Sustainable and Organic Beekeeping in Chester County

John Pisciotta
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John M. Pisciotta
WCU Biology Dept.
Overview

- Introduction
- Bee Products & Services
- Starting your Apiary!
- Growing your Operation
- Diseases & Sustaining Healthy Hives - organically
- Conclusions & useful websites
Introduction

- Humans have been *keeping* bees for around 5,000 years & collecting honey at least twice as long.

- From the Egyptians to Greeks, Romans, and Vikings saw honey was *simply divine*!
Beekeeping / “Apiculture”

• Honey bees Contribute **$15 billion** to the U.S. economy annually! (USDA)

• Honey bees pollinate at least 90 crops and are responsible for about **1/3 of our food**.

• They support 20,000 beekeepers in USA, and may happy consumers
Introduction

• Why keep bees today?

• Honey & other bee products

• Crop Pollination

• Promote Environmental & Self Sustainability
• U.S. Honey generally cannot be certified organic by the USDA.

• Why not? For certified organic honey, any plants within 1.8 miles of hives must be free of synthetic chemicals.

• So, almost all organic honey you see is Imported

• Is Honey vegan?...
So, many Other Hive Products!

- Beeswax (candles, lip-balm, figures, etc)
- Soaps
- Pollen
- Propolis
- Royal Jelly
- Bee Bread (mixture of pollen and nectar)
- Mead
- Nutritional Yeast
- Honey vinegar
- Apitherapy
- Selling ‘Nucs’ & Queens
Honey Bread
Hive Services
How do Populations Interact?
Without bees, many foods would vanish or become expensive.

**FOODS THAT DEPEND ON HONEY BEES**
Will your favorite fruit or vegetable survive if all of the honey bees die off?

1. **disappear**
   - 100% of these crops depend on honey bees

2. **very rare**
   - 90% of these crops depend on honey bees

3. **rare**
   - 60-40% of these crops depend on honey bees

*In recent years, bees have been under assault*
'Like sending bees to war': the deadly truth behind your almond milk obsession

The Guardian 2020

https://www.theguardian.com/environment/2020/jan/07/honeybees-deaths-almonds-hives-aoe
Starting your *Local* Apiary

**Site Selection:**

- Should face *southeast* for *early morning sun*

- *Overhead shade* against hot mid day sun of summer.

- Rear *wind protection* from cold north & west winds

- Soil substrate & Height may be important (sand, soil, concrete, etc)

Cost to start an Apiary $100 - $1,000 & up
Laying the Groundwork

Firm, but not 100% level, raised foundation

Start with 2 or more hives – *not 1* for a Sustainable Apiary

Extracts of Polypore Mushroom Mycelia Reduce Viruses in Honey Bees.
Stamets et al.
Scientific Reports, 2018
Laying the Groundwork

Firm, but not 100% level, raised foundation

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Types of Bee Hives

- Top Bar hive
- Skep Hive

LL Langstroff (L^3)

LL Cool J
Parts of a Langstroth Hive

- Cover
- Inner Cover
- Boxes (Honey Supers)
- Boxes Hive Bodies
- Frames & Foundation
- Bottom Board
- Base

“In a moment the suspended movable frames, kept at a suitable distance from each other and the case containing them, came into being...I could scarcely refrain from shouting out my ‘Eureka’ in the open streets!” - LL Langstroth
## 3 Castes (Types) of Bees in Hive

<table>
<thead>
<tr>
<th>Type of adult bee</th>
<th>What they do</th>
<th>How many in a honey bee colony</th>
<th>How many in a bumble bee colony</th>
<th>What they look like in a honey bee colony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen</td>
<td>Lay eggs</td>
<td>1</td>
<td>1</td>
<td>![Queen Bee Image]</td>
</tr>
<tr>
<td>Worker</td>
<td>Take care of larvae, build and clean nest, forage</td>
<td>10,000-50,000</td>
<td>Less than 50 to over 400, depending on species</td>
<td>![Worker Bee Image]</td>
</tr>
<tr>
<td>Male</td>
<td>Leave nest to mate, then die</td>
<td>100-500</td>
<td>0-50, depending on species and season</td>
<td>![Male Bee Image]</td>
</tr>
</tbody>
</table>
Development & Maturation

Life cycle of honeybees

- Queen lays egg
- Worker feeds larva and seals cell once larva reaches full growth

- Egg
- Larva: day 6
- Larva: day 10
- Pupa: day 15
- Pupa: day 18
- Adult: day 21

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Diet Direct Caste

DIET
Royal Jelly
faster development (~13 days)
slower development (~18 days)

Worker Jelly

Queen
jagged mandibles
queen mandibular pheromone
long-life span (>2 years)
spermatheca & active ovaries
barbless sting

Worker
short-life span (3-6 weeks)
corbicula
inactive ovaries
Visual I.D. of Developing Castes
Starting the Hive: Catch a swarm!

• Buy bees from supplier (Package –vs- Nuc$)

• Split an existing Hive (colony)

• Catch a wild Swarm!
Buying Bees

Package Bees (3lb bees & a queen) are $135 each.

5-Frame Nucleus (nuc) Colonies are $225 each. Available pick-up dates are: April-May
Established Apiary, growing

• Permitting
“Splits”
Beehaviors: Foraging

All the Best Plants to Grow in a Bee Garden

- Pollen
- Nectar
- Water
Beehaviors: Bearding
Beehaviors: Robbing

Stop the robbing right away!
Working your Hives: *Essential Beekeeping Items*

- Smoker
- Hive Tool
- Beesuit & Gloves
- Box & Bucket(s)
Conduct Periodic Inspections
Periodic Inspections look for

A “Queenright Colony” 😊

Eggs (good to see!... usually)

Queenless w/ Laying workers 😞
Honey Processing Tools

Extractor: (centrifuge)

Optional: Heated Knife
Indoor Honey Extraction
Always leave Bees enough honey to overwinter!

• Rule of thumb: ½ for you & ½ for them

“Honey can help treat gum diseases, including gingivitis, bleeding, and receding gums.... Prevent cavities”

[Link to the article](https://mypenndentist.org/dental-tips/2021/09/07/does-honey-rot-your-teeth/)

Dark fall honey also contain high amounts of antioxidants which combat free radicals, (molecules that damage cells)
Production of hydrogen peroxide is the primary reason for honey’s antimicrobial activity.
A great way to **Reuse** old Jars
Parasitic Mites cause huge losses in Agriculture

Two spotted Mites: Eggplants

Tomato russet mite: (from Australia)

Citrus mites: Oranges / Florida

Spider Mites: various plants
Exotic Species can devastate ecosystems

**Honey Bee**

**Parasite**

*Varroa destructor*
Colony Collapse Disorder: When workers leave hive & Queen to perish (Dramatic Rise over past 35 years)

Relative influence of CCD Causes
Effect of CCD on Total US Hives

US Honey Bee Colonies*

Honey Bee decline begins

Population begins to improve

National Agricultural Statistics Service (NASS), US Dept of Agriculture
Varroa Mite Arrives in US in mid 1980s
Life Cycle of Varroa Mite

1. Before the cell is capped, the mite crawls down between the larva and cell wall and embeds itself in the brood food.
2. Once the cell is capped and the brood food is eaten the mite is liberated and begins to suck the blood of the prepupa.
3. The mite lays its first egg (a male) 60-hours after capping and lays subsequent eggs (all females) at 30-hour intervals.
4. Mite feces begin to build-up within the cell.
5. Mites continue to develop and feed upon the bee, transferring viruses.
7. Adult female mites leave with emerging honeybee while male and immature mites stay in the cell and die.
Males (Drones) tend to **Amplify Mite population**

Note: All bee workers are females
Varroa Mite Treatments

- **Formic Acid**: Penetrate wax caps (use from 50-80 F)

- **Oxalic Acid**: Can be used in *cold weather*

- **Chemical Pesticides (Apivar)**: Not organic should not be used when honey is being made (i.e. late Spring)
Oxalic Acid Crystals bind foot hairs, Immobilizing & killing mites
The Apprentice Program
• Upon satisfactory completion of the program, the apprentice will get a CCBA ‘nuc’ the following spring. Program cost is $120.

The Mentoring Program
• Intermittent apiary advice from an experienced beekeeper – Free.

Philadelphia Beekeepers Guild
https://phillybeekeepers.org/

Local Links
https://www.chescobees.org/

https://easternapiculture.org/about/
Useful Information

Hive Placement
https://galenafarms.com/blogs/articles/beehive-location

Setting up a Beehive
https://www.beekeepingfornewbies.com/how-to-set-up-your-beehive/

Beekeepers Calendar