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### Sustainable and Organic Beekeeping in Chester County

John Pisciotta

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# **Sustainable & Organic Beekeeping in Chester County**



**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](#)

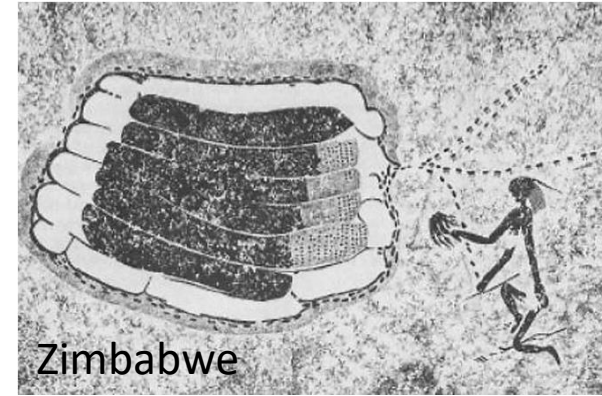
# Introduction



Spain — 7,500 BCE



Honeyguide bird



Zimbabwe

- 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!**



Egypt,  
Tomb of  
Pabasa  
700 BCE

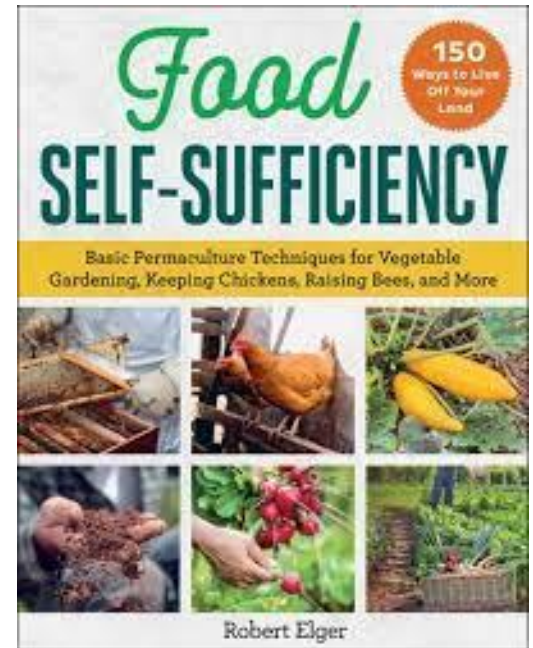


# Beekeeping / “Apiculture”

- 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

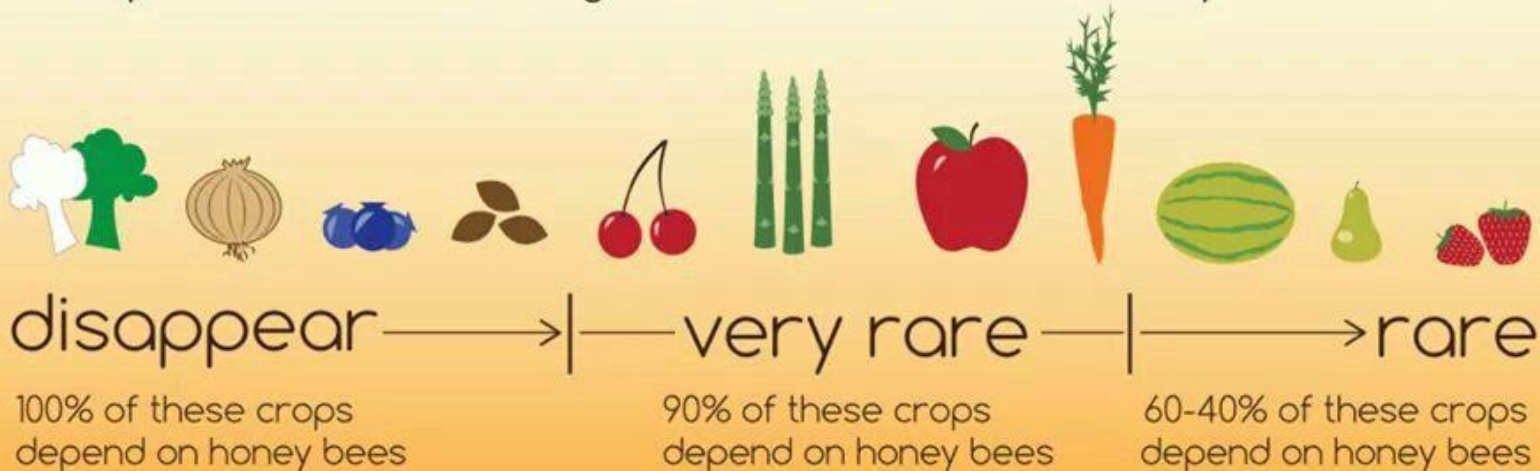
# How do Populations Interact?



# Without bees, many foods would vanish or become expensive

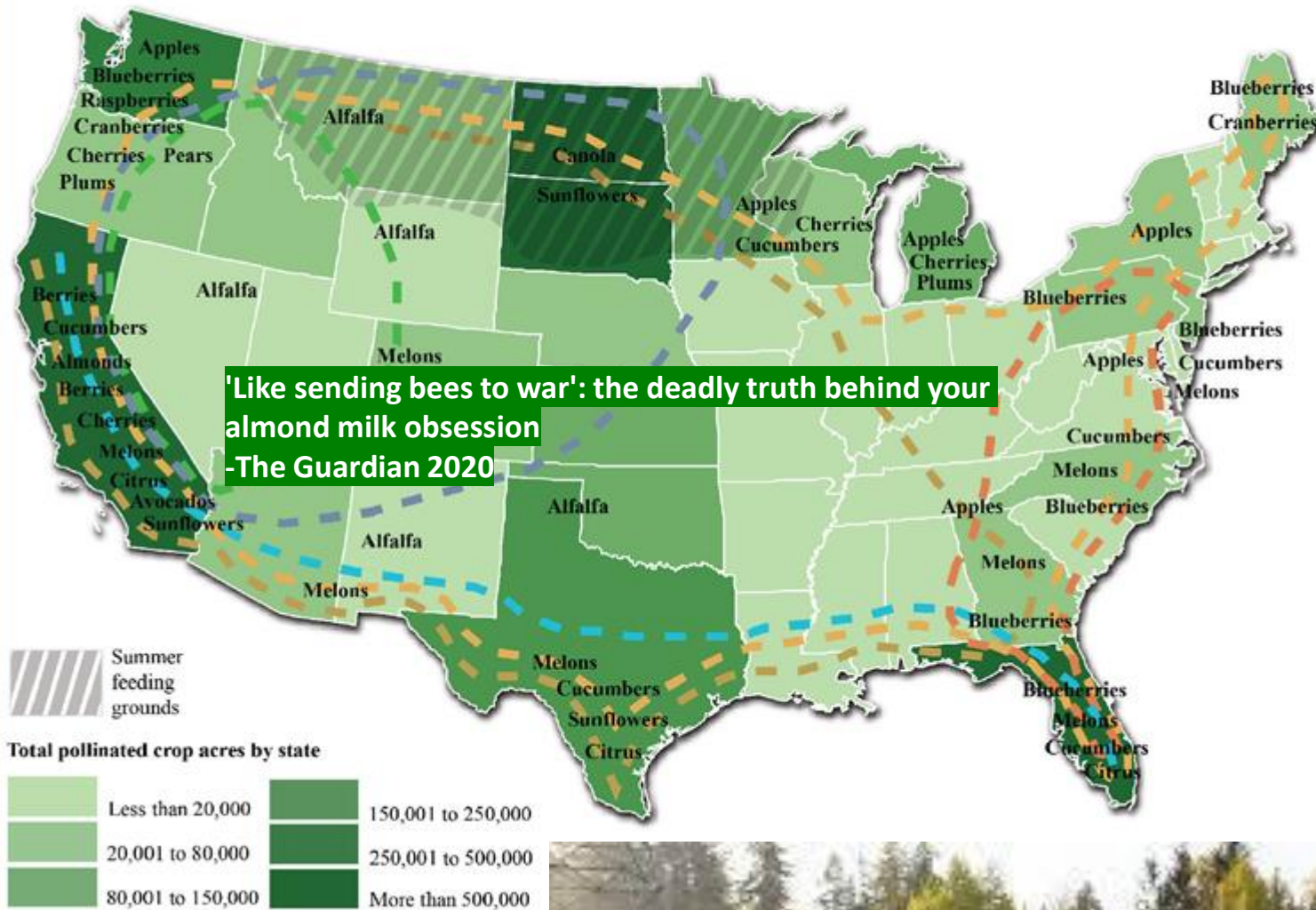
## FOODS THAT DEPEND ON HONEY BEES

Will your favorite fruit or vegetable survive if all of the honey bees die off?



*In recent years, bees have been under assault*

# Pollinator movement and crops in the U.S.



<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



South East



**BEES SIPPING DROPLETS FROM  
MUSHROOM MYCELIUM**

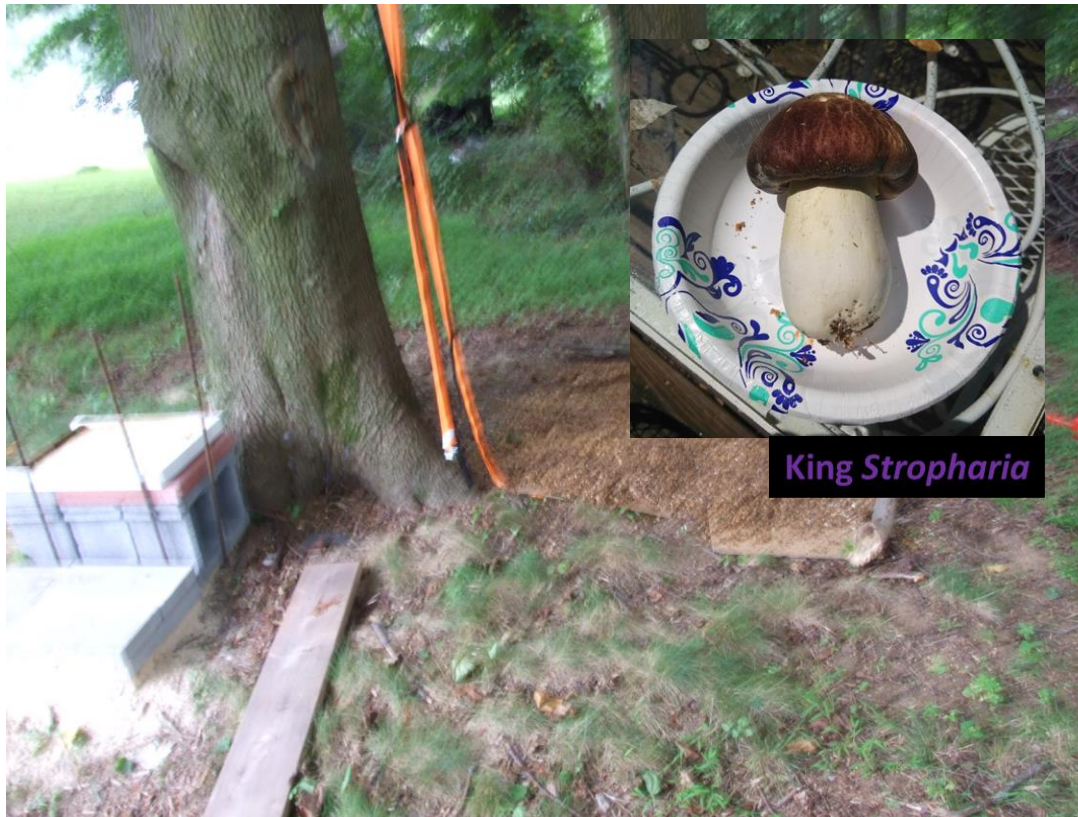
Extracts of Polypore  
Mushroom Mycelia Reduce  
Viruses in Honey Bees.  
Stamets et al.  
Scientific Reports, 2018

North West

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

# Laying the Groundwork

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# Types of Bee Hives



LL Langstroff (L<sup>3</sup>)

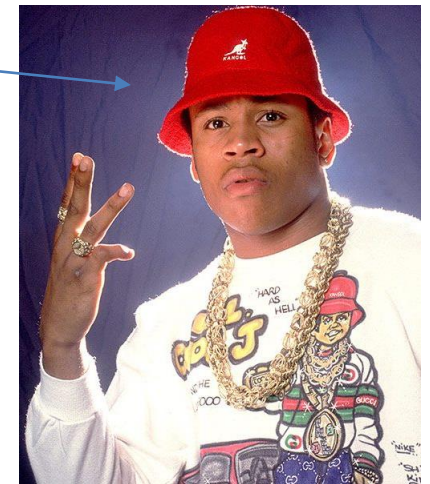


Top Bar hive



Skep Hive

LL Cool J



# Parts of a Langstroth Hive

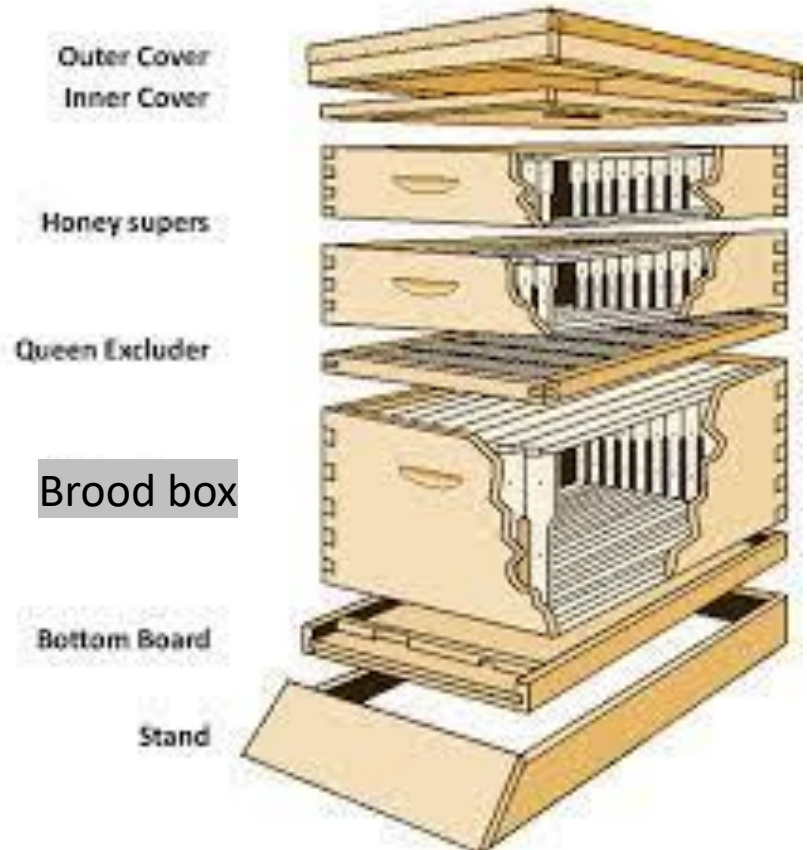
No. 9,300.

L. L. LANGSTROTH.  
Bee Hive.

2 Sheets—Sheet 2.




Patented Oct. 5, 1852.

- 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

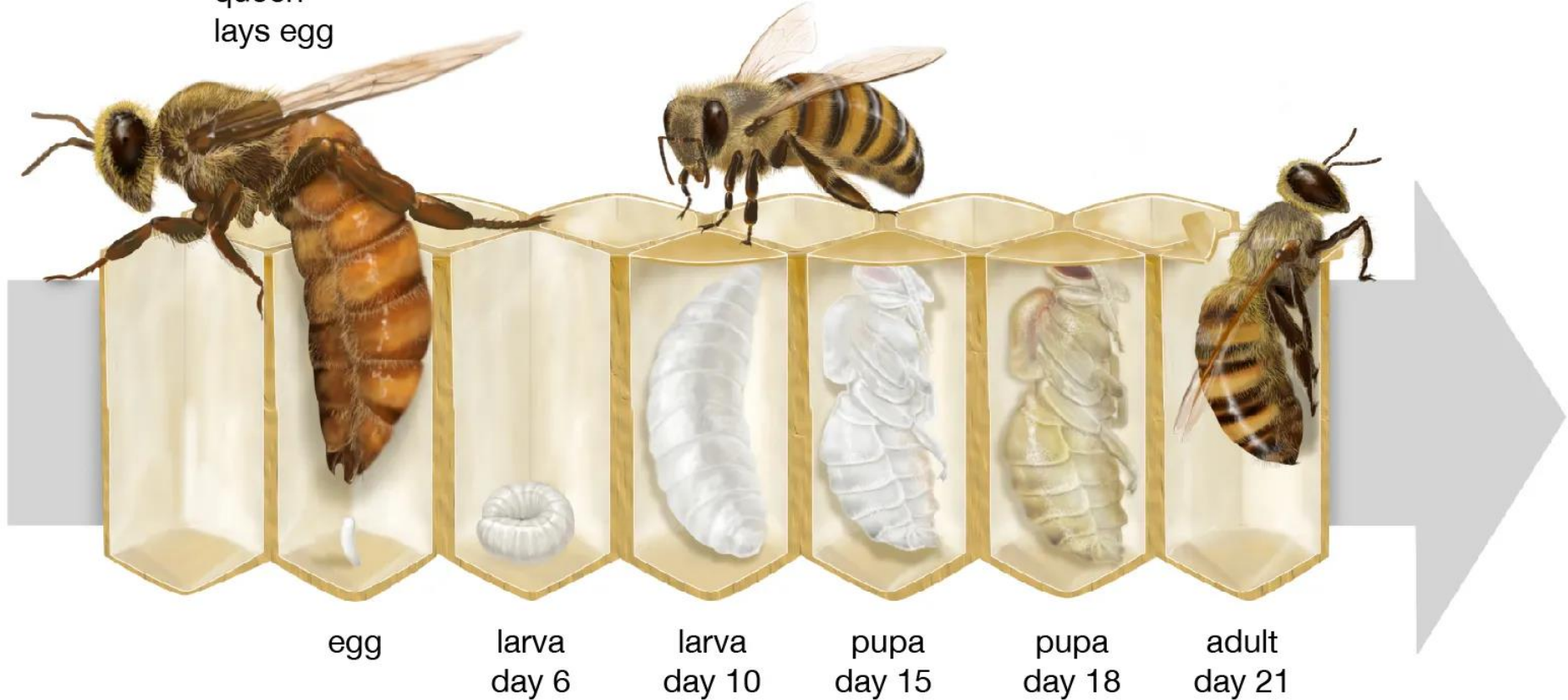
| Type of adult bee | What they do                                      | How many in a honey bee colony | How many in a bumble bee colony                | What they look like in a honey bee colony                                             |
|-------------------|---------------------------------------------------|--------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------|
| Queen             | Lay eggs                                          | 1                              | 1                                              |    |
| Worker            | Take care of larvae, build and clean nest, forage | 10,000-50,000                  | Less than 50 to over 400, depending on species |    |
| Male              | Leave nest to mate, then die                      | 100-500                        | 0-50, depending on species and season          |  |

# Development & Maturation

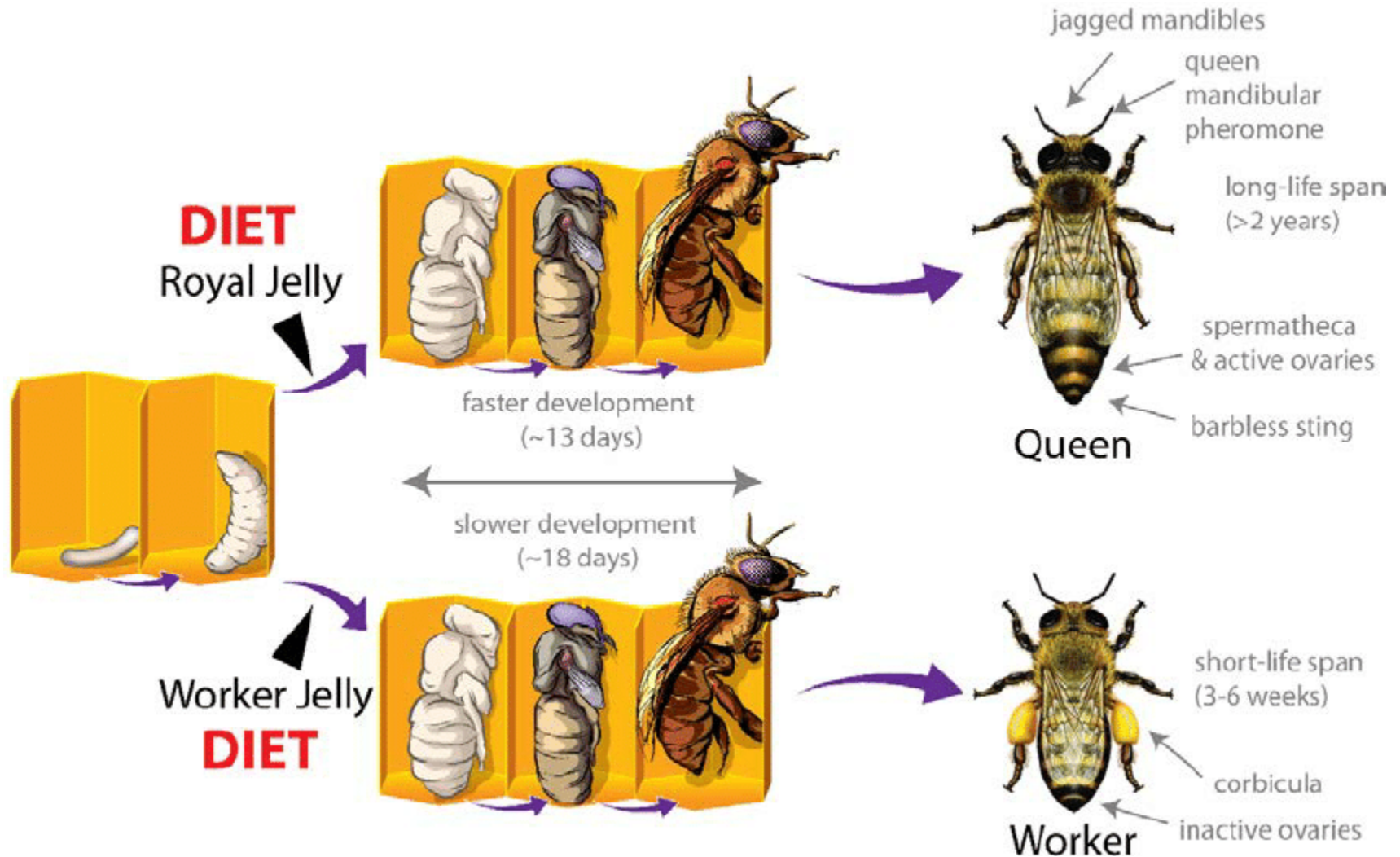
## Life cycle of honeybees

queen  
lays egg

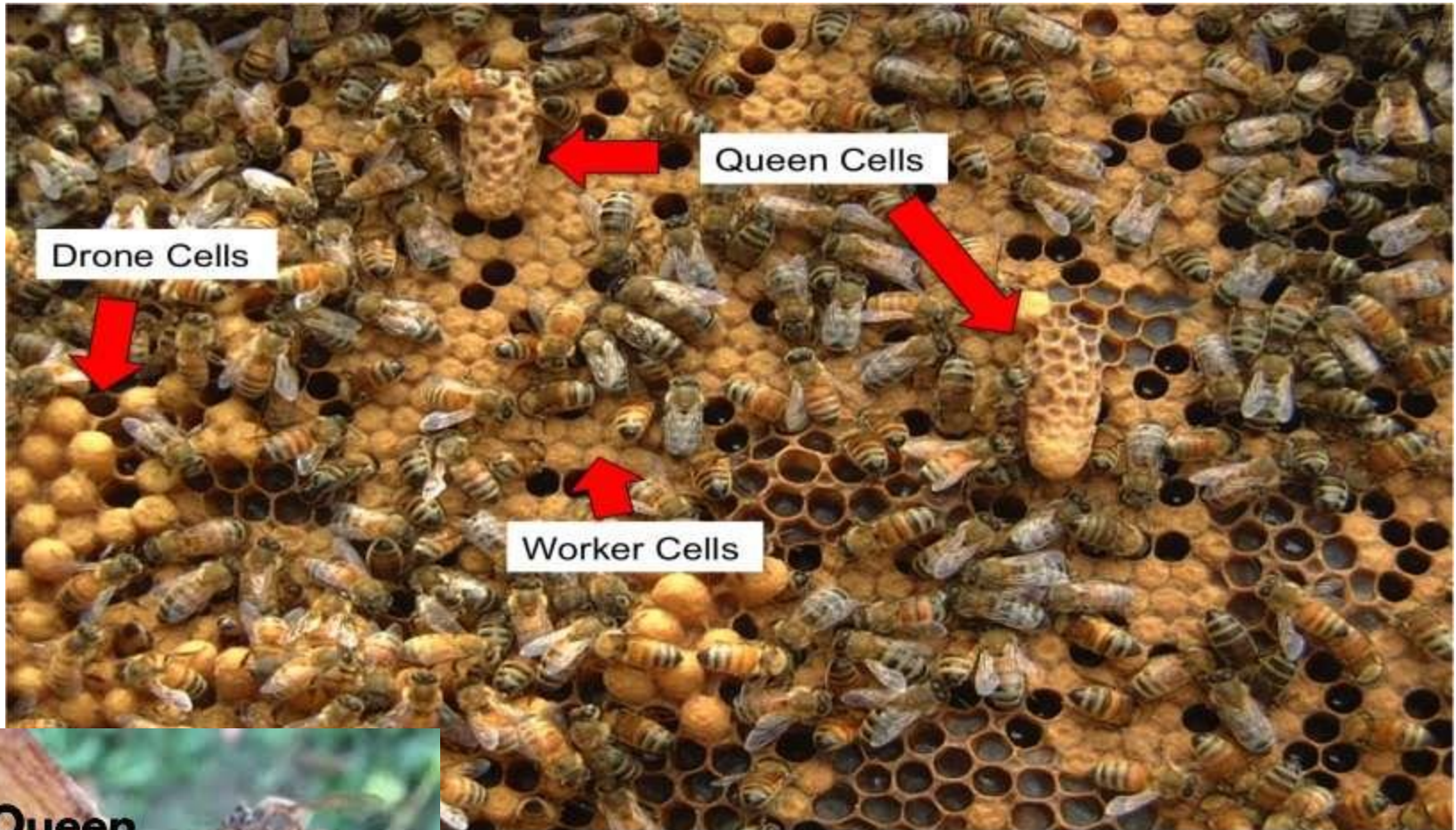
worker feeds larva and seals cell  
once larva reaches full growth



# Diet Direct Caste



# 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”



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF AGRICULTURE

HARRISBURG, PA 17110-9408

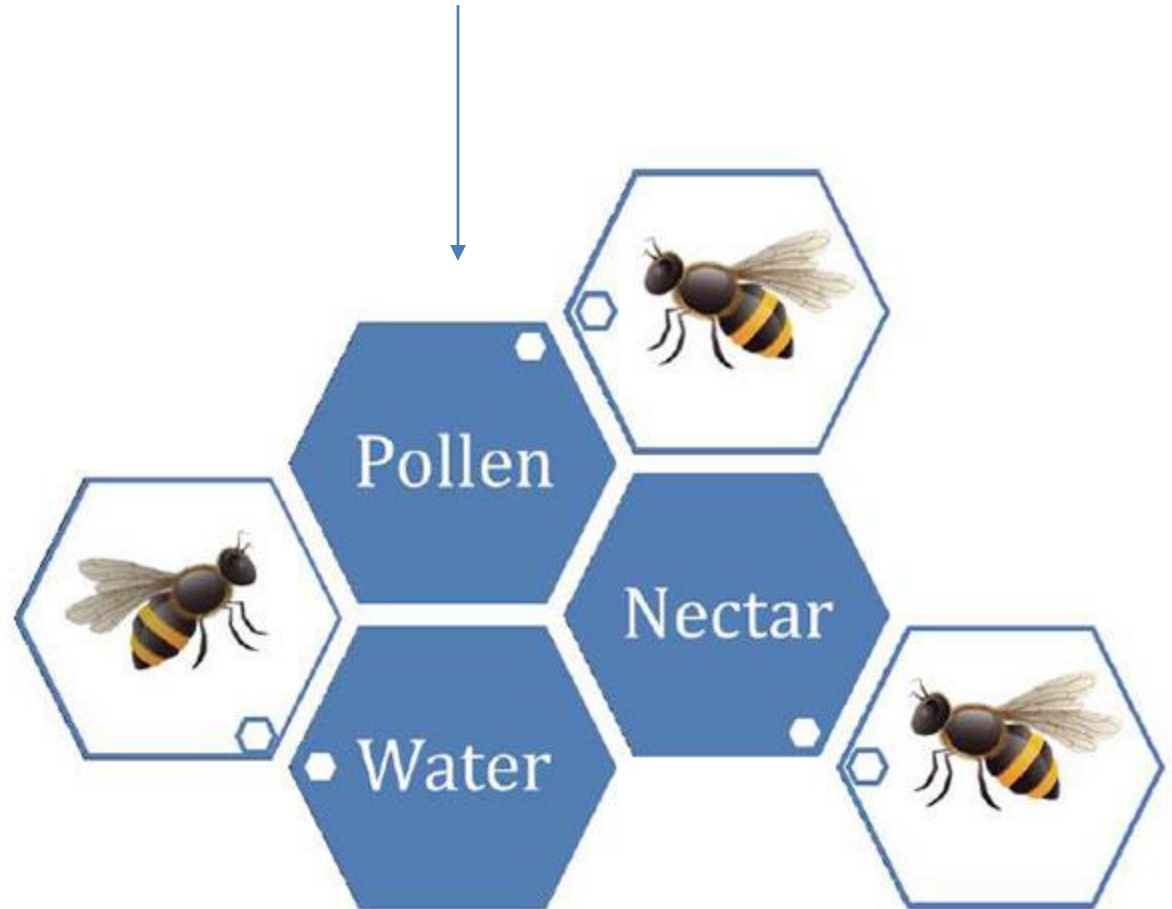
Apiary License

John M Pisciotta

# Beehaviors: Foraging



All the Best Plants  
to Grow in  
a Bee Garden 



# Beehaviors: Bearding



# Beehaviors: Robbing

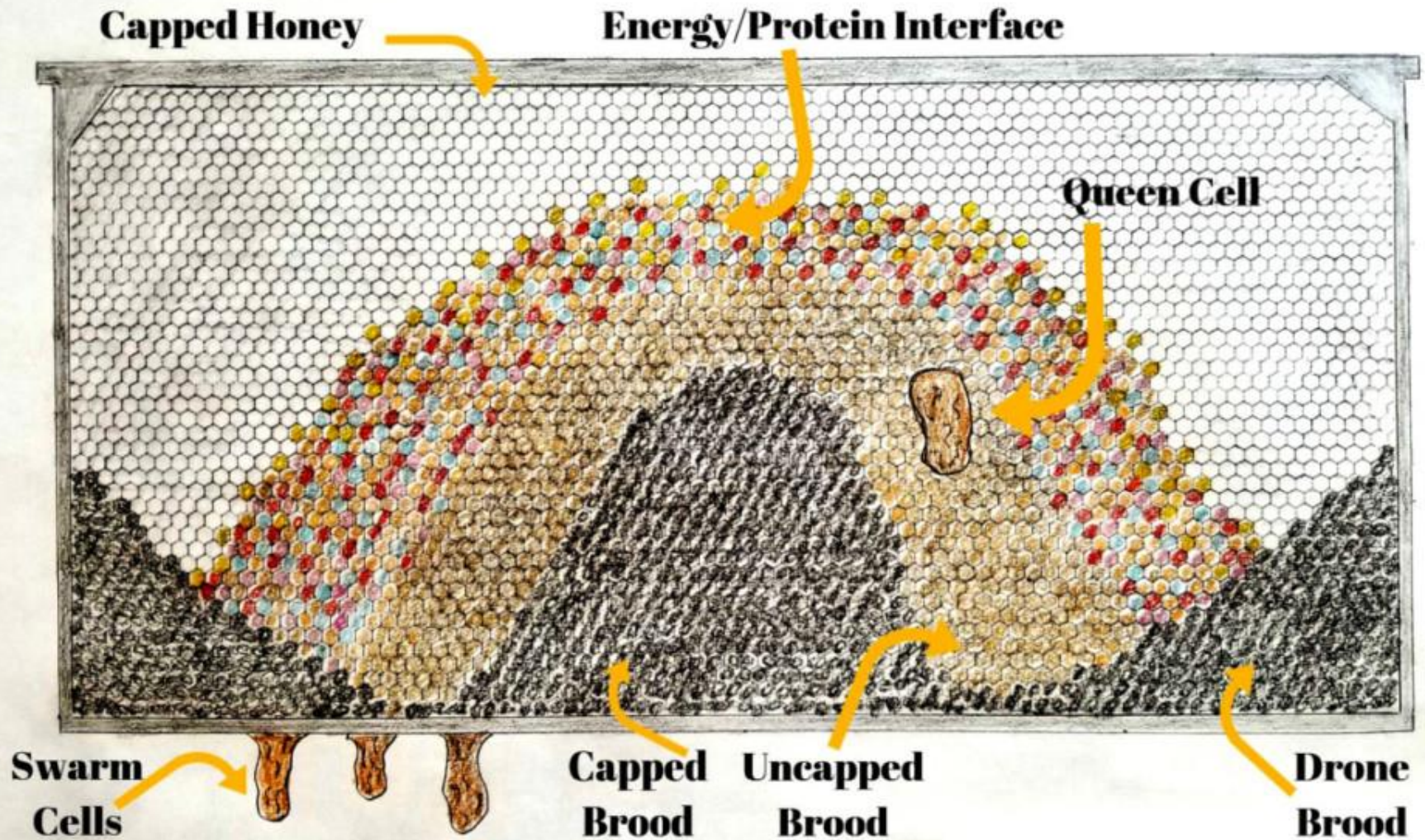


# Working your Hives: *Essential Beekeeping Items*

- 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

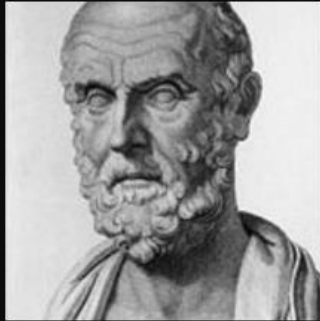


“Honey can help treat gum diseases, including gingivitis, bleeding, and receding gums.... Prevent cavities”

<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)

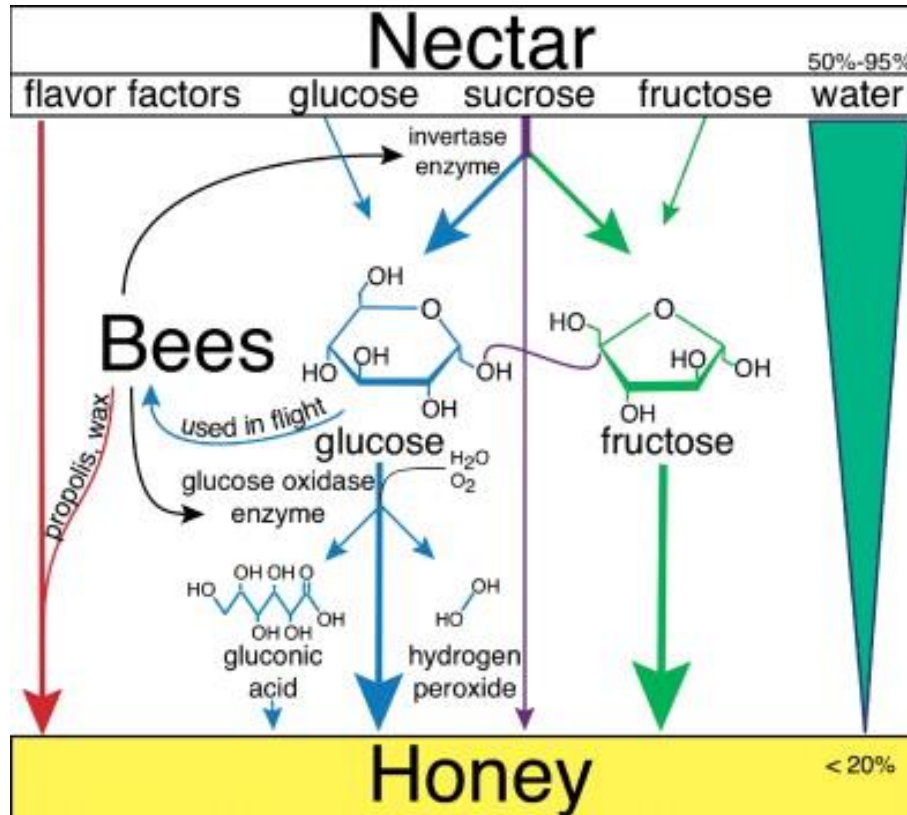


Let food be thy medicine and  
medicine be thy food

~ Hippocrates



AZ QUOTES



Production of hydrogen peroxide is the primary reason for honey's antimicrobial activity.

# A great way to Reuse old Jars



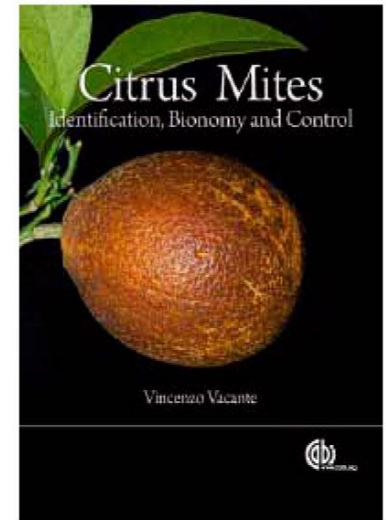
# Parasitic Mites cause huge losses in *Agriculture*

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

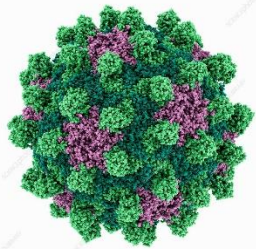
## VARROA MITE



*Varroa destructor*

# Colony Collapse Disorder:

When workers leave hive & Queen to perish  
(Dramatic Rise over past 35 years)



Deformed Wing Virus

**Pathogens**

New virulent viruses, some spread by Varroa mite

**Parasites**

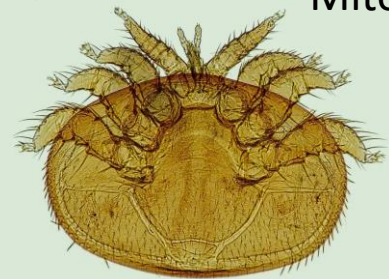
Most detrimental: the mite Varroa destructor

**Climate**

**Management**

**Nutrition**

**Pesticides**



Mites



Beetles



DEATH'S-HEAD HAWKMOTH

Relative influence of CCD Causes

**WANTED!**

**DEAD OR ALIVE**  
**deformed wing virus**



Photo by Bob Taylor

Deformed wing virus can be noticed by the damage it does to worker bees in the hive. Bees which are infected as larvae will have curly deformed wings as an adult and are incapable of flight. While this does not usually kill the bee directly, they cannot forage.

**WANTED FOR:** crippling innocent honey bees

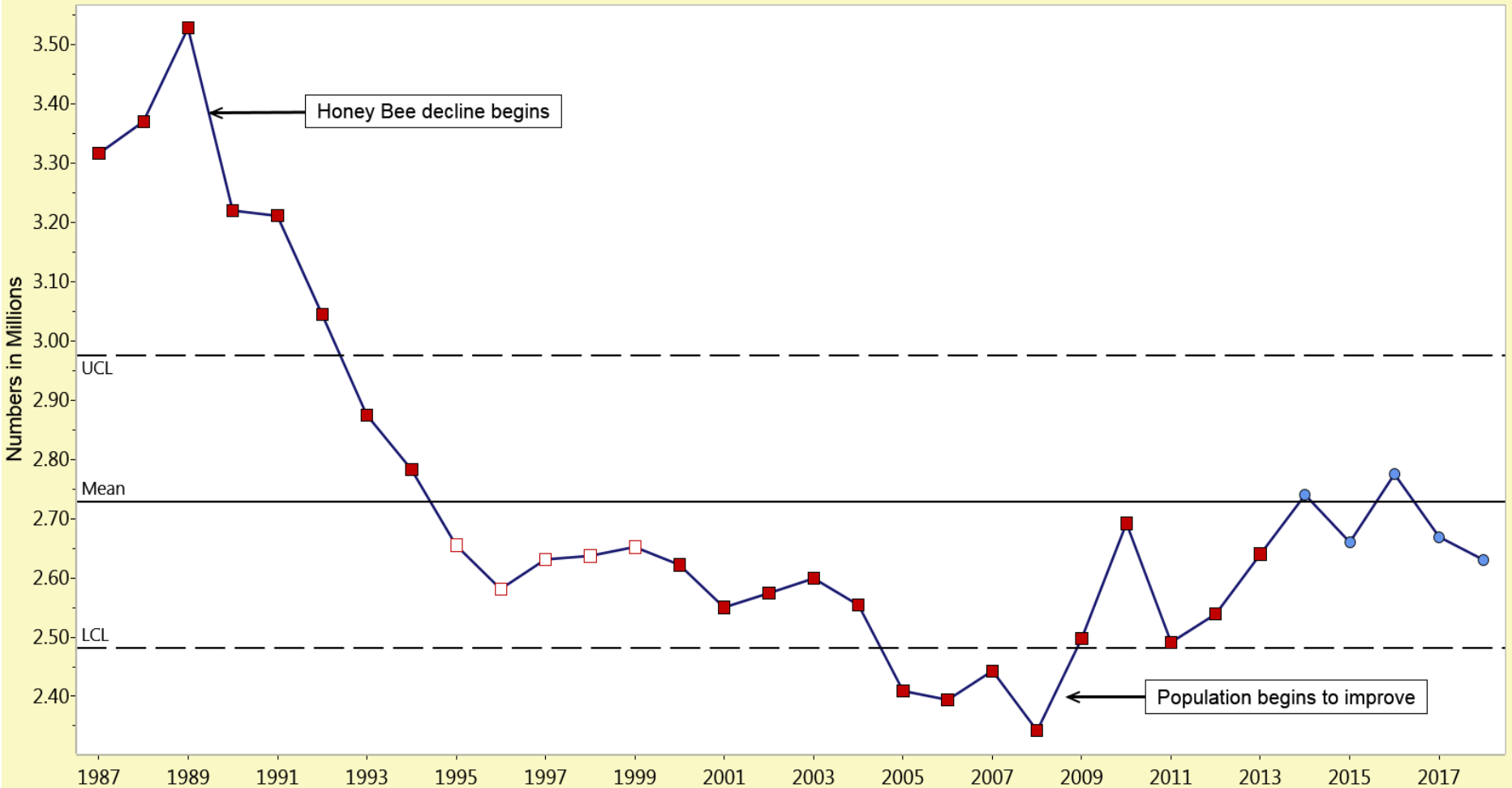
**If found:** there is no known cure for this virus. Proper care must be taken to prevent the virus before it establishes.



# Effect of CCD on Total US Hives

POWERED BY 

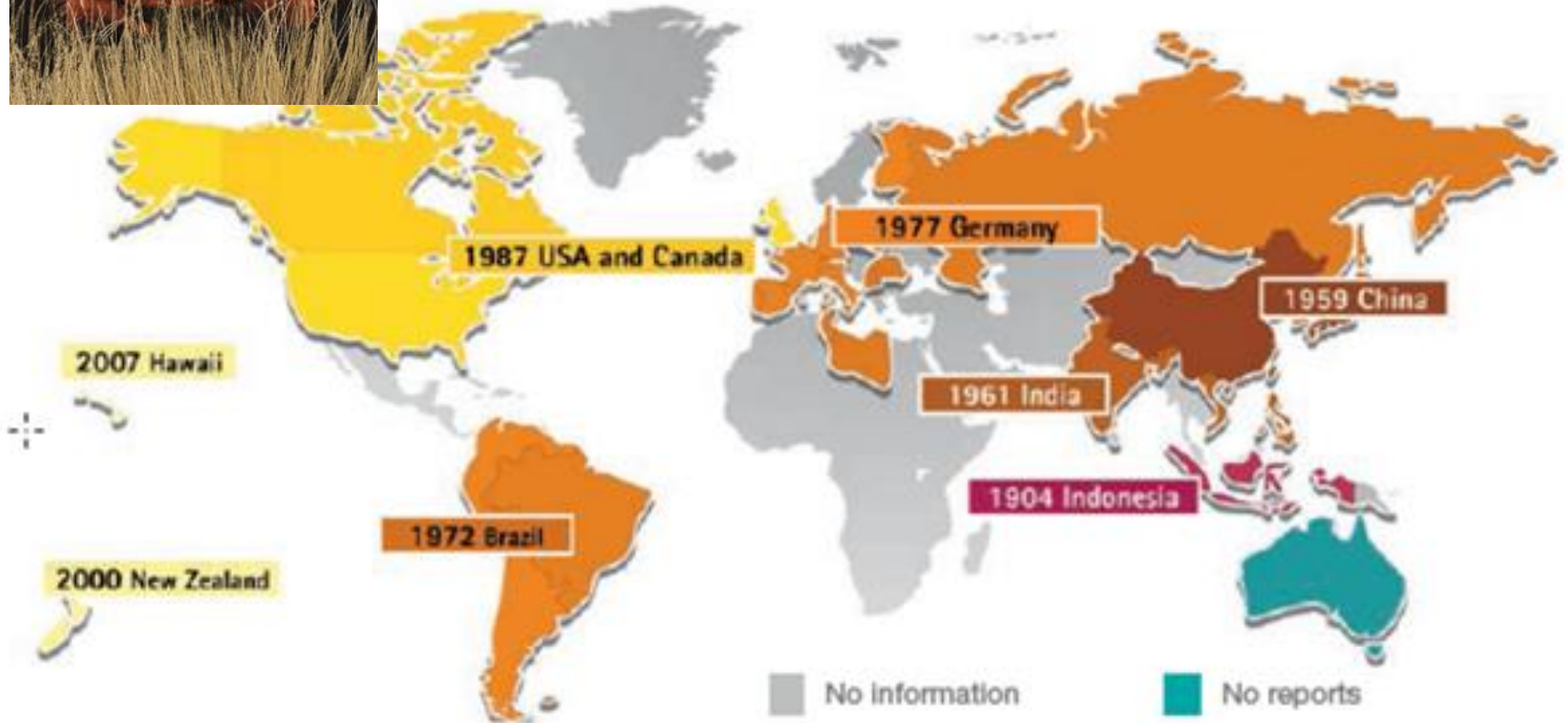
US Honey Bee Colonies\*



# Mite migration



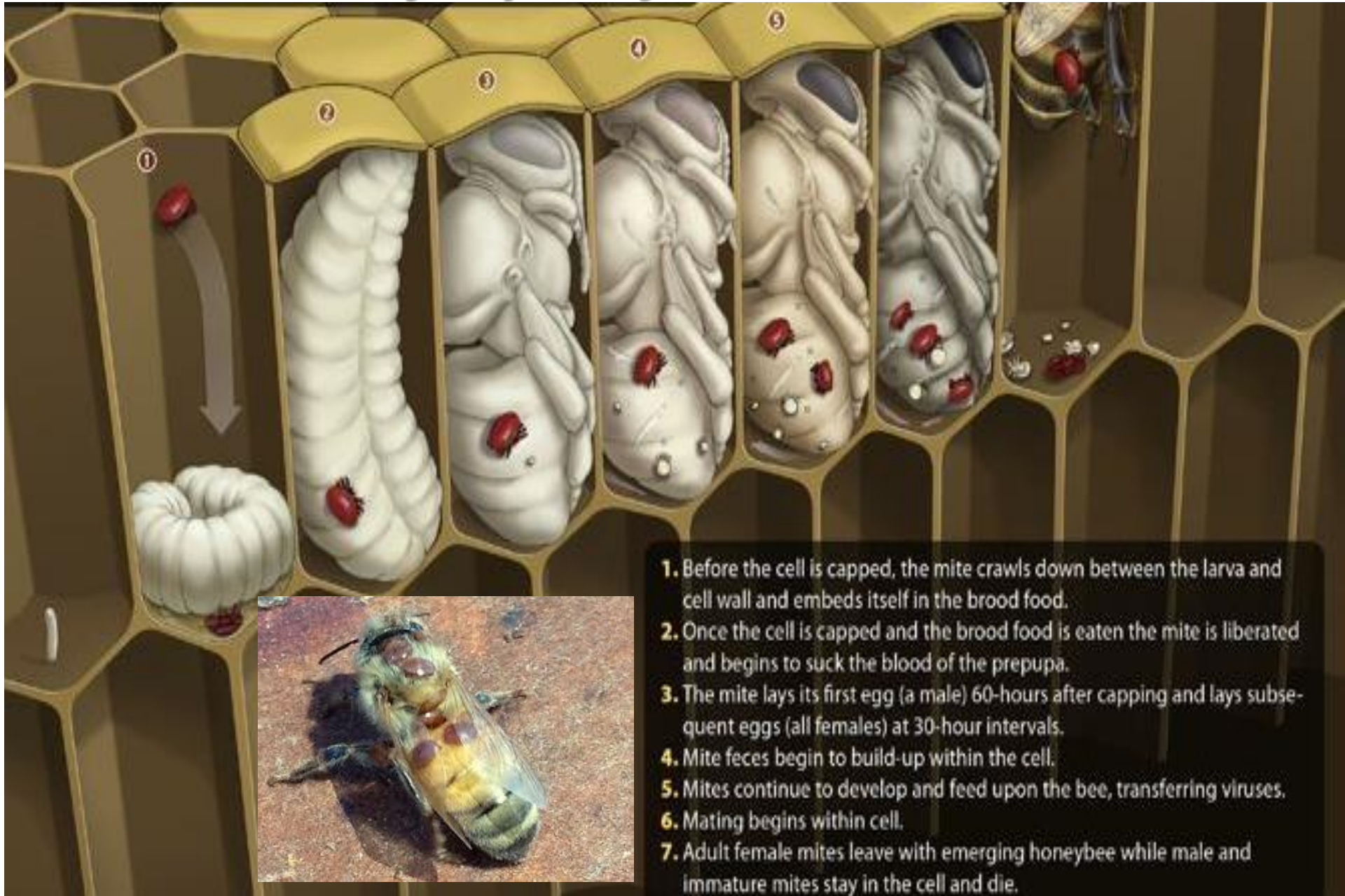
## Varroa Mite Arrives in US in mid 1980s



Spread of the Varroa mite in the selected countries with the year of detection in the corresponding decade.



# Life Cycle of Varroa Mite



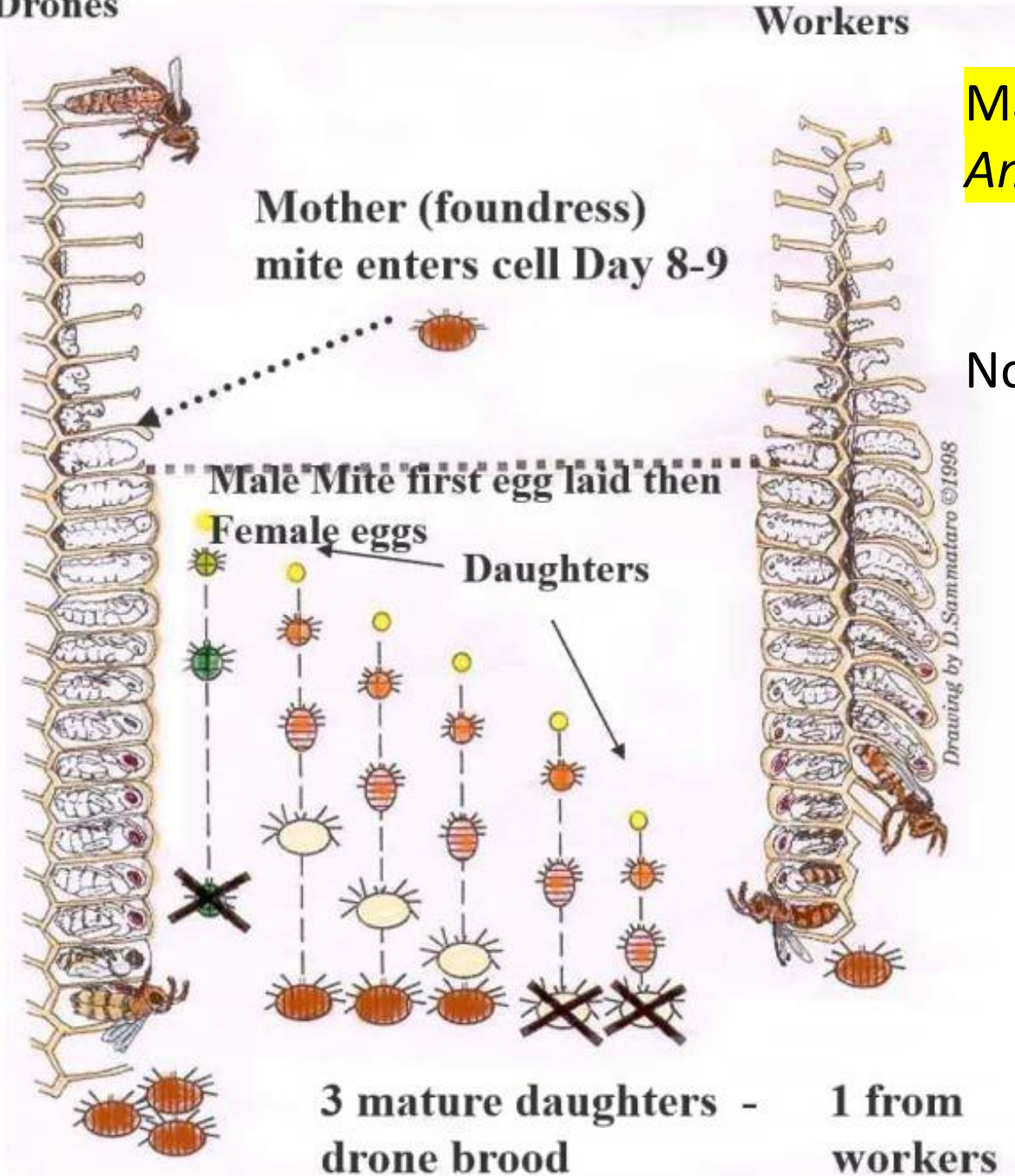
Drones

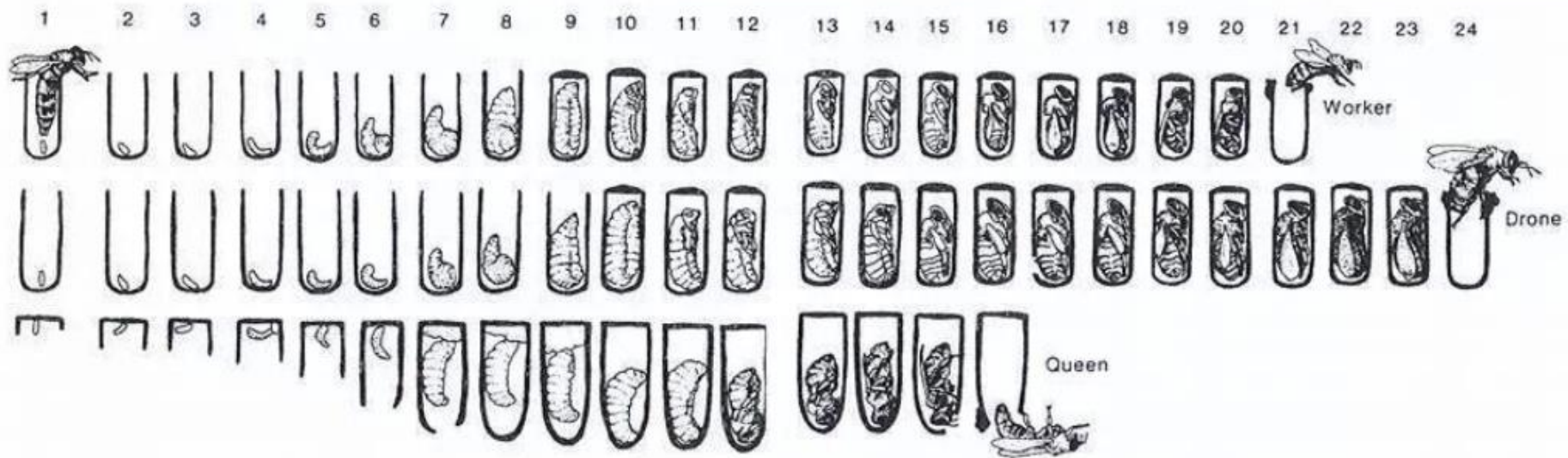
Workers

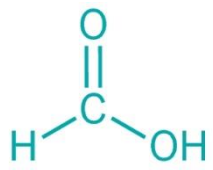
Males (Drones) tend to Amplify Mite population

Note: All bee workers are females

D.F.W.V.





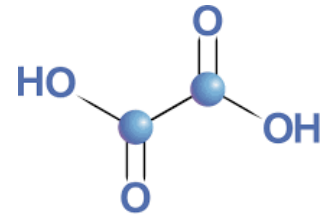


Formic acid

# Varroa Mite Treatments

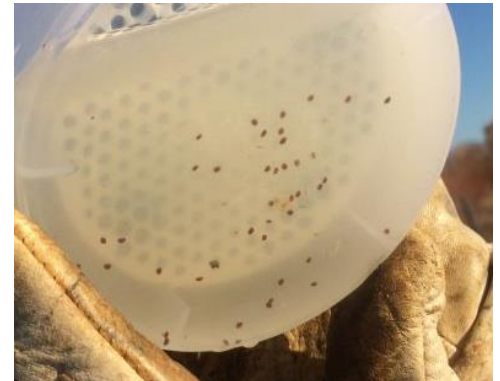
- **Formic Acid**: Penetrate wax caps (use from 50-80 F)

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



Oxalic acid

- 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

# Local Links



<https://www.chescobees.org/>

## 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/>



**EASTERN  
APICULTURAL  
SOCIETY**

<https://easternapiculture.org/about/>



# Useful Information

Hive Placement

<https://galenafarms.com/blogs/articles/bee-hive-location>

Setting up a Beehive

<https://www.beekeepingfornewbies.com/how-to-set-up-your-beehive/>

Beekeepers Calendar

<https://www.hobbyfarms.com/month-by-month-beekeeping-2/>