

Beginning Beekeeping

Module 4 Hive Products and Honey Extraction

Northwest Arkansas
Beekeepers Association
www.nwabeekeepers.com

And now for the good stuff – honey

- Nectar and enzymes are placed in individual cells for drying
- “Ripe” honey has less than 18.6% water content
 - Bees draw air through the hive to dry it
 - Each ripe cell is capped with a wax capping
 - Bottling unripe honey can cause fermentation

Honey

- Honey has anti-bacterial and anti-fungal properties
 - Can be put on wounds to seal them and kill bacteria
 - Use of honey bandages is becoming common
- Sealed, it lasts a long time
 - Archaeologists found 3,000 year old honey that was sealed and still good
- Most common sweetener before refined sugar created
- DO NOT feed honey to infants less than one year old

Honey

- Honey produced from the flowers of rhododendrons, mountain laurel, sheep laurel, and azaleas can produce honey intoxication
 - Dizziness, weakness, nausea, vomiting, sweating
 - Doesn't seem to be a problem in this area

Honey

- Honey will crystallize after a period of time
 - Predominately affected by fructose to glucose ratio
 - High glucose honey crystallizes rapidly, e.g. Hawai'ian Macadamia Nut honey
 - High fructose honey crystallizes very slowly
 - Can be re-liquified by putting jar in 120 degrees F water bath (melting point of honey is 104 degrees to 122 degrees F)

Honey

- Honey is hydrophilic
 - It will absorb moisture from the air
 - It will eventually dilute the honey until fermentation will occur
 - You want to limit the time honey is exposed to air during extraction

Honey

- Raw honey and strained honey
 - Obtained by extraction, settling, or straining without adding heat
 - Contains pollen and small bits of wax
 - Straining removes bee parts, pieces of wax, propolis, varroa mites, small hive beetles, debris

Honey

- Creamed honey
 - Whipped or churned honey
 - Has large number of small crystals to prevent formation of larger crystals

Honey

- Comb honey
 - Honey with the beeswax comb
 - Can get special frames for comb honey which is then cut out of the frame and packaged

Honey

- Pasteurized honey
 - Heated above 161 degrees F in pasteurization process
 - Destroys yeast cells
 - Delays crystallization
 - Affects appearance (darkens), taste and fragrance

Honey

- Filtered honey
 - Filtered to eliminate fine particles, pollen grains, air bubbles, other materials
 - Very clear and doesn't crystallize quickly
 - Supermarket honey
 - Source can't be traced by the content
 - Can also be cut by high fructose corn syrup

Honey

- Mead
 - Honey wine
 - Made from fermented honey
 - Made similar to grape wines
 - Many different ways to blend other fruits with the mead and to produce different sweetness levels
 - Has a very long history back thousands of years

Honey

- How much honey can I expect to get?
 - Don't expect to get any honey your first year
 - After your first year:
 - Nationally – 50 to 60 pounds per year per hive
 - Arkansas – 60 to 70 pounds per year per hive
 - Average – 40 to 45 pounds per year per hive

Honey

- One pound honey is 10.67 fluid ounces (volume)
- One pound honey is 16 ounces (weight)
- Honey is sold by weight

Honey Extraction

- Remove the honey super from the hive
 - The supers need to get under cover quickly because the bees will view the super as honey to be robbed
 - Bees can be driven from the super while still on the hive stack by chemical means
 - Using a fume board and product such as Bee Go, Bee-Quick or Honey-B-Gone

Honey Extraction

- Bees can be brushed off the individual frames
 - They usually return quickly to rob the honey
- Remove the supers to the extraction site and use a leaf blower to blow the bees from the super box
 - Doesn't seem to hurt the bees
 - Most of the workers will leave the box during transport
- You really want to minimize the number of bees you bring in the house

Honey Extraction

- Crush and strain method
 - Smash the comb and let the honey drain through a strainer (nylon bag from paint store)
 - Harvests both honey and comb
 - Destroys the comb
 - Must be done with top bar hives
 - Can make a press using a scissor jack

Honey Extraction

- Extractors
 - Removes honey from combs
 - Allows you to harvest some wax from the cappings – this is very clean wax
 - Allows bees to reuse the drawn comb next season

Honey Extraction

- Bees must consume about one pound of honey to make two ounces of beeswax or
- Eight pounds of honey to make one pound of beeswax
- Drawn honeycomb is valuable because it consumes hive resources to make

Honey Extraction

- Basic extracting equipment
 - Centrifugal extractor
 - Uncapping tank
 - Uncapping knife
 - Uncapping fork
 - Strainer
 - Settling tank
 - Jars for honey

Honey Extraction

- Use food-grade equipment for the strainer, uncapping tank, and settling tank
- Your honey is for human consumption
- Restaurant supply stores have items you can use for this

Honey Extraction

- Extractors – extracts honey by spinning the frames:
 - Radial extractors – allows both sides of frame to be extracted at the same time
 - More expensive
 - Tangential extractors – must extract one side at a time and flip the frame
 - Extractors are usually sold with hand crank or motorized options

Honey Extraction

- Extractors:

- Bees make honeycomb with a slight upward tilt so the honey doesn't run out of the comb while drying
- Important to pay attention to which way the comb is oriented while extracting
 - Honey will still come out, but you are making life hard if the frame is in wrong

Honey Extraction

- Extractors:
 - You can blow the comb and foundation out of the frame with a tangential extractor if the frame isn't wired well
 - This is why you went to the trouble to wire the frame
 - Will have a honey gate at the base to drain the extracted honey into the strainer and settling tank

Honey Extraction

- Uncapping knives come in cold knives and hot knives
 - The hot knives are heated and slice through the caps on the top of the comb easily
- Uncapping fork is to scrape the cappings off all of the places you missed with the knife

Honey Extraction

- **Extracting Procedure:**
 - Cut the cappings off both side of each frame
 - Do it over the uncapping tank so the cappings and honey drips fall into the tank
 - Use a thin board over the tank to set the frame on

Honey Extraction

- **Extracting Procedure:**
 - Load into extractor until full and then spin
 - Start slowly with a tangential extractor, then speed up as it becomes lighter
 - Balance as best you can, think out-of-balance washing machine

Honey Extraction

- **Extracting Procedure:**
 - Open the honey gate on extractor and let honey drain into the strainer and settling tank
 - This will take some time if cool
 - Drain the uncapping tank through the strainer

Honey Extraction

- **Extracting Procedure:**
 - Cap the settling tank when done
 - Need to let the air bubbles settle out while protecting honey from moisture in air
 - A honey gate on the settling tank is helpful when bottling
 - Save the wax cappings separately for refining
 - This is the cleanest wax

Honey Extraction

- **Extracting Procedure:**
 - Let honey settle before bottling
 - Lots of bottling options
 - Recommend using heat shrink seals on jar lids so your customers know the jars haven't been tampered with

Honey Extraction

- **Extracting Procedure:**
 - Set the boxes with wet frames back on the hives
 - Bees will clean, repair, and reuse the frames
 - You can set your equipment out for the bees to clean up
 - Do this away from the beeyard
 - This can promote robbing behavior

Honeycombs and Beeswax

- After extraction, store frames in a cool, dark place. Main problem are wax moths

Honeycombs and Beeswax

- Consider replacing the comb and foundation about every three years (1/3 of frames per year)
 - Comb goes from cream colored to dark brown from debris as it is used
 - Cell size shrinks with each brood cycle

Honeycombs and Beeswax

- Wax is extruded by 8 glands on the underside of the worker's abdomen as flakes (pic)

Honeycombs and Beeswax

- Comb is made by workers building up the flakes around them and melting flakes with body heat (pic)
- As the wax cools, surface tension pulls the wax into a hexagon shape
- Hive temperature needs to be 91 to 97 degrees F

Honeycombs and Beeswax

- Refining Beeswax
 - Plan for solar wax melters on Internet
 - You can also refine beeswax using a double boiler to melt the wax
 - Important to use a double boiler if melting over heat

Honeycombs and Beeswax

- Refining Beeswax
 - Beeswax melts at 144 to 147 degrees F
 - Discolors if heated above 185 degree F
 - Flash point (ignition) is 400 degrees F (204.4 degrees C)

Honeycombs and Beeswax

- Refining Beeswax
 - Melt the comb scrapped from hive, cappings, comb and foundation in frames
 - The melt will have all sorts of debris, bee parts, and honey

Honeycombs and Beeswax

- Refining Beeswax
 - Pour through a filter over a pan with some water in it
 - The wax will float on the water and solidify as it cools
 - Suggestion for a filter is four layers of cheese cloth

Honeycombs and Beeswax

- Refining Beeswax
 - The filter will be coated with beeswax and debris (called slum gum)
 - There will be a layer of fine debris on the bottom of the filtered beeswax block – scrap that off
 - The filter with slum gum and scrappings can be used as fire starters

Honeycombs and Beeswax

- Uses for beeswax
 - Candles
 - Lip balm, salves, soaps
 - Wood polish, waterproofing
 - Art uses (lost wax method of casting)
 - Ahnert, Petra, Beeswax Alchemy, Quarry Books, 2015, 136 pgs.

Pollen

- Bees collect pollen as a protein and carbohydrate source
- Carried back to hive in pollen baskets on legs
- Some beekeepers collect pollen and sell it as a food or dietary supplement
- Requires a pollen collection board and pollen cleaner

Propolis

- Bees use propolis to seal gaps within the hive
- Has anti-bacterial and anti-fungal properties
- Made from tree resin, honey, and enzymes

Propolis

- Nature's Gorilla Glue, difficult to clean off tools and clothing
- Soft and sticky at normal temperatures, usually brown in color

Bee Forage

- What if the bees aren't filling the supers with honey?
- Look at:
 - Nectar flow and lack of forage
 - Placement of supers on the hive (you might need a frame of drawn comb to attract the workers)
 - Colony health

Bee Forage

- Forage is nectar and pollen sources
- See honey labeled as “clover honey” in stores
 - No such thing as monoculture honey
 - Bees are gathering from all food sources within their range
 - They need multiple food sources for a balanced diet to get all the vitamins and minerals they need

Bee Forage

- Forage can be a problem in some areas
 - Deep woods may have limited floral sources
 - Red cedars (a juniper) are taking over some areas replacing the oak forest
 - Not much use to bees
 - Crowds out other plants
 - Plant sources have a 10 to 14 day cycle during the growing season

Bee Forage

- **If you can't change your location, change your location**
 - Plant bee forage where you can
- What are good forage plants?
 - Huge topic
 - Trees, shrubs, vines, herbs, garden plants
 - You want to look at when the plants provide nectar and pollen with the goal being to have plants available at all times during the season

Bee Forage

- Trees
 - Black locust
 - Tulip poplar
 - Korean Bee Bee Tree
 - Catalpa
 - Japanese Pagoda Tree
 - Black Gum

Bee Forage

- **Flowers**

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|-------------|-----------|------------|
| – Lavender | Buttercup | Sunflower |
| – Thyme | Snowdrop | Heliotrope |
| – Cilantro | Geranium | Dandelions |
| – Borage | Aster | Hyssop |
| – Sage | Calendula | Mints |
| – Fennel | Bee balm | Clovers |
| – Hollyhock | Poppy | |
| – Crocus | Zinnia | |