

## Beginning Beekeeping



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## Why keep bees?

- Products obtained- honey, wax, pollen, propolis, apitherapy
- Pollination
- Learn more about bee behavior
- Relaxing and therapeutic
- Fellowship with other beekeepers
- FUN!!!!



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## Ancient Beekeeping

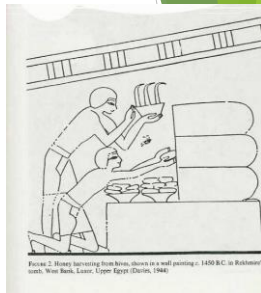
Evidence of beekeeping in  
7000 BC eastern Spain &  
Africa;

- 5000 BC in Middle East;

Egyptians and Greeks  
smoked bees;

Greeks used skeps and kept  
in walls;

Bees kept in tree trunks,  
pottery and woven  
baskets.



Egyptian beekeepers 1450 B.C.  
courtesy of "The Hive and the Honey Bee"

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## Early Beekeeping

- Primitive beekeepers killed bees to remove honey;
- Egyptians smoked back entrance, driving bees to the front so colonies survived;
- Learned to split colonies;
- In N. Europe, logs and woven skeps used, brood left over winter.



Picture from "The Hive and the Honey Bee"  
15<sup>th</sup> century Swiss beekeeper

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## The Modern Hive

- Brought colonies to USA in 1622;
- Lorenzo Langstroth (Oxford, OH) discovered "bee space" and principle of hanging, removable frames. 3/8 - 1/4 inch (5/16" average).



- ▶ The Standard Langstroth hive used today consists of hanging, removable frames;
- ▶ Bees allowed to grow and survive continuously;
- ▶ Hives can be inspected, manipulated and moved fairly easily.

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## Ohio Apiary Data

| Year | # Beekeepers | Apiaries | Colonies |
|------|--------------|----------|----------|
| 1940 | *            | *        | 117,230  |
| 1986 | 5000         | *        | 55,000   |
| 2006 | 3224         | 5029     | 32,827   |
| 2007 | 3128         | 4898     | 20,523   |
| 2008 | 3460         | 5241     | 29,000   |
| 2009 | 3736         | 5618     | 31,167   |
| 2010 | 3865         | 5838     | 32,153   |
| 2011 | 4001         | 6293     | 32,742   |
| 2013 | 4395         | 7199     | 39,822   |
| 2015 | 4837         | 6560     | 35,581   |
| 2018 | 7644         | 9831     | 47,000   |
| 2021 | 6900         | 9500     | 50,000   |

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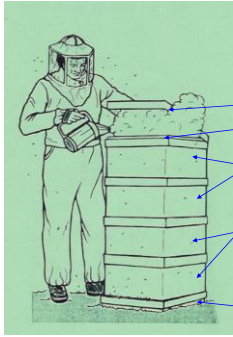
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## Hive Parts



Outer cover

Inner cover

Supers

Brood chambers

Bottom board

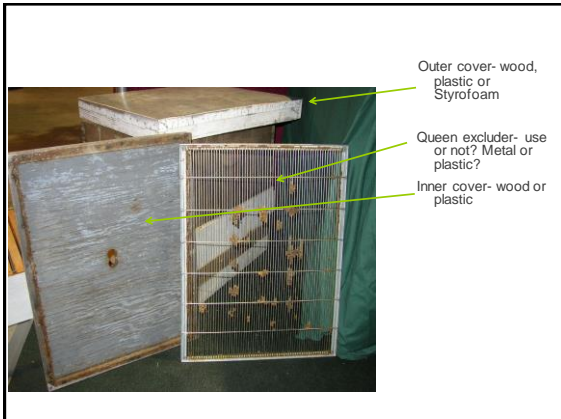
picture courtesy ODA  
Inspection bulletin

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## Frames can bee...

Stamped wax  
FoundationReturned to  
the hivePlastic (white or  
black)

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Outer cover- wood,  
plastic or  
StyrofoamQueen excluder- use  
or not? Metal or  
plastic?Inner cover- wood or  
plastic

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## The Necessary Tools:

- ✓ Veil / jacket
- ✓ Smoker, fuel, lighter;
- ✓ Hive tools;
- ✓ Disposable gloves;
- ✓ Cleaning supplies;
- ✓ Mite detection equipment;
- ✓ Pens, markers, notebook;
- ✓ Water!
- ✓ Tick repellent
- ✓ Epi-pen?



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## Beefore you get bees consider.....

- ▶ Location of hive;
- ▶ Available water & forage;
- ▶ City/ township zoning rules;
- ▶ Neighbor relations;
- ▶ Your time schedule;
- ▶ Your budget

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## Costs of Beekeeping

- Basic hive kit \$180-280
- Extra super with frames
- Bee jacket and veil \$60-200
- 2 hive tools
- Smoker \$30-80
- Bees!! \$150-350
- Mite Control \$50- 100
- Doo dads....



Stand not included

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## Source of bees/queens

- Package vs. Established Colony vs. Nuc
  - Advantages
  - Disadvantages
  - Swarm?
- History of Queen-
  - Mutt or records of genetic line?
  - Italian vs. Carniolan vs. Cardovan vs...
  - Russian, Varroa Sensitive Hygienic (VSH), Mite biters?
  - Ohio vs. Southern/ West bees?



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## A Year in the Life of a Colony...

### February-

- The Queen begins laying eggs in Jan-Feb.;
- Bees collect water, nectar, tree sap & pollen;
- Available food influences brood production.



### March- April-

- Youngest workers repair and build cells with wax glands under abdomen;
- Nectar and pollen are stored near larvae for easy access;
- At peak season, Queen lays ~ 2000 eggs/ day;
- Drone eggs laid in slightly larger cells
- Of 50,000 bees in hive, drones ~ 10%
- Colony builds quickly!

- ✓ Register your Apiary with ODA (bee yard) by May 31;  
<https://agri.ohio.gov/divisions/plant-health/apiary-program/>
- ✓ Order and build equipment;
- ✓ Check frames for honey and brood on warm days.

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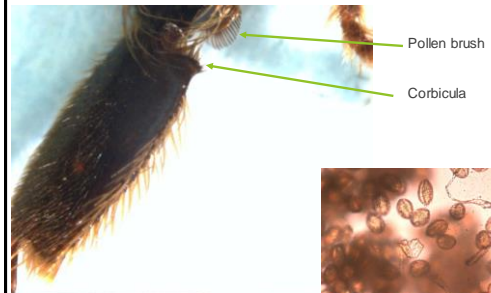
## Pollination



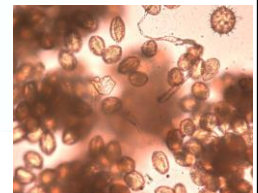
Photo courtesy Joe Latshaw

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## Hind leg femur

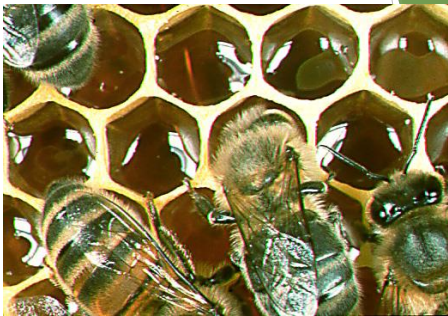


40x Magnification of Pollen



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## Workers depositing honey



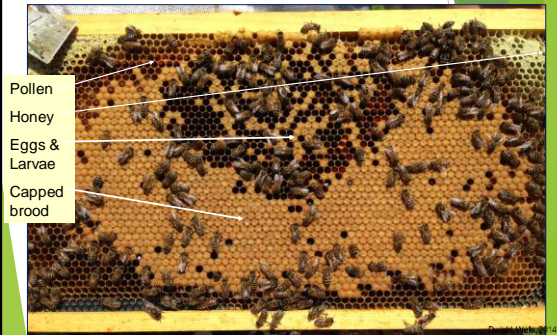
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## Queen surrounded by workers



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### Healthy Frame of Brood



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### Larvae Floating in Royal Jelly



Slide by Jerry Hayes

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### Egg and Larval Development

#### Days from egg- pupae- adult

Worker- 6 larvae - 21 adult

Drone- 7 larvae - 24 adult

Queen-5 larvae - 16 adult



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### Spring = Swarms

- Crowding or failing queen, so pheromone not detected;
- Virgin queen leaves to mate then returns to colony, old queen and older workers leave;
- Newly emerging workers recognize scent of new queen and remain;
- Later swarms occur if overcrowding continues (~400-1000) or queen issue.
- **Beekeeper must be proactive to avoid swarms.**



Photo Dwight Wells, 2014



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### Bee Space:

- the space desired by a honey bee to move around in a hive = 5/16"



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### Ohio State University Phenology Calendar



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## July- August

- Colony at maximal population- 50-60,000, colony is buzzing with activity and growth;
- Check for evidence that colonies are queen right;
- Check for Varroa mites monthly with alcohol roll;
- Monitor for small hive beetles;
- Add supers for summer flow as needed;
- Move supers from strong colonies to weaker ones to equalize;
- If the hive is weak or a dearth minimizes nectar, reduce size of colonies. Feed if needed;
- Ensure that bees have constant clean water;
- Maintain weed control;



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## Potential for Disease Transmission Always Present

- Beekeepers share- nucs, queens, advice, "remedies"- may not be safe or correct!
- Those who buy nucs and Queens should ask for proof of inspection!
- Beekeepers may not recognize sick colonies or report them;
- Tendency to rely on old remedies and advise from social media instead of research;
- Obtaining VFDs has not transitioned well yet; May have to wait and is \$\$;
- Hard to find local knowledgeable vet;
- Alternative sources of antibiotics available;
- Resistance to antibiotics is still occurring!
- Many states can/do not burn apiary.



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## Meet THE ENEMY! *Varroa destructor*



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## The Face of the Enemy



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## Varroa mites

*Varroa destructor*

LeConte, Ellis & Ritter 2010



- Infested colonies can die within 1 year;
- Lowers body fat, protein & weight;
- Leads to reduced immunity and susceptibility to stresses/disease;
- Unable to fly or function in the colony;
- Bees may abscond;
- Mites damage a colony by:
  - direct feeding;
  - vectoring viruses
  - secondary infection of sick bees.
- High mite counts reduces the life span of workers; weakens colony.

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## Where to find varroa mites

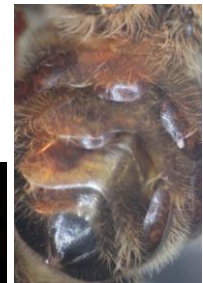
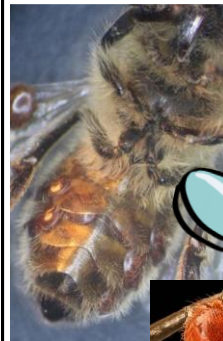


Photo by John Cooper 2019

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**Monitor Mite Population Monthly!**

Easy Check <https://www.vetopharma.com/>

<https://www.youtube.com/watch?v=ZkhfJvfrW6A>

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## Varroa Mite Control Guide: Tools for Varroa Management

Download the Guide:

[www.honeybeehealthcoalition.org/varroa](http://www.honeybeehealthcoalition.org/varroa)

Also available as an app.

- Cultural
- Physical
- Chemical

\* Also contains How-to videos and links to more information.



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## Seasonal Pests and Diseases

### ► Late Summer- Fall

- Storage of nectar and pollen continues;
- Egg production may slow with low food stores;
- Bee health is critical for winter survival;
- Small hive beetle numbers increase;
- Reduce entrances to slow robbing;

- ✓ Keep mite level low!
- ✓ Watch for other pests.



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## Fall Tasks

- Intense storage of honey and pollen;
- Weak hives often attacked by pests—small hive beetles, wax moths, yellow jackets;
- Check Queen health, requeen if needed;
- Treat for pests if needed;
- Feed if necessary;
- Combine weak hives?
- Install mouse guards.



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## September

### Pest and Disease Management

- Remove excess honey;
- Monitor varroa mite population and treat if necessary while supers are off;
- Remove miticides at the end of the application period;
- Protect colonies from invasion of small hive beetles, wax moths and yellow jackets;
- Queen may stop laying eggs in mid or late October;

### Condense Colonies

- Requeen failing colonies or unite weak colonies with strong ones;
- Remove empty frames and boxes so that brood boxes will be packed with winter stores;

### To Feed or Not to Feed?

- Examine honey stores and Feed if needed

### Determine winterizing strategy

- Provide top ventilation by turning inner cover up and prop up outer cover.



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## October - December

Continue to monitor for varroa mites;

Feed if necessary;

- Sugar syrup 1:2 – if temp is warm; Use inside feeder;
- Sugar bricks, candy board, fondant, etc.

\*\* NO artificial feed is as nutritious as their own honey!

- Store comb to prevent wax moth damage;
- Winterize colonies
- Plan for Next Year
- Take equipment inventory
- Order new equipment & Repair old ones;
- Review records (journal) to evaluate this past year.

-What worked? What didn't? Make plans for next year...

**READ Beekeeping Journals, factsheets and books**



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## The \$500 Question.. How cold and how long will winter bee??



<http://foxhavenjournal.com/tag/beekeeping/>

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## Bee Pest & Disease Review

### Diseases

- American foulbrood
- European foulbrood
- Mite viruses
- Nosema

### Pests

- Varroa mites
- Small hive beetle
- Wax moth caterpillars
- Ants/ Hornets
- Varmints



Varroa mites  
Sacbrood  
European hornet



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## The Label is the LAW! Follow label directions to protect bees, people and the environment



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## Ask for help! Ask Mentors, County Apiary Inspector or State Specialist



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<https://agri.ohio.gov/divisions/plant-health/apiary-program/inspection>

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## For Healthiest Bees..



- Maintain low Varroa Mites all season;
- Keep pest/ disease levels low;
- Allow 1-3 acres of forage per colony;
- Feed bees as needed (Spring and August is critical)
- Monitor bees at least 1x/ month;
- Work with County/ State Apiary Inspector;
- READ bee journals, books, articles, etc.
- Talk to multiple experienced beekeepers;
- **Bee careful with websites and UTube!**

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## Ready... set.... Spring!!



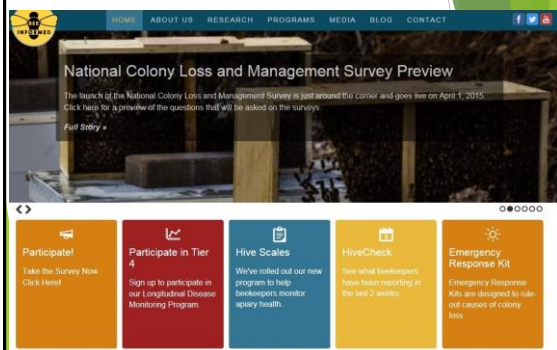
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## Beekeeping Supply Companies

- Local clubs and suppliers
- Better bee <https://www.betterbee.com/>
- Dadant <https://www.dadant.com/catalog/>
- Kelly Bee Company
- Mann Lake
- Blue Sky
- Many others

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## <http://beeinformed.org/>



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## General Bee Information

- Honey Bee Health Coalition <http://honeybeehealthcoalition.org>
- Bee Informed <http://beeinformed.org/>
- National Honey Board <http://www.honey.com/>
- American Beekeeping Federation
- Bee Pollination of Crops in Ohio (Bull 559) <http://ohioline.osu.edu/b559/index.html>
- NCRS <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/farmers/>
- Many Universities and Gov sites...**
  - Ohio State <https://u.osu.edu/beelab/>
  - Penn State <https://ento.psu.edu/pollinators>
  - University of FI <http://entnemdept.ufl.edu/honey-bee/>
  - MN <https://www.beelab.umn.edu/>
  - MSU <https://pollinators.msu.edu/>

- YouTubes – Not Reliable source of Information. find out where the bees are!

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## Thank You!



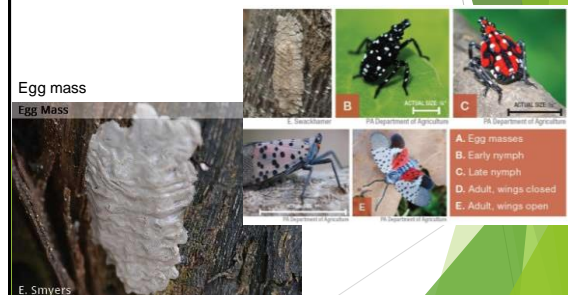
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Ohio Dept Agriculture  
<https://agri.ohio.gov/divisions/plant-health/apiary-program>

- Ohio State Bee Lab <http://u.osu.edu/beelab/>
- OSU <http://entomology.osu.edu/extension-outreach/>
- OSBA <http://www.ohiostatebeekeepers.org/>

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## Spotted Lanternfly-WATCH for It! pest of grapes and 70 other plants



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