

## Mite Management 2021

### Applying Lessons Learned

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I have written articles related to Mite Management for several years now. The articles have been published in January so beekeepers can use the information to plan for the new year. Many beekeepers have found the articles helpful and enabled them to overwinter healthy colonies and produce nice crops of honey.

See the 2018 January-February NJBA State Newsletter for more extensive information about Mite Management (pages 10 to 12).

[http://www.njbeekeepers.org/Site\\_Docs/Newsletters/Volume32Issue1.pdf](http://www.njbeekeepers.org/Site_Docs/Newsletters/Volume32Issue1.pdf)

The 2019 January-February NJBA State Newsletter has an update on page 4

[https://njbeekeepers.org/Site\\_Docs/Newsletters/Volume33Issue1.pdf](https://njbeekeepers.org/Site_Docs/Newsletters/Volume33Issue1.pdf)

The 2020 January-February NJBA State Newsletter has an update on page 11 to 13.

[https://njbeekeepers.org/Site\\_Docs/Newsletters/Volume34Issue1.pdf](https://njbeekeepers.org/Site_Docs/Newsletters/Volume34Issue1.pdf)

In this year's article, I share a lesson learned. My intent is to share what has been successful for me in Northern New Jersey and help you be successful too!

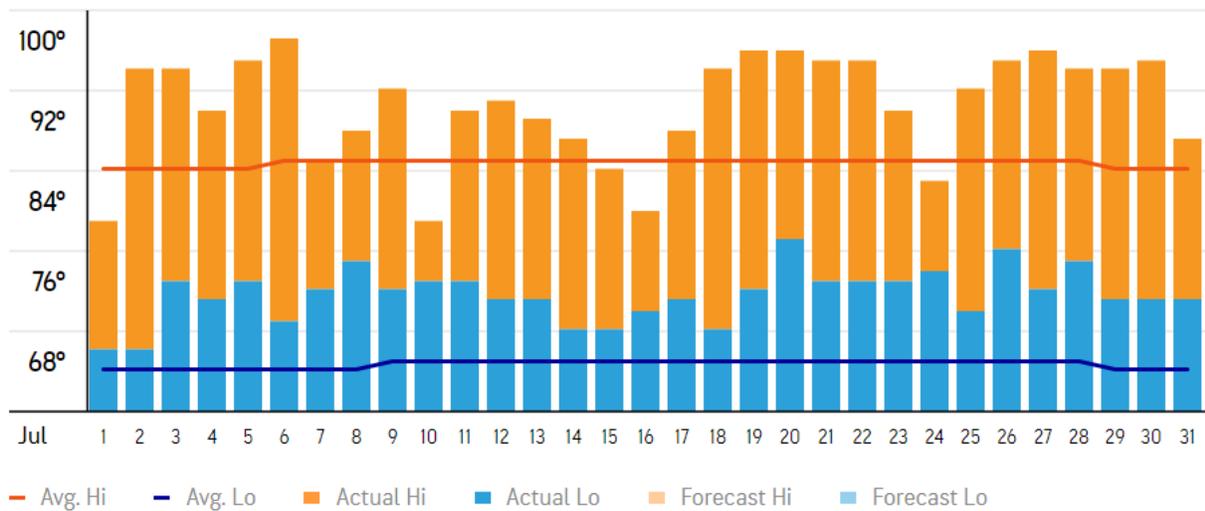
Part of Mite Management is "Assessing the results and developing an improved plan, incorporating any new information."

**This year's assessment of the plan:** Overall the plan was successful with no winter or summer losses in the production colonies. (There were a few losses in overwintered nucs due to multiple factors.) The honey crop was very good. The treatments in the late summer and early fall were not as successful as in past years; mite counts in some colonies were high (more than 1%) and retreatment was necessary in the late fall.

I did not apply the Formic Pro Treatment in early July as planned. The daytime temperatures were higher than ideal when I planned to treat. The instructions for Formic Pro specify the temperature at time of application should not exceed 85F and not exceed 92F for the first three days of application. I prefer to treat during the cooler evening and when the temperatures for the next 3 days are not forecasted to exceed 85F. The weather in July did not cooperate!

## TEMPERATURE GRAPH

°F



July 2020 Temperatures in Mahwah, NJ Daily highs were usually over 85F. From Accuweather.com

The plan was to apply Formic Pro on or about July 5<sup>th</sup>. I did perform alcohol washes as planned and noted that the mite levels were increasing significantly in some colonies, more than 3%. I chose to wait for cooler weather to treat though. In hindsight, that was a mistake. The weather stayed consistently hot through July. By the end of July, mite counts were now significantly higher in more colonies! The daytime temperatures were now above 92F! In early August there were a few cooler days and I applied a full 2 pad treatment to all the hives. I monitored the hives for bearding and bee loss. Fortunately, I did not see much bee loss, and on later inspections did not see any queen losses. After using MAQS or Formic Pro for several years, I have found that if the colony is healthy (specifically low viruses) and the queen is young there will be minimal losses.

**Lesson learned:** While the temperatures were higher than preferred in early July, I should have treated then or even earlier. By delaying treatment, I allowed the mite population to more than double! Formic Pro (or MAQS) had reduced mite counts in the alcohol wash to mostly 0's in past years; there were still colonies with 1% or more mites this year.

Treating with Formic Pro in late June or early July means there will still be honey supers on the hive. Formic Pro can be used with honey supers. Usually by early July I have harvested most of the honey from the earlier honey flow so lifting the supers is not too hard. Some beekeepers are concerned about treating in early July and reducing the honey production. Reviewing my records, this does not seem to be an issue. If there was nectar available, colonies continued to store honey during and after the treatment. Having some honey supers on is advantageous since it allows a strong colony to expand.

Formic Pro will interrupt the brood cycle though. The queen reduces her egg laying rate or temporarily stops laying for about a week, sometimes longer. Reduced brood production is not an issue in late June; a dearth will be underway soon and the population of the colony would naturally decrease.

My plan also called for application of ApiVar in mid-September. In the few weeks since the Formic Pro treatment, the mite counts continued to increase exponentially in the brood. Some colonies had more than 3% mites just before the ApiVar treatment.

ApiVar continues to be an effective treatment for me and many other beekeepers. Some beekeepers are reporting “failures.” Some speculate that they have resistant mites. While resistance mites are out there, most of the resistance tests I have performed show the resistance is not the reason for the ApiVar failure. Here are the best practices to maximize the effectiveness of ApiVar.

- Use one strip for every 5 frames of bees. For example, a double deep with 16 to 20 frames of bees would require 4 strips. (Each 1 to 5 frames of bees should have one strip applied.)
- Place the strips in the cluster of bees, near the center of each brood box.
- Move the strips if necessary, after about 4 weeks. The strips should be in-between or near the frames of brood to maximize their efficacy.
- Scrape any wax and propolis off the strips after 4 weeks. This increases the surface of the strips for the bees to contact the miticide.
- Leave the strips in for the full 8 weeks, 56 days. Removing the strips in 42 days reduces the overall effectiveness.

When ApiVar is not as effective as expected, it is often due to not following these practices. If a colony starts with high mites, ApiVar will reduce the counts but often not to less than 1%. Also, mite immigration is a real problem in many areas and the colony can have more than 1% mites even as ApiVar is performing as expected.

Because mites can develop resistance to Amitraz, the active ingredient in ApiVar, **rotation of treatments is mandatory**. I use Formic Pro because it can be used with honey supers at the same time the mite population is growing exponentially. Formic Pro is the only miticide that kills mites under the brood cappings. Up to 80% of the mites are in the capped brood in June and July. Formic Pro is an improvement compared to MAQS. The initial formic acid release rate is reduced and it is longer acting. HopGuard is the only other option to use when honey supers are on the hive. HopGuard is not as effective as Formic Pro, does not kill mites under cappings and has significantly more issues related to bee and queen mortality. The manufacturer recommends back-to-back repeated treatments when brood is present to increase its efficacy.

Formic Pro, HopGuard and Oxalic Acid are all organic acids. Before approving these chemicals as treatments as miticides, their efficacy and toxicity were tested. How these organic acid chemicals kill the mites is not fully understood. The toxicity to bees and brood were also tested to verify there were no significant mortality. While the acids attack the mites, they may be also impacting the sensory organs of the honey bees as well. Specifically, the organic acids may impact the antennae of the workers, drones and queens. The antennae are fascinating sensory organs providing senses of touch, smell (especially pheromones) and taste. The workers also use specialized sensilla on their antennae to maintain optimal conditions in the hive including temperature, humidity and carbon dioxide. If the antennae and sensilla are compromised due exposure to the organic acids, the performance of the colony will be compromised. This is especially a potential problem with repeated treatments. Therefore, some recommend treating each generation of bees only once with any of these organic chemicals. Queens can be even more compromised since they could be exposed multiple times even if

each generation of worker and drones only gets one treatment. **We need more research to understand the modes of actions of these organic acids on both the mites and the honey bees.**

After assessing the results of the plan last year, and gathering any new information, my plan for 2021 is below. It is very similar to the plan in previous years, incorporating the lesson learned that treating with Formic Pro earlier is much better than waiting for the optimal conditions. The counts need to be monitored in June and July since the mite population can explode in late summer, especially in strong colonies.

Your plan may be different, using different treatments. The most important part of any plan is monitoring the mite levels in each colony and verifying the treatments were effective. If mite counts are not taken before and after the treatment, you will not know if the plan was successful until it is too late.

<b>Mite Management Schedule</b>				
<u>Planned Date</u>	<u>Task</u>	<u>Notes</u>	<u>Actual Date</u>	<u>Notes and Actual Mite Count</u>
Tuesday, January 19, 2021	Treat with ApiVar (56 + 14 days before honey supers)	Put ApiVar Strips into Cluster Strips will be in place for 56 days		
Tuesday, February 16, 2021	Move and Scrape/Clean ApiVar Strips After 4 weeks	28 days after inserting		
Tuesday, March 16, 2021	Remove ApiVar Strips after 56 days	Remove 14 days before Honey Supers are added		
Thursday, April 01, 2021	Mite Check with Alcohol Wash	Post Treatment Check Target is <1 mite 1/2 cup of bees		
Thursday, April 01, 2021	Add Honey Supers			
Saturday, May 15, 2021	Mite Check with Alcohol Wash	Mid- Season Check		
Monday, June 28, 2021	Mite Check with Alcohol Wash	Pre-treatment Check		
Monday, June 28, 2021	Treat with Formic Pro	Full treatment (2 pads) to kill mites in capped brood cells.		
Wednesday, July 21, 2021	Mite Check with Alcohol Wash	Post Treatment Check Target is <1 mite 1/2 cup of bees		
Wednesday, July 21, 2021	Verify the colony is Queen Right			
Saturday, September 18, 2021	Remove Honey Supers			
Saturday, September 18, 2021	Mite Check with Alcohol Wash	Pre-treatment Check		
Saturday, September 18, 2021	Treat with ApiVar	1 strip for every 5 frames of bees		
Saturday, October 16, 2021	Move and Scrape/Clean ApiVar Strips	28 days after inserting		
Saturday, November 13, 2021	Remove ApiVar Strips	56 days after inserting		
Saturday, November 27, 2021	Mite Check with Alcohol Wash	Post Treatment Check Target is <1 mite 1/2 cup of bees		