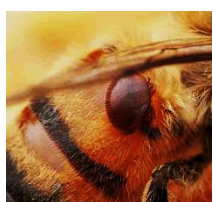


# Stahlman beekeeping notes for 2021

## Issue # 36 The Biggest Issue involved in a bee hive's survival

### Varroa Mites (Varroa destructor)

In all my years of keeping honey bees, there has been no issue more challenging to me than mite control. Varroa mites have been around for over 30 years and after many years using various methods of control, they have survived to be the major reason why many hives of bees are lost every year. I am asked about how I treat for them. I have tried just about anything that has been offered for sale, managed brood interruption, introduced queens from outstanding stock and used non-chemical drone brood removal techniques. I still can not advise any of you on the perfect # 1 control for mites. There has been a lot of research to control Varroa mites. The best advice I can offer – study and read about research being done. Buy the best VHS stock you can afford. Switch products used in the hive from year to year. Mites have built up resistance to many of the chemical products used in hives. Finally, if you are to survive as a beekeeper – Treat and use approved methods for mite control. You might visit: Honey Bee Health Coalition and get their Varroa Management Decision Tool. It is on the web and free.



#### Some facts:

- This mite is an external parasite that feeds on the honey bee.
- The disease caused by mites feeding on honey bees is varroosis.
- This mite can only reproduce in a honey bee colony.
- It reproduces in the cells of developing brood.
- It transmits viral and other pathogens.
- It is about the size of a pin head – note the bee in the first photo above.
- First discovered and identified by A. C Oudemans in 1904 - called Varroa Jacobsoni)
- First identified in the U.S. in 1987 (Dr. Roger Morse let readers of Gleanings in Bee Culture know that the Varroa mite in Europe would invade the U.S.- JANUARY Issue of Gleanings page 21)
- First positive appearance reported in package bees shipped to Wisconsin from Florida in the spring of 1987. By that time packages of bees had been distributed throughout the Midwest. No one knows how they got to Florida!

## **The Detection of Varroa Mites:**

There are several ways to detect Varroa mites in a hive of bees.

- 1) **Visual inspection (Not very effective but Varroa mites can be detected on single bees)**  
Many will be missed because they are hard to see – uncapping drone brood is a better method to identify a varroa mite infestation.
- 2) **If a person is using one of the common chemical treatments for Varroa mites, a sticky board can be placed on the bottom board to catch mites that fall as a result of the treatment. These sticky boards are sold by bee suppliers but one can be made easily using white poster paper. (This does not kill bees but gives one some data to use in determining mite population in the colony and the effectiveness of the treatment.**
- 3) **Sugar roll or Shake Test: This does not kill bees – the equipment needed can be found in most homes. A quart jar with a lid, some powdered sugar, a dish pan or something to pour bees after they are coated and shook.**
- 4) **Alcohol roll – much like the sugar roll except the bees are killed as the Varroa mites float free from the dead bees.**
- 5) **Use an uncapping fork to remove cappings especially on drone brood.**

## **Treatment for Varroa**

- 1) **Non Chemical treatment**
  - a) **Screened bottom boards**
  - b) **Drone brood trapping**
  - c) **Mite resistant queens**
  - d) **Brood interruption**
  - e) **Requeen with resistant stock**
- 2) **Chemical treatment – Many choices are available – I have tried most and still find some do not work as well as expected. I can make no recommendation except to change from one product to another each beekeeping season. Mites have built up resistance to some of the chemicals used as treatments.**

One thing I have learned is that almost every company selling a product suggests that it is best for treating Varroa mites. What works one year may not work the next. Out of date products are less effective. Researchers use a term "economic threshold level" to determine how many mites a hive can have before they do damage to the extent the hive will die.

A good general idea of how many mites a hive can tolerate is found in Back Yard Beekeeper by Kim Flottum. Personally, I think every hive has some Varroa mite population and Kim's Guidelines are based upon the size of colony in the hive.

To treat or not treat!

Treating a hive: Follow all directions on the product to the "T". Some treatment in my opinion is better than not to treat.

I include treating a hive using non chemical methods as "good beekeeping practice".

Not Treating: It is a decision that can be more expensive than treating a hive. All bees are struggling to survive. **At the current rate, the over winter survival rate of those treating for Varroa are higher than those doing nothing. The old concept of just letting the bees do their thing generally results in losses greater than 70%. The feral bee population has almost disappeared.**

Every beekeeper should try to reduce Varroa mite populations in their bee hives. The physical damage mites do to honey bees has consequences.

- Mites promote the spread of other diseases.
- The life span of honey bees is reduced.
- The productivity of the honey bee is reduced.
- The survival of the colony is at risk!

One other thought: **Mite Bombs**

A hive of bees with a large population of mites is a "Mite Bomb!"

The Entomological Society of America researchers have found that honey bee behavior has contributed to the spread of Varroa mites. Mites have "co-opted" these behaviors to their own advantage.

- The varroa mite is not highly mobile – It doesn't have wings such as the Small Hive Beetles.
- The Varroa mite "hitchhike" as seen in the 2<sup>nd</sup> photo on page 1.
- Honey bees fly from hives – carrying mites.
- Honey bees rob and drift from hives.
- Honey bees are transported from place to place – often by beekeepers but swarming is a natural process as well. Keep in mind those packages of bees shipped to the Midwest in 1987. Beekeepers selling package bees and nucs can spread the mite.
- Honey bees are managed in large colony apiaries. Bee population density is a contributing factor in many urban areas. Hives located close to one another increase spread.

A beekeeper can do everything bee management requires – treat for the mites but bee hives managed by neighboring beekeepers could be mite bombs. Thus, fighting the Varroa mite is an on-going practice responsible beekeepers must do from year to year.

Find out what the mite load is in a hive of bees!

An easy way is to collect a sample of approximately 300 worker bees from the brood nest of a strong hive.

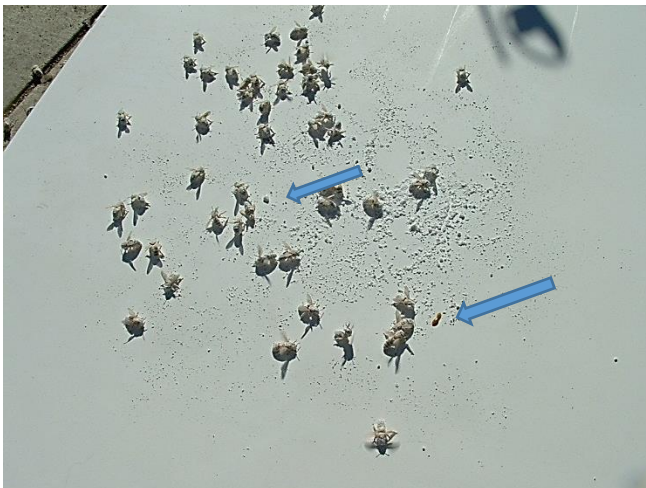


A frame of bees is held upright as shown (**Check to make sure the queen is not included in your sample**). A pint jar is placed below a cluster of bees. The mouth of the jar is moved upward on the face of the comb, collecting a number of worker bees. The lid is then placed on the jar to keep the bees from flying out of the jar. This process is repeated until about a half inch of bees cover the bottom of the jar.

Two basic methods are used –powder sugar is placed in a jar before the bees are shook for the sugar roll test. Alcohol is used to kill the bees and allow the collection of dead mites in an ether or alcohol test.

The sugar roll test: The lid is placed on the jar and the jar rotated and shook until all the bees are covered with sugar. Once the jar has been shook – may take a few minutes - The bees are dumped out of the jar into a clean plastic dish pan. A plain sheet of paper will also work.

The bees covered in sugar will attempt to fly back to their hive. If the jar is shaken too hard, some bees may be damaged. However, mites can not cling to the sugar coated bees and drop onto the paper or dish pan along with the bees.



Mites can then be counted. Arrows point to some mites from this shake. Using a dish pan allows sugar to be reclaimed easier than if one is using paper.

6 mites were identified on this sheet of paper.

My personal viewpoint is one mite – is one to many. I treat both spring and late summer.

**Alcohol test:** Bees are collected in the jar as described above. After collected, an alcohol solution is poured into the jar. This kills the bees but recovers more mites compared to the sugar roll test. The bees float to the top of the jar and the mites settle toward the bottom.

A sample was taken from the same hive but the results were much different. (An exact count of the bees was not done)



If you look close to the bottom of this jar, you will see Varroa mites.

After removing the bees from the jar, the mites were collected by straining the alcohol thru a filter to collect the remaining mites.



**The varroa mites found using the alcohol method**

Some might say this is a huge amount and another might say not so huge.

**The problem is this:** This does not represent the total mite population in the hive! A single worker cell or drone cell can contain a female mother mite laying eggs. Varroa mites prefer drone cells to worker cells because the reproduction time in drone cells is longer. Not only does the mother



Varroa mite live to crawl from the cell after the new bee emerges, she is joined by mated female daughters. It is interesting to me that the first egg laid by the Varroa mite mother is a male. He mates with his sisters. There may be as many as 5 varroa on a worker pupae and 6 on a drone pupae.

**Other indications that mites have done damage within the hive:**



**Most common will be bees with deformed wings.**

**But an examination of a worker cell on a frame from a dead out hive may also indicate mite damage from the feces of mites. The feces look like salt grains.**

**I cannot cover all the treatments available for Varroa mites. What follows are a few of the more popular choices available.**

**Because Varroa mite populations are mobile, I would suggest treating all hives in a bee yard if even one hive shows signs of Varroa mite infestation.**

**I need to mention that some of these chemicals are fumigants and will drive bees out of a hive in very hot weather! Prices were taken from a web check for small quantities - There are discounts available if bought in larger quantities from bee suppliers.**

### **Apivar - approximate cost \$3.00 per strip – 2 strips per treatment**

The Apivar strip is a combination of two components:

1. Amitraz is a sub-lethal miticide that excites and paralyzes Varroa mites. Varroa cannot keep holding on to the bees and falls to the bottom of the hive, leading to their starvation
2. Plastic polymer strip: specially designed to ensure a regular release of amitraz on the surface of the strip after its placement in the hive. The polymer strip was selected for its ability to release the active ingredient over a minimum six-week period. It was also selected for its inability to bend or move, therefore ensuring that it stays in place.
3. Can not be used while honey supers are on the hive.
4. Treatment period – recommended 42 day min to 56 days max.
5. Applied as ridged strips 2 per hive body (6-10 frames)
6. Usually applied in spring and fall before and after honey is harvested.

Apivar is registered but does not have Section 2B approval in all states. It is advised that you check with State Agriculture Dept. to find out if it is legal to use in your state.

### **Apistan<sup>®</sup> Strips - Approximate cost \$3.67 per strip – 1 strip for every 5 frames is recommended.**

Apistan is also a strip with the active ingredient tau fluvalinate

1. Tau fluvalinate is an ectoparasiticide of the cyanopyrethroid class of compounds which act by causing rapid depolarisation of the axonal membranes. **In common words, the mite that comes into contact with the strip is subjected to molecules of the chemical which are lethal.**
2. Strips are placed between frames so honey bees can come into contact with both sides of the strip.
3. The shelf life of this product is listed as 3 years.



4. Special precautions for the person using this product – Avoid contact with skin, mouth, eyes. Wear gloves when handling strips. Follow the general rule of washing hands thoroughly after handling the strips.
5. Cannot be used while honey supers are on the hive.
6. Treatment period – recommended 42 day min to 56 days max.
7. Applied as ridged strips 2 per hive body (6-10 frames)
8. Usually applied in spring and fall before and after honey is harvested.

## **Formic Pro & Mite-Away Quick Strips**

**Both of these products use Formic acid but formic acid has been used by beekeepers as a 60% solution for a number of years illegally. Only two products are legal applications in bee hives.**

**Formic Pro Sold as a pack with two pads called a dose. Using the same source for price I found that a 10 pack treatment package sells for \$71.95. Each pack is for a single hive. Thus, the cost may seem higher but if two strips are required for a hive (2 x the single strip cost) is about the same as a Formic Pro pack. \$7.20 cents per pack with two pads.**

1. Formic acid is the prime ingredient.
2. Each dose is enclosed in a protective sealed package.
3. Formic Pro is considered safe to use during honey flows and leaves no residues.
4. It has a temperature range of 50 degrees F. to 85 degrees F. to be effective.
5. It does kill mites incubating under cappings as well as adult mites.
6. Entrances to hives must be open – generally the bottom board entrance of a standard hive.
7. Treatment period is 14 days to 20 days – Do not use when temperatures are above 85 degrees.
8. Formic acid is a fumigant – it vaporizes and at high temperatures will drive bees out of the hive or kill them if enclosed without ventilation. – Screened bottom boards will reduce the effectiveness of the treatment.
9. Read the instructions on the Package -- Formic acid is Corrosive – don't place it even briefly on metal hive covers. It can cause skin burns – avoid breathing vapors –Do not rub your eyes if handling the product. Also recommended are coveralls over a long sleeved shirt, wear long pants and wash skin with soap and water after handling.
10. In my commercial beekeeping experience, I used early packaging developed by USDA as gel formulations. We had to wear respirators when working with it. Sometimes the packages developed leaks – results in dizziness and loss of control if driving a vehicle. Thus, I would advise not opening a pack to use only one of the pads. This is a product that affects breathing, skin burns, sight - if it gets in eyes, and internal issues such as vomiting and unconsciousness. At least handle it with gloves. The package even has the poison Control Center's Hotline number!

## **Mite-Away Quick Strips**

**Mite-Away quick strips are sold in several package sizes much like Formic Pro. The cost would be approximately \$5.50 per hive treatment. Read the information about Formic Acid above – to be effective the day time temperature should be in the (50 – 84 degrees F. range.**

1. Formic acid is the prime ingredient.
2. Quick strips are formic acid polysaccharide gel strip laid on the top bars of the bottom brood chamber.
3. The gel strips are considered safe to use during honey flows and leaves no residues and company literature even indicates it can be considered an organic treatment.
4. It has a temperature range of 50 degrees F. to 85 degrees F. to be effective.
5. It does kill mites incubating under cappings as well as adult mites.
6. Entrances to hives must be open – generally the bottom board entrance of a standard hive.
7. Treatment period is 7 days. Do not use when temperatures are above 85 degrees.
8. Formic acid is a fumigant – it vaporizes and at high temperatures will drive bees out of the hive or kill them if enclosed without ventilation. – Screened bottom boards will reduce the effectiveness of the treatment.
9. Wear gloves when handling strips. Put any unused strips in a zip lock bag!

**Due to the length of this issue, I will continue with thymol, hop beta acid resins (Hop Guard), Checkmite +, and Oxalic acid next week.**

**Illegal uses are wide spread on the internet. They represent usually individuals with a large number of colonies and contribute in my opinion-- to why mites are so hard to kill. Mites surviving higher doses of chemicals lead to highly resistant Varroa mite populations. If you use a product and it does not give the results you expect – don't blame the product. The **mites that do not die** are producing the next generation of mites that will require more research and new products to control them.**

**Beekeepers may live with Varroa mites for a long time before resistant bees are found.**

**Attempts to do this with the Russian stock of bees brought to the USDA Lab in Louisiana was a start. Requeening hives every year with resistant stock may be one solution for a beekeeper but if other beekeepers do nothing, no solution is on the horizon. This mite is going to be around for awhile!**