Bee Pests and Disease

Medina County Beekeepers Association
Tim R. Moore

https://tinyurl.com/4ct8ty4j

I’m so happy to be here!

For the MCBA Beginner Class of 2025!

Tim R. Moore

- Co-owner of **Elk Creek Honey Farm, LLC**. Have about 150 hives in thirteen apiaries. Wholesale/retail honey and other hive products.
- Keeping bees since 2004 but didn't become successful until after I started learning from local beekeepers. I lost all my bees for the first four years.
- Lorain County Apiary Inspector for 4 years, 2011-2014. Seen all the pests and diseases.

Hobby Beekeeper– Little or no expectation of income from beekeeping activity. Minimal time commitment.

Sideliner – Expectation to make a substantial percentage of supplemental income in addition to other sources. Major time commitment.

Commercial Beekeeper – Expectation to make substantial amount of annual income keeping bees. Fulltime commitment.

Things about our discussion today:

- **THERE ARE NO DUMB QUESTIONS** if you don't know please seek an answer. This is a very casual environment – no pressure.
- **I don't know-it-all** and don't pretend to. I ask questions all the time; learning never stops.
- I've changed my opinions over time.
- **Please – no filming or recording**. Photos are okay.

Why talk about disease and pests?

- I get to talk about **pests and disease** – Oh boy!
- Pests and disease is a BIG problem. **Most hives that die is because of pests and disease**.
- To be successful, you need to be able to **identify problems, make decisions, and act**. Hesitation may mean losing hives.
- Steep learning curve. Beekeeping isn't easy to learn. **Be prepared to lose some bees**. Most new beekeepers get too discouraged too quickly and lose interest. May take 5 years or more to become consistently successful.
- **Gets easier every year** if you take every opportunity to learn: Association meetings, conferences, books, magazines, mentors, experience. Internet: Beesource.com (be careful - beekeeping is local!!).

So what's so hard about that?

To be successful, you need to be able to identify problems, make decisions and act.

Hesitation may result in losing bees.

Identify Problems – First must know what is normal and abnormal. Comes with experience and knowledge.

Make Decisions – Must know what your options are and anticipate outcomes of various choices. What are the risks? What are the benefits?

Act – Have enough confidence in your abilities to properly identify the problems and then act with confidence. Don't fear making mistakes – you'll make plenty!

So what's so hard about that?

The "**SECRET**" to successful beekeeping:

<u>Give the Bees What They Need, When They Need It</u>

Mite treatments, sugar syrup, more room, less room, pollen substitute, windbreaks, new queens, drawn comb, foundation, honey supers, water, more brood frames, less brood frames, ventilation, etc., etc., etc.

So what's so hard about that?

There's a **Science** and an **Art** to beekeeping.

The science can be learned by reading books, studying, attending meetings, talking to other beekeepers, etc.

The art is learned through experience. The more hours you spend in your hives, the more experience you will gain, the faster you will develop the art of beekeeping.

It takes time to acquire both knowledge and skill!!

Decisions, decisions, decisions . . .

Making a wrong decision is better than making no decision because you will rarely learn something from doing nothing.

- However -

Sometimes doing nothing is the right decision! Make sure "doing nothing" is a decision to give the bees more time and not your strategy for keeping bees.

What is a normal hive for us, here in NE Ohio?

- Presence of some Varroa Mites (you can't kill them all)
- Presence of a low number of Small Hive Beetles (SHB)
- Not unusual to have low levels of microscopic Nosema spores in bees' gut.
- Presence of honey bee eggs, or larvae, or capped brood (or all three) from March to December. There can be a totally broodless period after a swarm lasting maybe a week or two.
- A small number of dead bees at the hive opening.
- A small number of dead bees or bees appearing to be lost or unable to fly on the ground in front of the hive in summer/late summer.

Objective and Methodology

The **objective** of this class is to get you thinking about:

1. How to recognize if things are going wrong
2. How you plan to manage pests and disease in your hives before there's a problem too late to fix

"An ounce of prevention is worth a pound of cure"

Ohio Apiary Inspection Program

Register Your Hives!!

REGISTERED APIARY SUMMARY FOR 2024										
COUNTY	INSPECTOR	APIARIES	APIARIES INSPECTED	COLONIES INSPECTED	AFB	EFB	CB	NOS	VAR	SHB
MEDINA	MOHN	293	31	89	0	1	0	0	470	35

293 Registered apiaries in Medina County

31 apiaries visited, 89 colonies inspected.

If the average apiary in Ohio is 5 hives, there are about 1,465 registered hives in Medina County.

Medina County Bee Inspector: Michael Mohn 330-591-5035
mohnandsonsfarm@gmail.com

State of Ohio Inspector: Brad Deering
https://agri.ohio.gov/divisions/planthealth/apiary-program

O.K. Dogs done . . . now let's talk Bees

Let's list some of the potential stresses the bees encounter as they survive in their environment:

- Lack of Water
- Malnutrition
- External Parasites
- Internal Parasites
- Viral Diseases
- Bacterial Diseases
- Fungal Diseases
- Environment: Heat, Cold, Wind
- Pests

With all these things potentially stressing our bees, how can they live without our help?

Very seldom will only one stress cause the hive to fail

Combination of:

- Nutrition and hydration
- Temperature extremes
- Ectoparasites
- Endoparasites
- Bacteria
- Funguses
- Viruses
- Genetics - unable to adapt to our NE Ohio climate

What I found when inspecting bees. I used four assessments of hive-health.

Stress factors are cumulative (Fall time period)

Little stress: Thriving 20%

Some stress: Surviving 40%

Distressed: Declining 30%

Overwhelming Stress: Collapsing 10%

What can you do to avoid decline?

Thriving

Surviving

Declining

Collapse

- Reduce environmental stress
- Reduce nutritional stress
- Identify and treat parasites & disease
- Limit external pests
- Productive queens

What can you do to avoid decline?

Stress factors are cumulative

Actual Case Study:

Since the hive is dependent on its owner to identify and correct stresses,

What will happen in an apiary if the owner fails to recognize stress and fails to act?

Actual Case Study:

An experienced, prominent local beekeeper with 26 hives suddenly passes. No care for 3 years. I arrive to inspect the apiary.


























How many hives are still alive after 3 years of 100% neglect?


























6 Hives Alive – 77% loss


























Base on Ohio statistics: If an average beekeeper managed those 26 hives during those thee years, how many hives would have survived with average hive management? (No replacements)

9 Hives – 65% loss

Just one more hive survives each year . . . Why?

Just one more hive survives per year . . . Why?









An expectation that bees don't need our help!

Just one more hive survives per year . . . Why?

Buzz Words:

"Treatment Free"
"Natural Beekeeping"
"Chemical Free"

These methods require advanced management skills usually beyond a new beekeeper's skill

Use time-proven beekeeping methods until overwintering success is achieved first!

Just one more hive survives per year . . . Why?

Biggest killers of our hives:

- Varroa & vectored viruses
- Nutritional deficiency
- Queen issues
- Little to no hive management

A philosophy that bees don't need our help

Just one more hive survives per year . . . Why?

Decide for yourself:

1. I want to keep my bees alive over the winter (takes time & effort)

2. I want to replace my bees every spring (takes money)

A philosophy that bees don't need our help

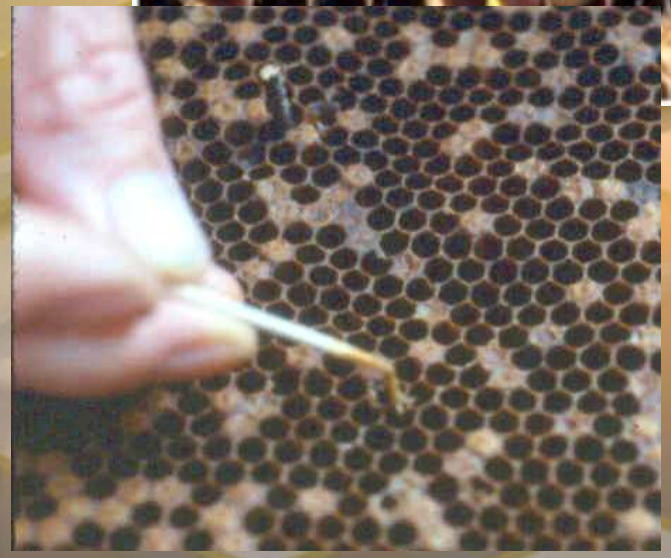
What does a healthy hive look like?

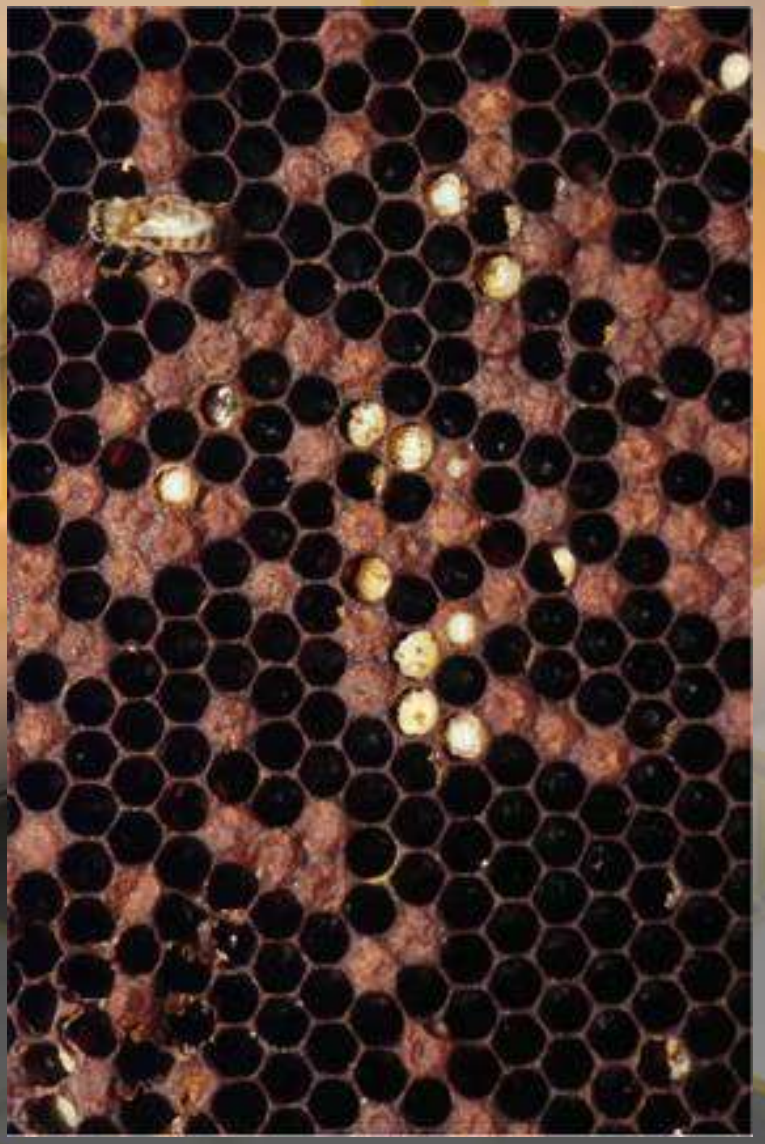
What does a healthy hive look like?

Not too much or too little room for the number of bees.

- Adequate population of bees for season
- Always honey and pollen stores in hive
- Glistening white larvae
- Brood in all stages of development (unless swarming conditions)
- Healthy hive smell (No offensive smell)
- Lots of activity at front on warm, sunny days

What does a stressed hive look like?





What does a stressed hive look like?

From V

No. 1 Problem

Varroa Mites: (external parasite)

Monitor mite infestation level

- Alcohol wash is best
- Prick 10 drone larvae (purple eye) > 3 mites treat
- Decide on your management strategy now – do research
- Keep records. Every hive is different.

What does a stressed hive look like?

No. 2 Problem

Viruses:

- Bees crawling on ground – especially drones.
- String-wing/deformed abdomen/ stunted growth
- Twitching, trembling
- Oftentimes confused with pesticide exposure
- Very common when high mite counts

Varroa mites as Vectors

These Honey bee viruses have been shown to be associated with *V. destructor* infestation:

** Deformed wing virus (DWV),

- Acute Paralysis Virus (APV),
- Israeli acute paralysis virus (IAPV)
- Chronic Bee Paralysis Virus (CBPV);
- Bee Paralysis Virus (SPV),
- Black Queen Cell (BQCV),
- Kashmir Bee Virus (KBV),
- Cloudy Wing Virus (CWV), and
- Sacbrood Virus (SBV)

What does a stressed hive look like?

No. 3 Problem

Snotty Brood/Parasitic Mite Syndrome (PMS)

- Lots of dead bees on ground in front of hive opening.
  - Dead, dried-up white larvae in open cells.
  - Off-white larvae – little or no roping
  - Often perforated brood caps
  - Spotty pattern & dead emerging bees
  - Often confused with pesticide exposure or European foulbrood
  - Very common with high mite counts in late summer

What does a stressed hive look like?

Dysentery:

No. 4 Problem

- More a symptom of stress
- Listless bees
- Colony doesn't build population
- Dark red to brown color blotches on top of frames. Sometimes around entrance of hive.
- Be careful not to cross contaminate to healthy hives
- Not uncommon over winter (usually a result of stress)
- Usually clears up in a nectar flow; better weather.

Nosema Apis – Nosema Ceranae

Nosema apis has traditionally been the most common type of Nosema in honeybee colonies.

It tends to cause problems in early spring or late fall. Symptoms include diarrhea (dysentery), where infected bees may defecate inside the hive, leading to brown streaks on the comb and hive entrance. Infected bees may appear weak and sluggish, and there may be a noticeable reduction in foraging activity.

Nosema ceranae, originally a parasite of the Asian honeybee, has spread globally and is more aggressive. Unlike Nosema apis, it does not have easily observable symptoms, making it harder to detect. Infected colonies may decline rapidly without obvious signs. To accurately diagnose Nosema, a microscopic examination of bee samples is necessary. This involves crushing a sample of bees and examining the gut contents under a microscope to identify Nosema spores.

Also caused by feeding sugar syrup too late in the year

What does a stressed hive look like?

No. 5 Problem

European Foulbrood: (bacteria)

- Swollen, random discolored larvae
- Usually confined to section of frame.
- Be careful not to cross contaminate to healthy hives
- Not uncommon in nucs from southeastern U.S.
- Easily controlled with Tetracycline

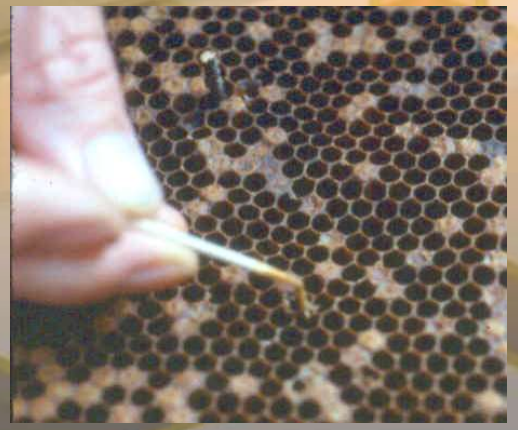
What does a stressed hive look like?

No. 6 Problem

American Foulbrood: (bacteria)

- Spotty capped brood
- Bad smell – decay
- Stringy, caramel-color larvae
- Usually found in section of frame.
- Be careful not to cross contaminate to healthy hives
- Not common
- Robbing (maybe SHB)

What does a stressed hive look like?



No. 6 Problem

American Foulbrood: (bacteria)

- Used equipment/swapping frames
- Do not use/buy someone else's used equipment as it may be contaminated with American Foulbrood. Spores live for 100s of years.
- Most beekeepers would not be able to recognize it.
- New beekeepers can and have gotten American Foulbrood

What does a stressed hive look like?

Chalkbrood/Stonebrood: (fungal)

- Springtime/wet weather
- Spotty capped brood
- Hard, white larvae
  - Mummies seen on bottom board or in front of hive
  - I've only seen two cases severe enough to take action (requeen)

What does a stressed hive look like?

Chilled Brood

- March, April, May & Fall
- Sudden cold snap
  - Outer edges of brood nest dies
  - Bees remove dead larvae & pupae – usually white.
  - Yellowish-white tinged in black and then black.

What does a stressed hive look like?

Small Hive Beetle: (pest)

- Can be seen scurrying around hive
- Larvae looks shiny/plastic/wiggly
- Keep empty space to minimum
- Enough bees to cover comb/stores
- Beetle Jail trap with bait works O.K.
- Mostly a nuisance but will overwhelm weak or queenless hives

What does a stressed hive look like?

Wax Moth: (pest)

- Late summer/fall
- Webs
  - Dusty, dull larvae burrows through comb
  - Pupae burrows into wood leaving indentation
  - Watch comb not guarded by bees; or comb in storage
  - Freeze combs or use Paramoth, Certan, or XenTari

What does a stressed hive look like?

Mice:

- No outside visual symptoms
- Destroyed frames and foundation in Winter.
- Mice eat honey/pollen when bees are clustered for winter.
- Mouse guards should be in place before first hard frost.
- Shrews eat bees. If you can get in opening with your finger, shrews can get in.

What does a stressed hive look like?

Skunks:

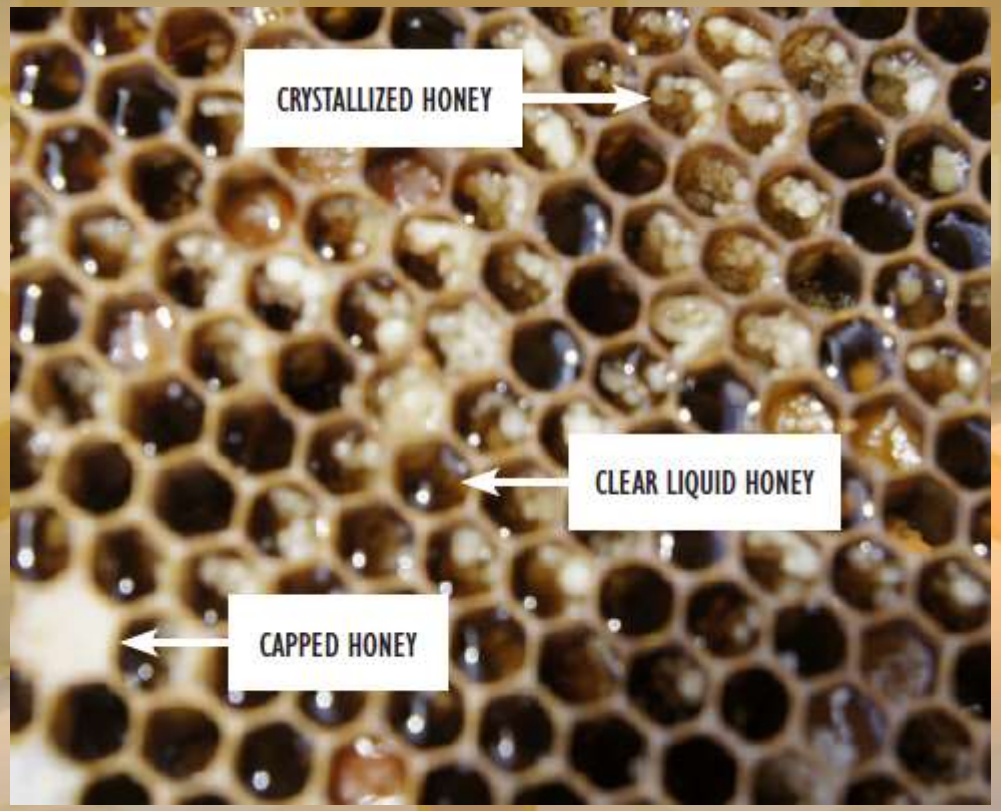
- Bare dirt & scratches in front of hive
- Eat bees at night as bees defend hive.
- Not usually a problem, but when faced with skunks you should do something about it.
- Elevating hives works well

What does a stressed hive look like?

Pesticides:

- Usually from someone who doesn't like your bees. Intentional attempt to kill hive – call sheriff.
- Can be from anyone using pesticides in and around flowers.
- Sevin dust very deadly.
- Farmers spraying fields – drifting insecticides.
- Tell farmers that you have bees. 10-20% kill.

What does a healthy hive look like?



Crystallized Honey:

- White sugar chunks in comb in Spring
- Bees remove
- Find it on bottom board
- Often confused with disease

Let’s talk more about mites since they’re the biggest threat

To monitor or not to monitor for mites?

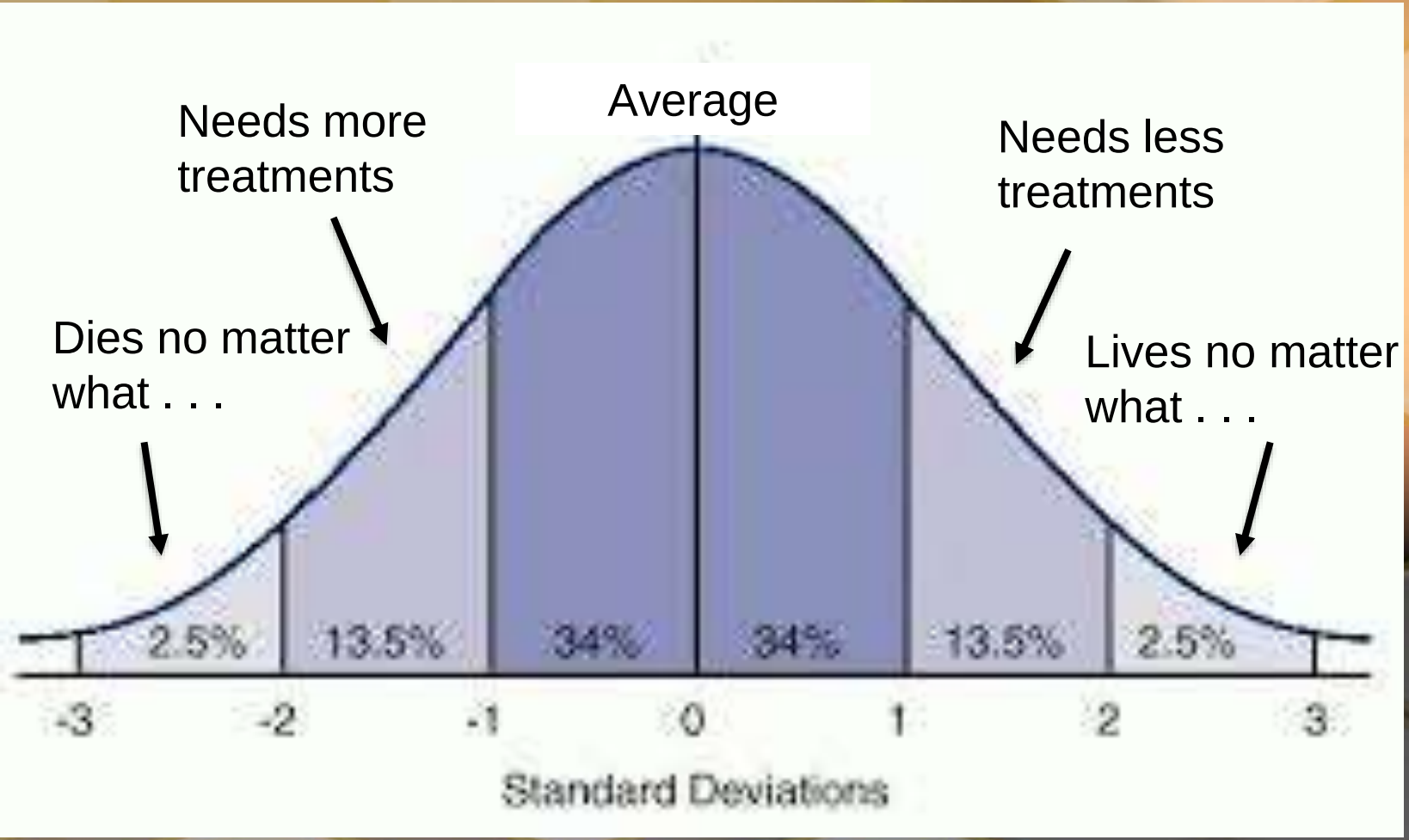
If you do <u>monthly monitoring</u> for mites you will not subject your hives to unneeded treatments.

- Save money on treatments
- It will take more time and effort

If you don't monitor for mites, you will need to put in place an annual <u>mite treatment regimen</u>.

- Will spend more money on needless mite treatments
- You will over/under treat some hives
- Will take less time to treat, versus monitor & then treat

If using a regimen,
you will under/over treat some hives



Bell Curve

Monitor: Roll methods (collectively):

1. Capture about 300 bees in a jar (little less than ½ cup)
2. Get bees from brood frames, not honey super frames!
3. Separate the mites from the bees.
4. Count mites to estimate mite infestation percentage:

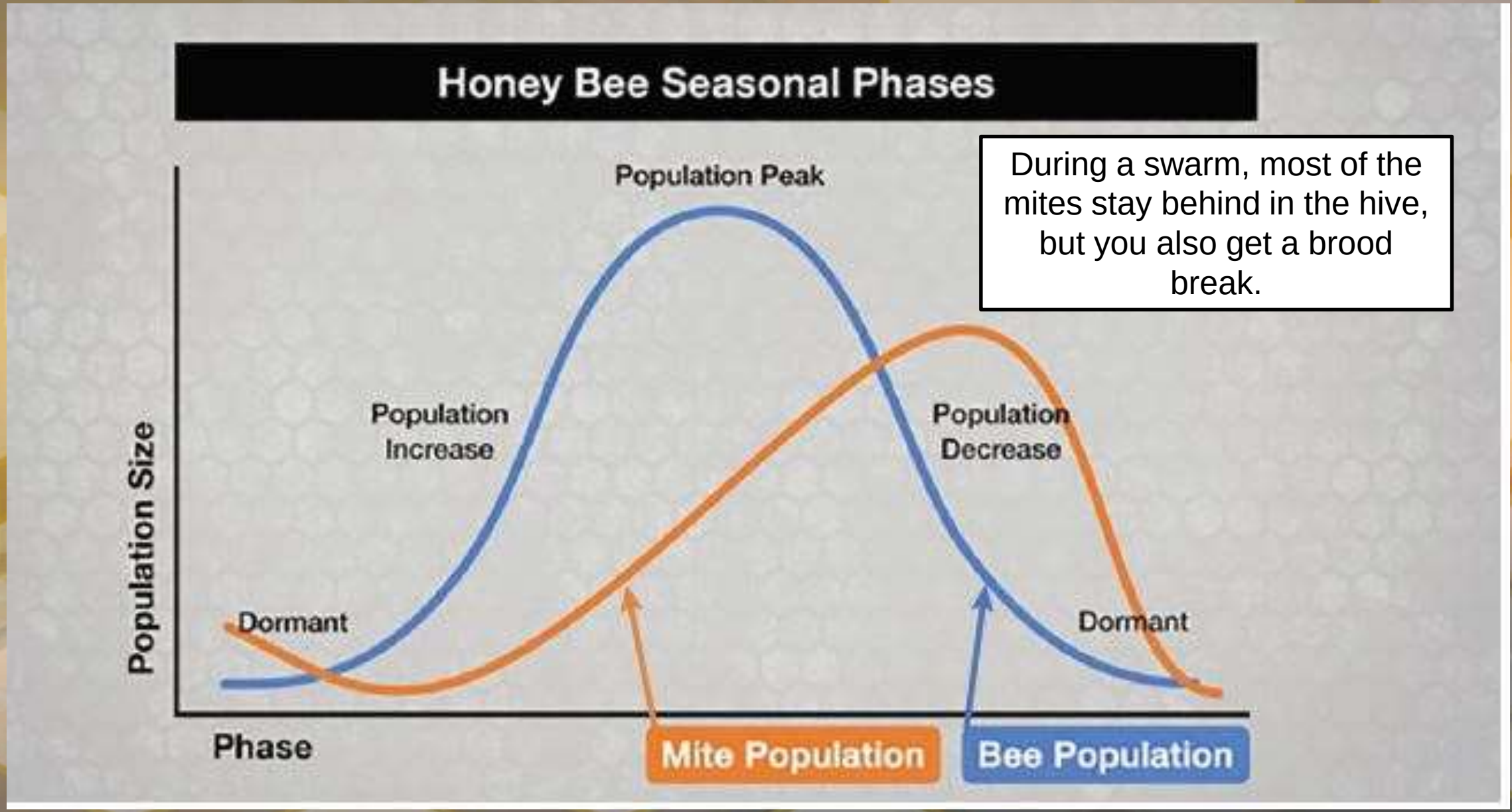
Treat immediately if:

4-6 mites per sample is usual spring threshold (1-2%)

9-10 mites per sample is usual fall threshold (3%)

Alcohol roll is most accurate method

Drone Pupae Inspection:



During a swarm, most of the mites stay behind in the hive, but you also get a brood break.

My current mite regimen strategy:

Early Spring (Feb/March) – Before Maple bloom, oxalic acid vaporization treatment or Formic Pro if brooding.

Early Summer (April/May) – Before adding honey supers, full treatment of Formic Pro

Summer (July) – After removing spring honey supers, full treatment of Formic Pro

Early Fall (September) – After removing summer honey supers, full treatment of Formic Pro

Early Winter (Thanksgiving/Christmas) – Oxalic acid vaporization treatment.

I still lose a few hives to mites every year.

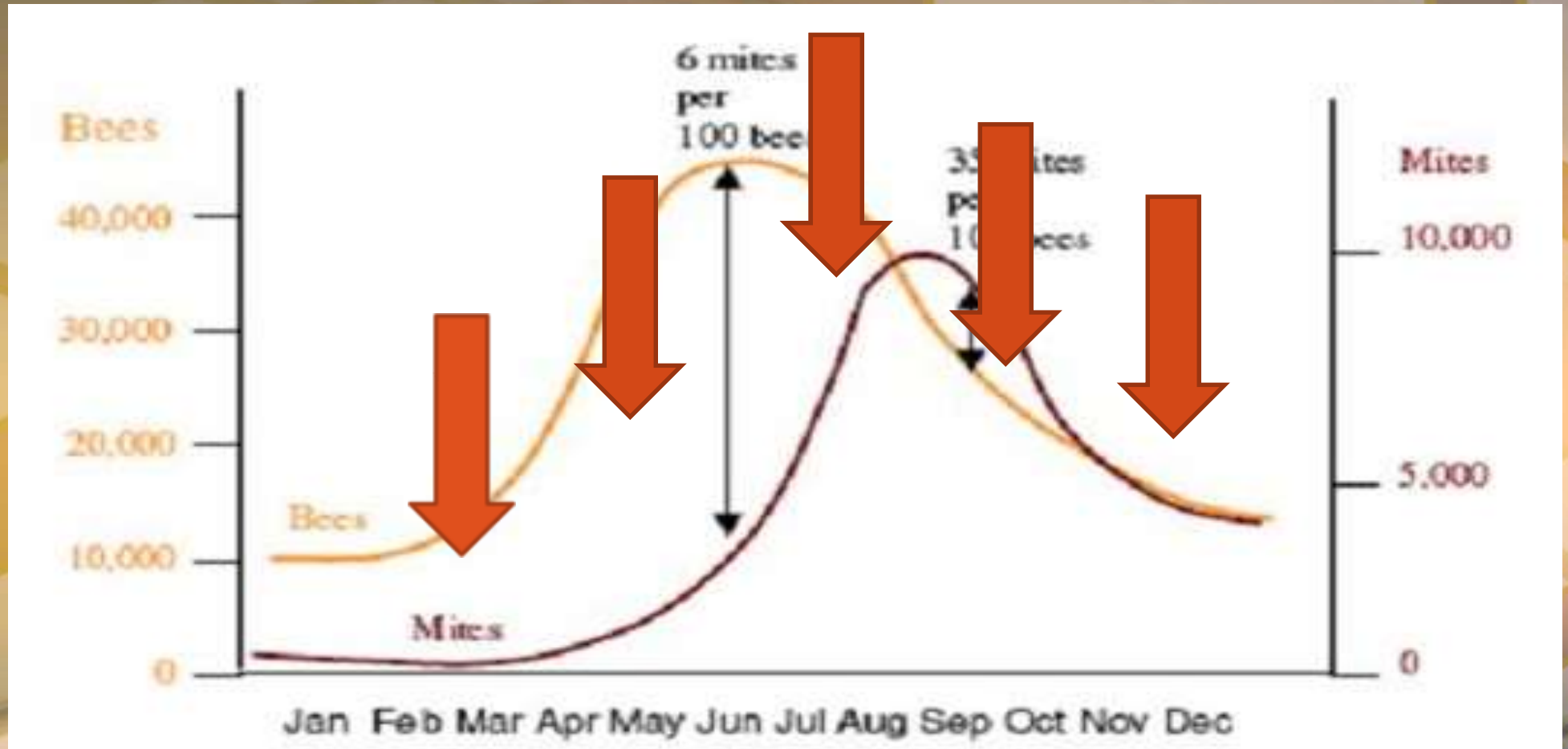


Figure 1. Simplified bee and mite population growth curves for a temperate climate. The mite growth curve lags behind the bee curve. Note how the number of mites per hundred bees greatly increases in fall. A colony is unlikely to survive a fall infestation rate this high.

Monitor again after treatment

We have to ensure that the treatment worked and we need to keep monitoring mite levels.

Once the threshold is reached again, retreat.

If you suspect you have a problem – ask!

1. **Contact an experienced beekeeper or club mentor**
2. **Contact the county apiary Inspector for help**
3. **Ask someone at your bee supply store (have received a lot of bad info)**
4. **Contact the state apiary inspector for help**
5. **Get a good reference book with lots of pictures**
6. **Research on Internet (be careful on forums)**
7. **Send samples to Beltsville Bee Lab**
8. **If American Foulbrood – no cure. Will continue to infect bees put on previously infected comb.**
9. **Be very careful about used equipment. Keep your own equipment clean, repaired, sanitized, and be mindful about cross-contamination.**

My Other Suggestions

- **Take the time to learn beekeeping before adding a lot of hives to your apiary or starting out-yards.**
- **Try to learn to keep bees without using leather gloves.**
- **Use standard beekeeping methods until you have mastered standard beekeeping methods. There will be plenty of opportunity to experiment and try more advanced methods. Attain overwinter 70% or more of your hives and produce about 50 lbs. of surplus honey per hive.**
- **Only start new hives with packages unless you can recognize problems in a nuc. Or buy from a reputable local source.**
- **If you suspect that you have a problem, ask someone for help before the problem gets too big for anyone to help you.**
- **Go into winter with strong, healthy, well-fed colonies.**

Summary - Have Fun!

Our bees are continuously subject to the stresses of living in an increasingly hostile environment.

Bees need our help to thrive and survive. With knowledge and experience, you will be able to anticipate their stresses. Beekeepers with a plan can overwinter 80-100% of their hives successfully every Winter.

Challenge yourself to learn as much as you can and keep an open mind to new ideas.

The bees are your best teacher - observe and learn! What the bees tell you is the ONLY opinion that counts. The bees will let you know if you are on the right or wrong path to success.

Everything Worthwhile Takes Time and Effort

Remember this . . .

If you don't remember anything else, remember this:

Beekeeping is Local!

No one in the world knows better how to keep bees alive in NE Ohio but the people who keep bees alive in NE Ohio.

Thank you!

Welcome to Beekeeping!