Apis m. Esoteria 10

Varroa Mites

VARROA MITES, *Varroa destructor*!

What to do? What to do? Visiting the Emerald City won't work. You must do something!

That something is "Integrated Pest Management" (IPM).

This is an analytical thought process that causes you to identify your situation as it pertains to varroa mites (the pathogen). You use this process to assess all situations for all the bad things that can happen in your hive (hive beetles, foul brood, Nosema). By using some technique, you determine the level of infestation in the colony. Is it above the "economic threshold"? That means is it bad enough to kill my colony in the short term or do I have time to work on the problem? In between a clean hive and death is the "economic threshold". This is the level where a pathogen impacts on the life and productivity of the colony.

The varroa mite goes into the uncapped cell where larvae are growing. They may enter any time after the larva hatches until just before capping on day 16. The mite starts feeding off the larvae. It drills a hole in the soft carapace and stays attached to the bee for life or until we kill the mite with some treatment. We used to think the mite was eating homoglyph (the bee blood). Now we know the mite is drilling into the abdomen where it can reach the "fat bodies". It injects a solvent and then sucks out the fat. The injection transfers the viruses that the mite is carrying just like a mosquito does with malaria, yellow fever, etc. When we kill the mite, the dissolved fat continues to leak out of the bee's body. For how long I don't know yet. The combination of leaking fluid and viruses eventually kills the bee.

For varroa mites there are several techniques to assess the severity of the problem.

One is the sticky board which measures the 24-hour mite drop. The mites are falling off the bees continuously. A sticky board inserted on the hive floor will

catch the mites. You can count them. You will need better than average eyesight. There are two ways to do it. Leave the sticky board in for 24 hr. and then count. Or leave it in for 72 hours, count the mites and divide by three. The 72hr. method gives a better average count.

The good old ether (or alcohol) roll is a good way to take an assessment. Catch 100 bees and place them in an empty pint jar. Spray ether starter fluid on them and screw the lid on. The bees will die. Roll them around inside the jar in the small amount of liquid ether and the mites will fall off (and die) and stick to the side of the jar. You can count them quite easily. Oh, but I can't kill my girls!

So, take the same 100 bees (actually these are different bees, the first 100 are dead), place them in pint jar with maybe ¼ cup powdered sugar. Place the lid on the jar. Roll them around for a couple of minutes and the mites will fall off. This is called "the powdered sugar roll". Pour the bees and powdered sugar in a light-colored bowl. The bees will leave. The mites are buried in the powdered sugar. Add a little water to dissolve the powdered sugar and you can count the little black dots (varroa mites).

Mite threshold: 7 mites in the spring 17 mites in the fall the reason for the difference between spring and fall is that there are more bees in the fall which will carry more mites without seriously damaging the colony. Update Spring 2018, it is pretty well accepted that if you count any mites, THEN treat!

All these tests require some expansive extrapolation to determine how infested the colony is. A more direct way is to look at white larvae which is capped over. Maybe around 16-day old larvae. You can see the brown (mature mites) and red (immature mites) on the larvae. Varroa mites prefer to lay eggs on drone brood so that is the first best place to look. If you don't have much drone brood look at worker brood. Just pull 10 larvae from different locations in the hive. If very few of larvae have very few or no mites you are in good shape. If every larva has one or more mites you are in very bad shape. If your worker larvae have no mites but your drone brood has a few each the system is working as designed. You will want to take some action to knock the mite population down before winter.

You don’t want to go into winter with newly hatched bees that are weakened by mite infestation. They may not live through the winter, and they won’t work hard next spring to get the hive going again.

ANTICIPATE is a word that beekeepers must live by.

The colony population starts growing in the spring. The mite population will start growing as more larvae develop in the brood chamber. As the population expands all summer long so does the mite population. As the bee population starts to shrink due to natural attrition in the fall the mite population continues to climb. This creates a situation where more sexually mature mites are going into fewer larval cells to lay eggs. The larvae will be overpowered by too many mites growing on them. This is when you start seeing deformed young bees. The most commonly spotted is dumpy (crinlkle) wings. These bees will not make it through the winter. Knock the mites back to a respectable level in August so the colony can hatch out 60 days of healthy bees before the queen stops laying eggs.

If you have large colonies the surviving mites will be spread around the large population. Some of the bees will not be parasitized, allowing them to get through the winter in good shape.

When the queen starts laying eggs next spring, there will be some (hopefully not too many) mites. They will all head for the first larvae ready (about day 15 just before capping). This will cause a situation of too many mites on too few larvae and the bees will be born deformed and weak. As more larvae reach the proper age for the mite to lay eggs on them, a balance will be achieved and some of the bees will be born okay. Those that were used by the mites in the cell will be born weak but maybe not deformed. This situation can repeat itself all summer long until the colony collapses. AH! An explanation to why that colony didn’t collect much honey and then died in the early fall.

If we can enhance the individual bee's health through reduced mites and add proper nutrition (syrup/nectar and pollen/pollen substitute) they may be able to withstand the degradation caused by the mite wound and viruses. We need to grow fat, healthier, honeybees.

This cycle tells me to be ready to do mite control next spring before the queen starts laying eggs. When there is no brood all the mites are on adult bees. None are hiding in capped brood. Hence, you can get a better mite kill when treating.

This concept of mite control causes many good discussions among beekeepers. Why not let the bees that cannot sustain a symbiotic relationship with the mites just die and the resistant colony live creating a tougher bee? WELL, because it is expensive to buy new bees all the time. Until all the bees we buy from the producers are “mite resistant” the beekeepers with a few hives need to do all they can to protect their bees and manage their bee budgets.

I tried powder sugaring my bees once a week for 4 consecutive weeks. I also powdered them for more weeks if I was not collecting honey. I do not powder sugar during honey flow. I had very few mites. Now this creates a whole ‘nother discussion. I am not creating the most hardy resistant bees. But I am also not creating a super mite (ones resistant to chemical treatment). They cannot become resistant to powdered sugar. There is some discussion that this does not work. I think it stimulates grooming, and the mites are knocked off. Some say the mites can’t hold on and fall off. Some say it does not work. But, Hey! The powdered sugar will be picked up and used as bee food. Some beekeepers use “dry” feed instead of syrup. It is hard for me to do nothing and buy new bees next spring. This is IPM.

UPDATE: The powdered sugar treatment has been surpassed by better proven treatment with not too strong of a chemical. By getting better mite kill, the bees are doing better.

I am in the process of doing 2 tests in my own 30 hive apiary. This fall (2013) I will treat 10 hives with Oxalic acid, and 20 hives with Apiguard (Thymol). I don’t need a non-treated control group because I know that does not work. I have enough dead hives to document that “nothing” kills bees. My over winter death rate using organic techniques is unsustainable. My bees need a little help. Varroa mite removal directly reduces viruses and diseases vectored by the mites.

Oxalic Acid fumigation was easy and effective. Formic acid patties may be better than thymol. Bees avoided thymol at 85 degrees and queen shut down egg laying.

Temperature sensitive vs. Oxalic Acid fumigation: this technique can be done at any temperature, hot or cold. Formic Acid and Thymol must be done between 60° and 80°.

Update 2018 I am going to Randy Oliver paper towel/oxalic acid. Put the paper towel in the top bars and leave it for the bees to remove. Well, I quit that also it didn't prove better than Oxalic Acid fumigation.

Today February 2021: I have used oxalic acid fumigation with different heat wands. I am using a propane torch system now. Very easy and quick per hive. When very cool (spring and fall) this system will kill mites. Late spring or early summer and early fall I alternate to using formic acid patties. When I need to treat in temperatures above 80° I go back to oxalic fumigation. This pattern allows me to treat anytime of the year when mite population seems to be getting too high. Mostly, I am keeping the mites under control at a very low population level. Where I get a spike in mites, I think I am getting drifting bees into my hives from migrating beekeepers or my bad beekeeping neighbors. South Georgia beekeepers bring their bees into the mountains to collect sourwood honey in late June.

Mite-Away quick strips work well Formic Acid jelly

Apivar works well especially in spring and fall Amitraz

Apiguard works but make sure temperature is below 82° and above 62° Thymol jelly

Switch around in what chemical treatment you use. Also consider a brood break period during requeening.

Treat your bees at least 6 times throughout the year. Preferably when there is no honey for human consumption being collected