheap
- + Puts syrup close to the bees
- Requires a shim (rim)
- Can be messy

Prevent Robbing

Force a robber to take a long distance trip through the hive.

- Close notch in inner cover when using a top feeder
- Use a reducer if using a front (Boardman) feeder
- Robbing is much more prevalent in the fall.
- Before fall, research how to prevent robbing, but also to recognize and stop it should it occur.

Honey Bee Pests & Diseases



Hive Pests

Pests Outside the Hive









Hive Pests

Pests Outside the Hive



Pests Outside the Hive

- Skunks
- Bears
- Other insects



Skunks

Skunks will scratch at the entrance, then eat the bees that come to investigate



Skunks

- You may have a skunk problem if you see the grass or dirt trampled down in front of your hives. Your bees may also be unusually aggressive when you try to inspect them.
- Raising the hive up higher will usually correct this problem.
- You could also put tack strips in front of the hive.



Bears



- Not much of problem in Lancaster Co.
- For those of you elsewhere, bears destroy hives for the protein rich larvae, the honey is just dessert.

Once found by a bear, you <u>WILL</u> need a powerful electric fence surrounding your hives. Of course, this is after you replace the bees you've lost.



Yellow Jackets



- Yellow jackets will kill and take sick and dying bees from the front of the hive, but usually are not a threat to a healthy, strong hive.
- If they begin entering the hive and taking bees, reducing the entrance will help your bees defend their hive.

Mice

- Mice can cause quite a bit of damage during the winter months. They get into the lower part of the hive when the bees are clustered in the upper part.
- They chew up the comb, build nests between frames, and urinate everywhere.
- Mouse guards installed in the fall will protect your hive from damage. Put them on while bees are still active. You do not want to trap a mouse inside the hive.



- Ants will sneak into hives and take some syrup but usually are not a threat to your hive.
- Roaches will sometimes be seen in hives between the inner cover and the top cover but will do little or no harm to the hive.
- Spiders around your hive can take a bee or two...creepy to you, but little threat to the hive.



Hive Pests





Wax Moths

- Adult females lay their eggs in the hive.
- Larvae feed on old bee pupae cocoons, weaving webs as they go.
- Will be found most often on brood frames, less often on frames not used yet for brood
- Hives appropriately sized can keep moths in check
 - Ideally, at least some worker bees should be on every drawn area in the warm months.



Wax Moth Damage





Protecting Your Comb

- Most damage is done when storing frames of comb.
- Freeze the frames for 48hrs.
- Store below freezing or tightly sealed full time...
 OR
- Store in hive bodies or a sealed trash bag with a small dish of moth <u>crystals</u> containing paradichlorobenzene.
- <u>DO NOT</u> use moth balls or anything containing naphthalene.
- Frames should be aired out for a few days prior to using them after being stored with crystals.









- Can fly, which is how they enter your hive
- Adults live and reproduce in the hive.
- Beetle larvae feed on pollen and honey
- Leave a slimy mess the bees do not like to clean up, and can cause the bees to abscond
- Beetle larvae pupate in the ground after feeding in the hive.













What You Can Do

- As with wax moths, ensure the box size is appropriate for the bee population.
- Simple beetle traps exist and are sold by the supply companies.
- Nothing special to do for beetles when storing frames (remember, frames require freezing or moth crystals).
- Diatomaceous earth can be spread on the ground around a hive, but will kill/injure bees as well, so be careful

Guard Your Comb

- Guard your drawn comb against pests.
- Drawn comb is a valuable asset.
- Comb can be reused, even from dead hives
 - A package on drawn comb will have a large advantage
 - Protect it from wax moths, mice and anything else that will destroy it.



Hive Pests





Brood Diseases

- A number of brood diseases exist, most caused by fungus or bacteria
- Identifiable by their effect on the brood itself
- Don't lose sleep over these. The most important thing is to know what healthy brood looks like so you can identify unhealthy brood.



Healthy Brood

Healthy Brood: Convex, dry caps, shiny white larvae (darker wax is fine)





Unhealthy Brood

Diseased Brood: Concave, wet caps, many with holes





Unhealthy Brood

American Foulbrood

Again, don't lose sleep over this disease, but this must be reported to the PA Department of Agriculture as soon as you suspect its presence.



American Foul Brood

- AFB is highly contagious among bees
- The spores can live for decades in old equipment
- This is why it is ill-advised to buy used equipment unless you <u>KNOW</u> that healthy bees were kept in it very recently.
- The hives in the neighbor's grandfather's barn may be cheap, but you may be buying a serious problem.



Hive Pests

NOD Varroa Video https://www.youtube.com/watch?v=wj-h5VJqaoI

* This video is trying to sell a product. While many members use this product, LCBS is not promoting it in any way. The informational part of the video is very good.





Varroa Mites

Mites on larva





Close up of mite



Quick Varroa Facts

Rule #1: Your hives <u>*WILL*</u> have varroa mites Rule #2: You cannot change rule #1.

Your main concern is how many mites aka infestation level

Mites...

- Reproduce inside capped brood cells
- Immature mites feed on developing brood
- <u>Are rarely visible</u>
- Are highly attracted to drone larvae



You almost certainly won't see them





Can you see them now? Imagine if this bee was alive and walking



Monitoring Your Mite Load

- Alcohol Wash
 - Swirl known amount of bees in a jar of alcohol
 - Mites will sink to the bottom of the jar and can be counted
 - Kills the bees, but is the most accurate
 - Think of this like a biopsy
- Known amount of bees:
 - 1/2 Cup, approximately 300 bees
- More than 3-5 mites for 300 bees (>=1%) is where most experts recommend treatment be considered



Alcohol Wash

Gauging the Infestation Level

University of Guelph Honey Bee Research Centre

https://www.youtube.com/watch?v=k95CrnTSTCY



Unmanaged Mites Will Likely Kill Your Bees

- Remember, they're <u>rarely visible</u>
- *"I don't see any"* is not a valid reason not to monitor
- By the time you see them on a worker bee during an inspection, the infestation is likely so bad that the colony is doomed.
- Dr. Jamie Ellis, Gahan Endowed Professor of Entomology, University of Florida https://www.youtube.com/watch?v=9cOZpEr4NHc



How To Treat...

- Synthetic Chemicals
 - CheckMite/Apistan
 - Apivar
- Naturally Occurring Chemicals Made Into Products
 - Apiguard & Apilife Var
 - Mite Away
 - Oxalic Acid
- Mechanical Intervention
 - Culling Drone Brood
 - Forced Brood Breaks



How To Treat...

- A Guide on Our Website
 <u>https://bit.ly/2DpvlqX</u>
- Another Excellent Resource/Guide

https://honeybeehealthcoalition.org/resources/varroa-management

Treating For Mites

- You are treating for a pest, therefore any product you use is considered a pesticide
- Even the products containing naturally occurring substances can be dangerous if misused
- ALWAYS read and follow the label, including required protective gear...it's the law.



A Hive That Didn't Make It





A Hive That Didn't Make It





A Closer Look



First Year In The Apiary Part I

> Denny Gorman Vice President

Matt Libhart Executive Director

January and February

- Gold star for attending the workshop
- Read a Bee book
- Subscribe to American Bee Journal or Bee Culture
- Order bees and equipment
- Assemble and paint equipment
- You have decisions to make
 - Number of hives (recommend 2)
 - 8 frame or 10 frame, deep or medium
 - Plastic or wooden frames, plastic or wax foundation
 - Your apiary's location

Your Bees Arrive

- Have your hive assembled and at its location before your bees arrive.
- Choose the very best location you can offer your bees.
- Install your package as soon as feasible, the day they arrive if possible, preferably late afternoon.
- Have 1:1 syrup ready to go before beginning installation
- Plan on feeding your bees for several weeks, possibly longer.



Queen Cage



Your First Visit

- About the third day after you install the package, you'll want to ensure your queen has been released.
- Disturb the hive as little as possible. Lift the frame with the queen cage. Remove the cage and look to see if the queen is in the cage.
- If she is released (not in the cage), lower the frame and close the hive.
- If she is still in the cage, remove the cork from the noncandy end and put the cage back between the frames. The queen will come out and the cage can be removed the next time you open the hive.

Your First Inspection

- On or about day 7, one week after you install your package, perform your first inspection.
- You're looking for properly drawn comb and eggs.
- If you see a queen cell along with eggs, destroy the queen cell. This is the only time (immediately after a package is installed) that this is recommended.



Properly Drawn Comb



Crooked Comb Must Be Removed



Your Second Week

- Inspect 7 days later (about 14 days after install).
- Again look for eggs
- This time you should see larvae, these were eggs on your first inspection.
- More comb should have been drawn, expanding the brood area to the next frames
- You should also see nectar/syrup and some pollen in cells, some may be capped.
- Continue to feed 1/1 syrup, bees may take a quart or more a day
- You have no new bees yet.



Remember...

• If you see eggs, you don't have to find your queen

But

- If the weather is nice, spend time with your bees and practice finding her. Your colony will almost never be smaller, so finding her should never be easier.
- Finding your queen is a necessary part of beekeeping

Your Third Week

- Inspect 7 days later (21 days after install)
- Again look for eggs, practice your queen spotting
- You should see larvae of all ages
- This time you'll see capped brood
- More comb should have been drawn. Remove comb not drawn properly
- Pollen and nectar may be seen in the comb around the brood
- Do they need more room? Probably not, you still have no new bees



Notice The Blooms

As a beekeeper, you should be in tune with what's blooming and available for your bees.

March/April

• Henbit, deadnettle, red maple, early apples, peaches

May

• Apples, dandelions, strawberries,

June

 Raspberries and blackberries bloom early, tulip poplar, <u>black locust</u>, clovers later

The months are just a guide. As is true with most agriculture, this is all dependent on the weather.

Week Four

- Inspect 7 days later (28 days after install).
- As always, look for eggs.
- You should see eggs, larvae and capped brood.
- You may see emerging bees. Look on that middle frame.
- Comb should continue to be drawn.
- More pollen and nectar may be seen in the comb.
- Do they need more room?
- You're finally starting to get new bees.

Do Your Bees Need More Room?

- You should add another box onto your hive when the bees are just beginning to draw out the outer two frames of the last box you gave them
- Bees often ignore a box that's nothing but foundation
- Lure the bees into the new box by moving the two second-to-most-outer frames from each side of the current box up to the center of the new box, and move empty frames down in their place.

Routine Hive Inspections

1. Bees

2. Brood

3. Queen

4. Food

- <u>Bees</u>: A sufficient number of bees, seasonally based
 - A deep frame=~1215 bees per side, medium=~1000 per side
 - A strong hive in Spring will have 8 to 10 frames of bees
 - Medium 5 to 7 frames
 - Weak , less than 5 frames

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• <u>Brood</u>: Sufficient Brood, seasonally based

- A standard deep has 3500 cells per side, 7,000 total.
- 1 square inch of frame contains 25 cells.
- Today's sealed brood will be foragers in about 6 weeks
- Does the brood look healthy?

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- <u>Food</u>: Sufficient stores of pollen and honey

Week 4 Into August

- Feed until they don't take the syrup or your full-time hive bodies are drawn...it may take 8 gallons of 1:1 syrup to get your hive fully drawn
 - That's 2 deeps OR 3 mediums
- Inspect every 7-10 days.
 - Look for eggs to ensure the queen is alive and well.
 - Practice queen spotting
 - Once eggs and healthy brood are spotted, no further inspection is necessary.

• Heft the hive on each inspection to get an idea of the increasing weight.



Six Important Behaviors of Beekeepers

- Continuous Learning
- Be Observant
- Pay Attention to Your Own Behavior During Manipulations
- Be Prepared
- Cultivate Good Relations with Your Neighbors
- Keep Written Records on a Calendar

First Year In The Apiary Part II

> Denny Gorman Vice President

Matt Libhart Executive Director

Sting Video

Harvesting Honey

- You're looking for capped honey, not the sugar syrup you have been feeding them.
- Most honey in the Lancaster County area will be capped and ready to harvest about mid July.
- Harvest only frames that are least 75% capped.
- Expect no honey your first year
 - You may be able to get a frame or two if you've stopped feeding and the bees have capped honey in a super
- Removing bees from supers
 - Research this as homework.
 - Feathers, branches, fume boards...

July – August - September

Mite Treatments

- Generally need to be done toward the end of July
- Multi-week or a "one-shot" depending on your chosen treatment
- Continue mite monitoring, a late fall treatment may be needed

• Begin feeding light hives in the middle of September

- 2:1 (thick) syrup
- A total hive weight of 100lbs is a good goal
- Try to be finished feeding the first week of October
- This gives the hive time to dry and cap the syrup just as they would honey

Inspection Temperatures

- 40 50 60 Rule (assuming no wind)
 - 40° 50° : Peek inside
 - 50° 60° : Remove frames for short periods
 - 60° + : Full inspection



Ordering Wax Foundation

- Order next year's wax foundation in late summer to early fall
 - Supply companies will not ship wax during cold months
 - There WILL be a spring rush on equipment

September & October

- Continue inspecting as temperatures allow
- You may not see eggs at this time as the queen may have stopped laying
- Moving frames always involves risk of harming the queen.
 - This is not the time to "practice" finding the queen.
 - Find her if you must, but if you see eggs or young larvae, you're done.

Goals For Late Inspections

- 1. Remove empty frames, ensure all boxes are full of fully drawn comb
- 2. Identify pest/disease issues
- 3. Evaluate the colony's population.
- 4. Remove unused boxes from hive
 - Better to have two full medium boxes than 3 or 4 with a lot of empty frames
 - If you remove empty drawn comb, be sure to protect it from pests like wax moths.

October Winter Prep

- Moisture Management Options
 - Inner cover notch down
 - Homasote moisture board
 - Insulated covers
- Mouse Guards
 - Install during the day when bees are flying
- Other Considerations
 - Wind break
 - Wrapping hives
- Good wintering document, written by one of our members, is on our website in "Brooke's Binder
 - http://www.lancasterbeekeepers.org/useful-info/

Winter

- Overwinter feeding is plan B
 - If the hive is a good weight, feeding will be unnecessary
 - Fondant, sugar blocks, etc, are all emergency feed
 - Gently tilting hives from the back can be done anytime to check weight
- Bees will fly if temperatures get toward 40°-50°F
 - This is a good way to check your hive is still alive in the winter.



Winter Tasks

- Purchase new equipment
- Assemble/paint new equipment
- Repair/repaint old equipment
- Order bees
- Review your previous year. Plan new year.
- Read, Read, Read

Spring Comes Early

- Spring buildup begins in mid-February
- If emergency feeding, you must continue until blooms arrive
- Once temperatures allow, you can inspect for eggs and overall colony health
- Swarm prevention
 - You did read over the winter, right? \odot



Not Every Hive Survives

Survival

- Statewide losses are 40-50%
- Replacing hives is expensive
- Consider...



Survival

- Statewide losses are 40-50%
- Replacing hives is expensive
- Consider
 - Splitting Hives
 - Keeping and wintering nucs
 - Keeping more hives



Constant Learning Be a beekeeper, not a bee-haver

Thank You



LANCASTER COUNTY BEEKEEPERS SOCIETY NEW BEEKEEPER WORKSHOP

HONEY HARVESTING & EXTRACTION

Denny Gorman

Certified Master Beekeeper (Cornell) Vice President LCBS

HARVESTING HONEY a simple 5 Step Process

- 1. HARVEST (Pull) SUPERS, clear bees
- 2. UNCAP FRAMES, save comb and cappings
- 3. EXTRACT honey
- 4. STRAIN out wax and particulates
- 5. BOTTLE and label



PA Honey Sale and Labeling Act rev. June 2021

- Registration unnecessary....If 100% of the regulated product offered for human consumption are produced or processed "on the farm" on which the retail food facility or the food establishment are located.
- If honey producer sells off-site of his or her "farm": (Off-site locations include stores, farmers' markets, internet, craft shows, restaurants, ag fairs, etc.)... the honey processor MUST fill out and submit an application to register as either a Limited Food Establishment (if home-based), or a Commercial Food Establishment
- There is an annual fee and your kitchen will be inspected.
- Jim Pinkerton and I both offer bottling service in a registered facility for a small fee.



1. PULL SUPERS

- "Supers," are medium size (6 5/8 inch high boxes placed on top, (superimposed) on the Brood Box, or boxes (deeps).
- Usually separated with a queen excluder
- A full 10 frame medium super can weigh 50 or more pounds
- WHEN? In Lancaster County around first or second week of July, after the FLOW.
- Do not pull supers until ready to extract

Clear Bees From Supers

Bee Brush each frame to remove all bees



Alternative methods to clear supers







Triangular Bee escape board

Fume Board with removal chemical

2. UNCAP FRAMES



PHOTO: Denny Gorman

- Hot electric knife
- Minimize loss of drawn comb
- Uncapping Scratchers
- Uncapping machines

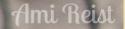


Uncapping Tub or Tank

- Put down Newspaper or plastic, EVERYTHING will be sticky!
- Have a bucket of warm soapy water near by.
- Do not harvest outside!
- Plastic or Stainless steel tub (food grade) with cross bar frame rest, and screw point.
- Strain honey from cappings, clean and harvest the wax



Use the edges of frame to guide your knife, cut off only cappings



CULINARY TRA CONNECTION

Theri-FIR

R on the

Harvest or not?

Your Bees will often backfill frames of hatched brood with honey

It is best practice to use **dedicated** frames for honey supers.

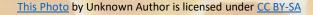
PA LAW "Honey shall be extracted only from combs that are free from brood of the bees and/or larva of wax moths." Some of the wax capping has been removed...the darker comb is where there was once brood. As the brood hatched the bees filled it with honey. The honey is the same color, just the cell is darker.



Would you harvest this frame?

- 80% or more capped honey
- No Brood in frames
- No evidence of SHB or wax Moths
- Honey should have a moisture content :15 to 18.5%,
- Refractometer





Simple Harmony Farms Uncapper



3. EXTRACT FRAMES

- EXTRACTORS
 - Radial– Like spokes on a wheel
 - Tangential Must flip frames
 - Electric
 - Hand Crank



Thermador. FIRST S' WALK.

THERMADOR.

4. STRAIN

- Remove wax, bee parts, particulates
- While Extractor is running
- Drain through Sieve or cheesecloth filter
- Allow to settle for a few days
- Skim or use a bottling tank
- Return "wet" supers to hives for bees to clean up.
- Freeze frames 24hrs and store



Let the honey settle a few days

After a week or so what is left on the top is some foam and small bits of wax that made it through the sieve, all have floated to the top. Perfectly eatable, but don't look nice in a jar of honey.

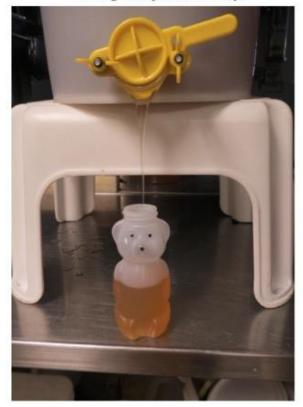


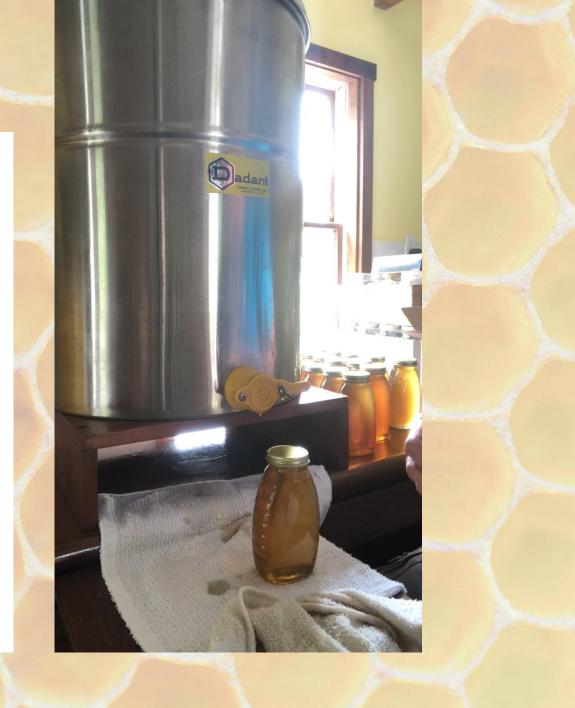
A large spoon is used to skim the foam and wax from the surface.



5. BOTTLE and LABEL

If the honey was in storage buckets, it can be poured into a bottling bucket with a gate. The gate is opened to fill whatever bottles you are using for your honey.





A FEW TIPS TO SAVE SOME HONEY MONEY

- You may reserve and borrow the CLUB EXTRACTOR.
- Food grade buckets, are often available for free at bakeries and some restaurants, buy honey gates on-line and make your own bottling buckets.
- Food grade tubs, sieves, trays etc. are available at restaurant supply stores, cost less than bee catalogs
- Refractometers are available at science supply sites and Amazon at lower cost than bee suppliers.
- Jim Pinkerton and myself both offer use of PA registered bottling facility and extraction services for a small fee.







THANK YOU

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