

# Topic: Varroa

Medina County Beekeepers Association



*Varroa Destructor*

# Thank you for inviting me!

## Tim Moore

- Beekeeping since 2004
- Lorain County Apiary Inspector 2011-2014
- Co-owner of Elk Creek Honey Farm, LLC
  - Honey production wholesale & retail

## What a Year!!

- Super great spring flow! Unusually warm and dry spring resulted in my best spring honey crop ever - by 10%
- Not so much for summer! Wet conditions in July dampened summer honey production by 20%.
- Waiting to see what happens for fall!

# This talk is about Mites

- Mites! Not again!
- Are we Beekeepers or Mitekeepers?
- Seems like every conversation between beekeepers ends up in a conversation about mites!
- Why another talk on mitekeeping!

## *Varroa destructor*

***Varroa destructor*** is an external parasitic mite that attacks the honey bees *Apis cerana* and *Apis mellifera*. The disease caused by the mites is called **varroosis**.

*Varroa destructor* can only reproduce in a honey bee colony. It attaches to the body of the bee and weakens the bee by consuming fat bodies. In this process, RNA viruses such as the deformed wing virus (DWV) spread to bees. **A**

***significant mite infestation will lead to the death of a honey bee colony, usually in the late autumn through early spring.*** The ***Varroa*** mite is the parasite with the most pronounced economic impact on the beekeeping industry. It may be a contributing factor to colony collapse disorder.

# Honey Bee Health Coalition

[The Situation](#)

[About the Coalition](#)

[How We Help Bees](#)

[How You Can Help Bees](#)

[News](#)

## TOOLS FOR VARROA MANAGEMENT

### FREE VARROA RESOURCES

#### **Below you can access the Tools for Varroa Management Guide and Watch the Demonstration Videos**

The Guide explains practical, effective methods to manage Varroa mites within your hives. The videos provide practical step-by-step demonstrations on monitoring and controlling varroa mites.

[DOWNLOAD THE GUIDE](#)

#### **Access the Coalition's Varroa Management Decision Tool**

This tool will walk you through the decisions you need to make to determine how best to manage varroa mites

[CLICK HERE TO ACCESS THE TOOL](#)

#### **Host an Evening Varroa Bee Club Program**

The Honey Bee Health Coalition has developed an informative evening program for your bee club or association. You can either use the prepared presentation or play the recording to your club.

[DOWNLOAD THE PRESENTATION & RECORDING](#)

### VARROA VIDEOS

The following videos demonstrate techniques for combatting Varroa mites

# Honey Bee Health Coalition

## TOOLS FOR VARROA MANAGEMENT

A GUIDE TO EFFECTIVE VARROA SAMPLING & CONTROL

HEALTHY BEES · HEALTHY PEOPLE · HEALTHY PLANET™



**HONEY BEE  
HEALTH  
COALITION™**

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# Honey Bee Health Coalition

Let's dispel the notion that your hive doesn't have mites:

“Every honey bee colony in the continental United States and Canada either has Varroa mites today or will have them within several months”.

# Honey Bee Health Coalition

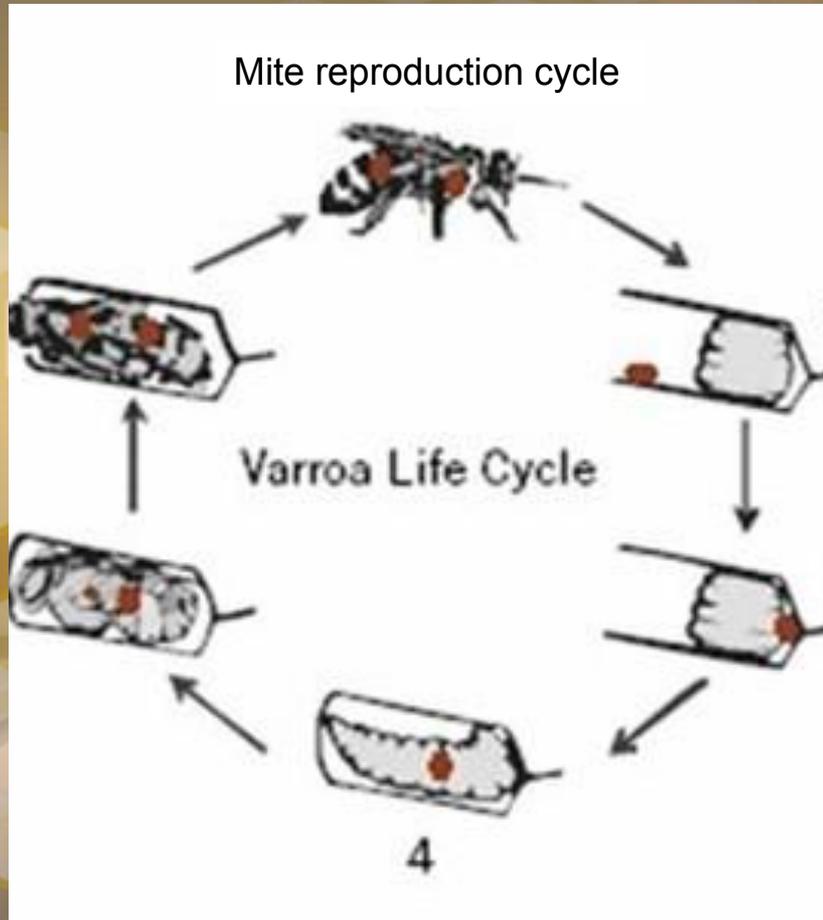
Mites will kill your hives:

“When honey bee colonies are untreated or treated ineffectively, colonies can fail and beekeepers can incur major economic losses, and, ultimately, agricultural food production may be impacted”.

# Honey Bee Health Coalition

You can help kill other people's hives:

“In addition, colonies with Varroa are a source of mites that can spread to other colonies, even in other apiaries, through drifting, robbing, and absconding activity of bees”.



**Critical Concept:** Each mite produces one additional mite per week during the brooding season. **1 = 4 per month**

Varroa have two life stages, **phoretic** and **reproductive**. The phoretic stage is when a mature Varroa mite is attached to an adult bee and survives on the bee's fat bodies.

I believe all hives have mites. Packages come with mites.

## Before we blame mites for all our problems:

Buy Local!!!

- **You have to have good bees or mites don't matter!**
  - Bees that are genetically adapted to survive our climate.
  - From my totally unscientific-based observations, I believe about 30% or more of new packages originating from warm climates will not survive our winters. The harsher the winter, the more deaths.
  - We also need **well-mated queens** to last all season and all winter. Many commercial queens are not well mated.
- **You have to keep your hives in an area of nutritional abundance.**
  - If your bees are malnourished, any additional stress, mites or otherwise, will diminish the survivability of the colony.
  - Many hives are located in nutritionally deficient locations. (50-55#)

# How much time does the hive have?

Once a hive becomes inhabited by Varroa mites, the clock starts ticking before the hive collapses without intervention.

The question then:  
How long does it take for the hive to collapse? 6-24 mos.

## Variables:

- Overall stress
- Ethnicity of bee
  - Brooding
  - Swarming
- Cultured traits
  - Grooming
  - Ankle-biters
- Environmental
  - Temperature



# Too much Hype about bee genetics!

In my opinion, way too much is made of bee ethnicity; one ethnics or hybrid being preferable over another:

- Whether or not the bees are actually one ethnic strain or another is dubious at best. How pure are they?
- Once you establish your ethnic apiary, the queens are going to breed with any drone (up to 24), diluting the gene pool:
  - Other apiaries
  - Feral colonies
- **What I want is any bee that can overwinter and make honey.**
- **Local, winter survivor bees are those bees.**

In my opinion, the worst aspect about losing all your hives is that you would have to start selecting for winter survivor bees all over again.

It takes years of work to cull out bees and clean out deadouts that could not adapt to our climate or cannot be productive honey producers.

# If you want to effectively kill mites . . .



You must:

1. Monitor mite levels
2. Have a plan once your threshold is reached
3. Execute the plan
4. Recheck mite levels after plan execution

# 1. Monitor Mite Levels

We must choose a method to monitor mite levels

# Mites? What mites?

**If you don't look for mites, you probably won't find any.**



# 3 Methods to monitor mite numbers:

1. One of the “roll” methods: Sugar, alcohol, or ether.
2. Drone pupae inspection
3. Natural mite drop on a sticky board

# Roll methods (collectively):

1. Capture about 300 bees in a jar (little less than  $\frac{1}{2}$  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:*

9-10 mites per sample is usual fall threshold

4-6 mites per sample is usual spring threshold

Advantages: Most accurate method

Disadvantages: Time consuming



# Drone Pupae Inspection:

1. Use a toothpick or scratcher to remove 10 drone pupae
2. Count the number of pupae with mites (not the mites)
3. If more than three pupae have mites, start treatment

Advantages: Fast and easy to perform

Disadvantages: Not always able to find 10 pupae, or pupae of the correct age. Highly variable frame to frame.

# Drone Pupae Inspection:



# Natural Mite Drop:

1. Use sticky board or clean tray under screen bottom board
2. Count the number of mites after 24 hours (mites/days)
3. If more than 25 mites/24 hours, start treatments

Advantages: Easy to perform (use on my hives)

Disadvantages: **MUST** use extrapolation - size of hive, time of year - must accurately estimate number of bees in hive.

## 2. Have a Treatment Plan

We must choose a plan or plans on how to treat the mites so as to bring the number back below an acceptable threshold.

# “Tools” to reduce mite levels:

1. Synthetic or “hard” chemicals (No one uses these)
2. Organic acids or “soft” chemicals
3. Mechanical methods (Biotechnical)
4. Treatment-free methods
5. No method - let nature take its own course

# Synthetic or “hard” chemicals:

**Agents:** Apistan, Checkmite+

**Advantages:** Effective and easy to apply

**Disadvantages:** Mites develop resistance. Cannot treat with honey supers on.

# Organic acids or “soft” chemicals:

**Agents:** ApiLife Var, *MAQS*, *Formic Pro*, Hop-Guard, Apiguard, *Apivar (Amitraz)*, *Oxalic Acid*, Acetic Acid, Thymol, EOs, etc.

**Advantages:** Little time needed applying treatments. Some very effective.

**Disadvantages:** Some cannot be used with honey supers. Can be somewhat expensive. Multiple treatments often needed.

# Mechanical Removal Methods (TF):

**Agents:** Powdered Sugar, Drone Frames, Mite-Zapper, FGMO fogging, **Screen Bottom Boards** (SBB), Oil soaked paper towels, etc.

**Advantages:** Can be used at any time

**Disadvantages:** Powdered sugar method and SBB largely ineffective. Drone removal methods time consuming - timing is critical but reports are good.

# Hive Manipulation Methods:

**Method:** Spring/Summer splits, caging queens, allowing swarms

**Advantages:** Can create increase

**Disadvantages:** Equipment expense. Can reduce honey production. Reestablishing lost queens. Results are inconsistent.

# What treatment(s) to use?:

Criteria to consider:

1. Brood or broodless
2. Honey supers or no supers
3. Seasonal ambient temperature

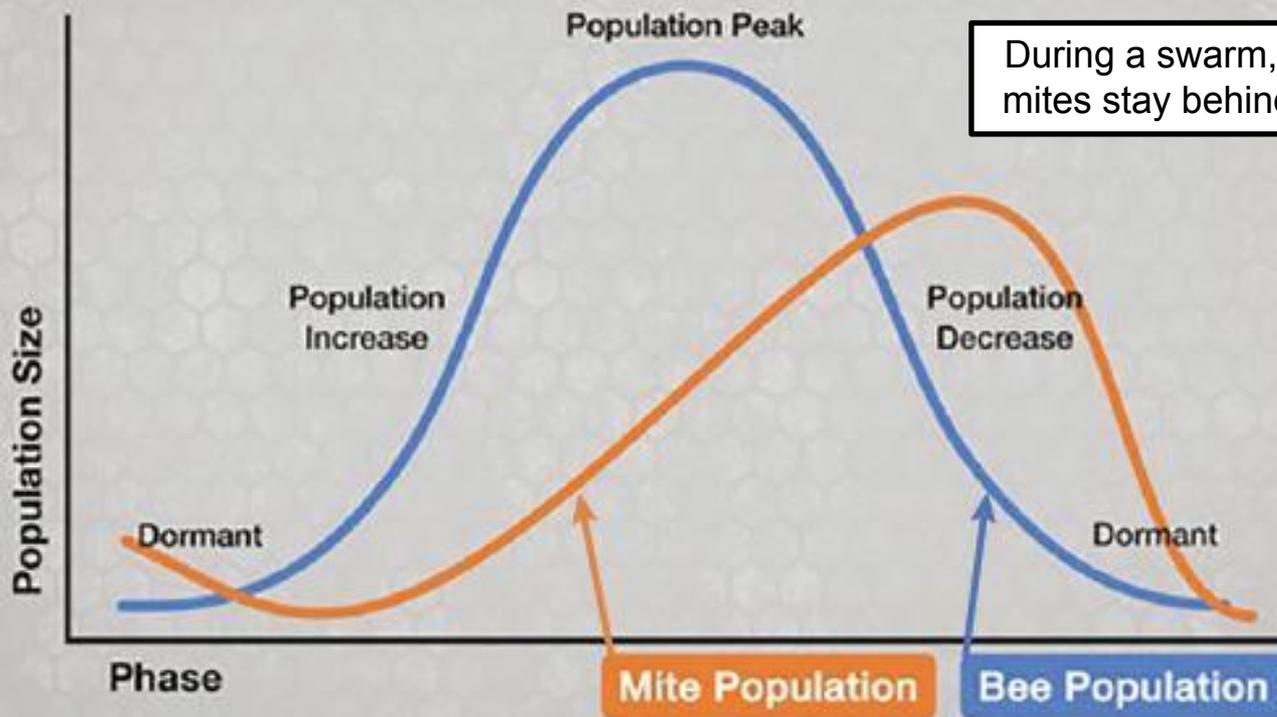
# 3. Execute The Plan

Now that we've made some decisions on monitoring and what methods to use, we need to execute those plans to lessen mite stress on hives.

## What I have selected for my operation:

- MAQS or Formic Pro for those times of the year when I have brood in the hive. (April – October)
- Oxalic Acid for those times that the hives are broodless, or nearly so. (November – March)
- Amatrax (Apivar) for treating nucs – whenever it's needed
- Screen bottom boards (some mites fall through)
- Try to place hives in full sun.

## Honey Bee Seasonal Phases



## My Current Strategy That's Working Well:

Early Spring (March) – Before Maple bloom, oxalic acid vaporization treatment.

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

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

Early Winter (November/December) – Oxalic acid vaporization treatment.



**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.

## **MAQS vs. Formic Pro:**

MAQS is more effective at killing mites than Formic Pro, but I lose more queens (about 5% MAQS vs. almost no queen loss FP).

Formic acid is a fumigant, so the less interior space in the hive, the more effective (why I use after removing supers).

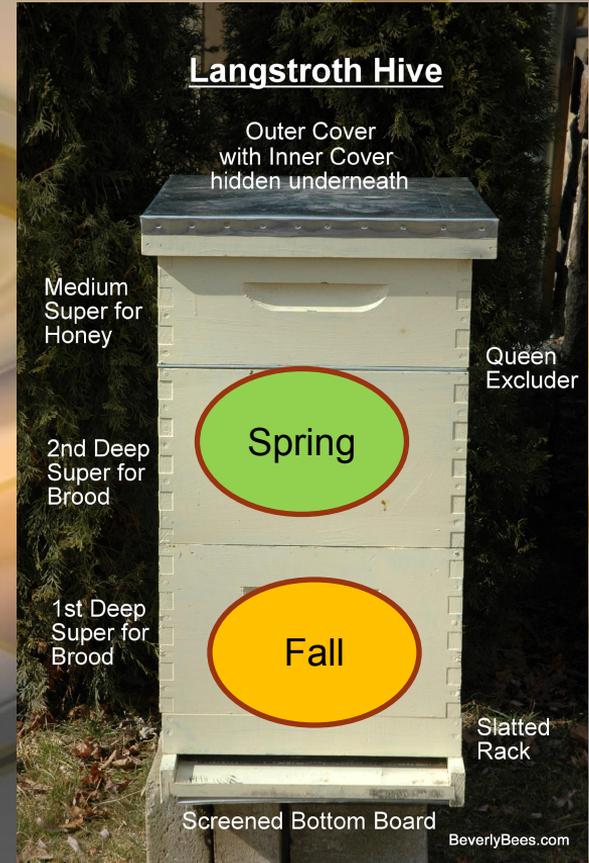
Put the pads in the vicinity of the brood nest.

Must watch the temperatures! Especially with MAQS. 50 to 85 degrees (first 3-4 days). Put pads on in the afternoon – cloudy days are better.

# Formic Pad Placement

Put the pads in the vicinity of the brood nest.

That could be at the top of the bottom brood box, or it could be the top of the upper brood box.



## Formic Pad Placement

Entrance opening must be wide open

Close bottom board tray if using screened bottom board.

At least six frames of bees

Use a medium on top, even if it's just plain foundation for bees to retreat if needed.

Probably will see bearding, dead bees, some larvae removed.



## **MAQS or Formic Pro:**

Mfg. says either the two-pad method for 7-14 days, or the one-pad at a time method for about 10 days each.

I use the two-pad method because I know it works better. There is much better penetration of the brood caps.

The one-pad method primarily only kills phoretic mites.

I don't have time to do the one-pad method twice.

Check for eggs/larvae 20-25 days after treatment for evidence of laying queen.

## MAQS or Formic Pro:

Check the expiration date before leaving your bee supplier. I've had problems with being sold expired product, or product expiring before I plan to use them.



The product becomes stronger, not weaker over time.

## **Oxalic Acid – Vaporization Method:**

Oxalic is a fumigant. The less interior space in the hive the more effective it is.

Need warm temperatures! Need a loose cluster of bees. I wait for minimum of 50 degrees, or 45 degrees in full sun before treating.

I use 1 gram of crystals for each deep brood box.  
Normally 2 grams.

## **Apivar (Amitraz):**

Contact agent. Must hang strip(s) in brood nest

No honey supers.

Temperature is not a factor.

Use 1 strip per 5 frames. Leave on for 42-56 days.



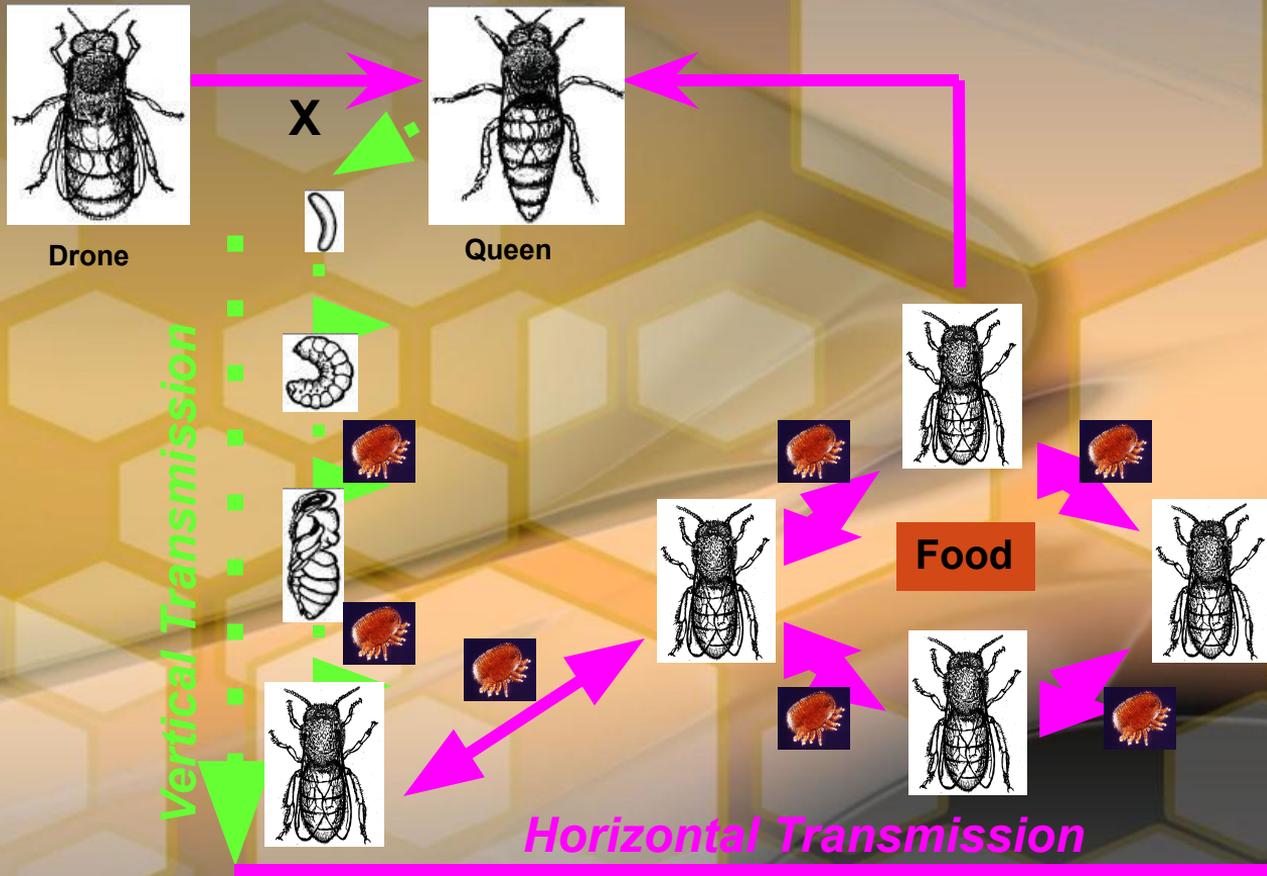
# 4. Retest After Treatment

We have to ensure that the treatment worked and we need to keep monitoring mite levels. Once the threshold is reached again, re-treat.

# An ounce of prevention is worth a pound of cure!

If you find lots of bees with string-wing, your battle may require repeat treatments. The viruses have probably overwhelmed the hive. Queens can be infected with viruses (drones infected too).





Transmission Pathways of Viruses in Honey Bees

Parasitic Mite Syndrome (PMS) is an indication that the hive is severely infected with virus. Looks like European Foul Brood with capped, dead pupae. Uncapped cells with dead pupae in bottom of cells.

Two formic acid treatments back-to-back early in the season can sometimes recover these hives.



# The Battle with Mites Doesn't End!



**Some years are worse than others.** The important habit to get into is monitoring mite levels before they get out of control.

## Great Varroa References:

ScientificBeekeeping.com     Randy Oliver

University of Georgia     Jennifer Berry

NOD Apiary Products

Ohio State Beekeepers



**Thank you!**