Dealing with varroa

By Caroline Abbott

The varroa mite invaded the United States in the late 1980's and early 1990's depending on the location. Most people believe it came in with infected bees from other countries that had been in contact with *apis cerana* bees which are its original host and are not native to the United States. The initial effect of the varroa mite on honey bees was devastating. Because it was an invasive species, the honeybees had no natural defensives against it and large percentages of colonies, both managed and feral were completely wiped out. Small beekeepers quit in large numbers. Larger beekeepers decided to fight with chemical warfare. They petitioned the government to allow banned chemicals to be used on bee hives to kill the mites on the bees. This initially worked very well. There was probably some lethal effects to the bees, but more lived than died.

Over time, of course the mites developed resistance to the chemicals. Some beekeepers decided to take an approach called the "James Bond" approach – Live and Let Die. They decided to let the bees sort out the crisis and the strong would survive. By the early 2000's this began to work out into an equilibrium. Many beekeepers were successfully keeping bees without chemicals, although it was standard to continue to put in chemical controls for varroa. Then, in 2006-2007 many commercial beekeepers suddenly lost large percentages of hives in one winter. Many different names were given to this malady. Some called it "disappearing disease", others called it "dwindling disease". Those that researched old bee literature saw that these events had happened on occasion in the past with the same types of symptoms. Then someone came up with the name "colony collapse disorder" or CCD, and that name stuck, whether it was an accurate description of the event or not. This touched off what I call a "chicken little" response in the media. You know the old children's story, the chicken runs around saying, "The sky is falling, the sky is falling". The media repeated over and over a statistic that no one really knows the source of – "if the honeybees all die, we will be dead in four years."

The effect of this information in the media was a type of panic situation among beekeepers. The public was alarmed and concerned and wanted to do whatever it could to "save the bees", but most weren't really seriously afraid we would all be dead in four years. Commercial beekeepers however were afraid their business would be dead in four years if they didn't resort to desperate measures. The old chemicals weren't working anymore, so they pulled out more. The pressure from the public was to go more natural, so they developed chemical treatments that somewhere back in their chemistry had some connection to a real plant or something organic. A really extreme example is formic acid. This very strong and dangerous acid is found naturally in small amounts in ants. Therefore it is marketed as a safe and "natural" treatment. Just ignore the fact that the beekeeper has to wear a respirator to apply it, and that it corrodes all the metal parts in the hives.

The backlash from this panic and increased use of more and various chemicals was that the general bee population got weaker and weaker from the stress of these treatments. Many beekeepers rely on the package bee industry to acquire bees. These are bee farms, mostly in warmer regions in the U.S., where millions of boxes of bees containing enough bees to start a hive and one queen bee are produced each year. These farms supply mostly commercial beekeepers, but also most hobby beekeepers. Because the commercial beekeepers use many more bees in a year, of course they are the biggest customers. All businesses must cater to their largest customers. Bee farms had to use a lot of chemicals to keep their operations running. Commercial beekeepers want lots of bees that can be strong at all seasons of the year so they can pollinate fields of almond trees in February, apple trees in April or pumpkin fields in

June. They need queen bees that lay a lot of eggs and make a lot of bees year 'round. They do not need winter hardy bees because they move them to warmer climates in the winter.

This pressure from commercial producers created a situation in the bee farms where they were breeding bees that have big strong hives, but don't really have any winter hardiness. They need chemicals to control the varroa mites because the bees have no natural resistance. New, hobby beekeepers had to buy these bees to get started because they had no other sources for bees. These bees died if they weren't given the chemicals to kill the varroa mites, so if a hobby beekeeper wanted to keep bees naturally, they eventually got discouraged and ended up with a lot of expensive, empty equipment with nothing to show for all the blood, sweat and bee stings.

This situation is pretty widespread around the United States, but it is worse in areas where there is less natural forage for the bees. Natural forage has been destroyed by large production agriculture, especially large tracts of corn and soybeans and also commercial or residential development of what was once open and mostly undeveloped land. Well fed bees can overcome some of the obstacles of poor breeding and chemical contamination, but bees that have inadequate natural sources of food will be weaker and will be less likely to overcome these man-made stressors. The effect of large commercial operations on small producers varies by location as well. In regions where there is a lot of large commercial pollination operations there is more effect on the small beekeeper than in areas where there is relatively little pollination activity.

Large commercial pollinators affect small beekeeping operations in several ways. First of all, they increase the flow of genetics from out of the area into a given area. Even the "feral" bees in a given area will mostly be escaped swarms from these operations or the bees that they sell to smaller beekeepers from their suppliers or their own stock. The other effect large producers have on small producers is the competition for available forage. Some pollinators have target crops in which they place their bees, mostly in the spring months. After those crops have completed blooming and the need for pollination, the bees are pulled and either placed in summer pollination crops or just placed in any location the commercial pollinator can find to leave them for the rest of the season until fall when they are moved down south. These locations are getting harder to come by as more and more land is either developed or put into large production crops. So, it is more likely that a large producer will place a significant number of hives near enough to a small beekeeper to compete for limited forage.

This situation is largely out of the control of a small beekeeper because one can only control what happens on his or her own property. Certainly one can appeal to the owner of the beehives or the property owner, but in my personal experience that doesn't always make much difference. Therefore, the small, hobby beekeeper is left with a dilemma and a choice of two different management methods which follow two different inherent philosophies. One can follow the guidelines that are promoted by commercial beekeepers, which are necessary in their situation because of how their operations work, or one can follow a more "natural" path, which leads in the opposite direction. This is all complicated by educators and "experts" in the beekeeping field who draw no distinction between the two types of operations, assuming that bees are bees and what applies to one situation is also applicable to every other situation.

The other complicating factor, which drives at the heart of the philosophical differences between the two paths is the question, "which came first, the varroa, or the weak hive?". Those that promote chemical controls of varroa work on the assumption that the varroa comes first and causes the weakness and disease and eventually death of the hive. The other side, which promotes a more

"natural" approach holds to the theory that varroa are in the environment and are waiting to infest weak hives. If a given hive is strong enough, it will fight off the varroa, at least from getting to a point where it can weaken the hive. This side believes that a strong organism will be able to fight off invasions of all sorts, but if it gets stressed by lack of adequate forage, too much manipulation, moving the hives around, extreme weather or the loss of its queen, it will become vulnerable. This leads to assessing the hive from a standpoint of overall health and if it is found to be weak, to determine the cause of the weakness and attempt to correct it. Chemical controls for varroa are considered to be another cause of stress to a hive which contributes to its overall weakness and vulnerability to parasites and diseases.

The majority of mainstream beekeepers and educators ascribe to the first viewpoint, that varroa is the cause of pretty much everything that can go wrong in a beehive. Since varroa is the main cause, the solution is quite simple: just control for varroa and everything will be fine. The problem is that in real life this is not working. First of all, the varroa are becoming resistant to the controls and secondly, the hive loss rates are not decreasing. In fact they are increasing, especially in the summer when they shouldn't be experiencing excessive stress. Many beekeepers, especially those who depend on honey for income have just given up the fight and plan on taking all the honey off their hives each year and just let the hives die over winter and buy new bees each spring. Some alternately sell off their hives in the fall to someone who takes the bees down south and doesn't need winter stores on the hives. This way they get their honey and don't have to battle and worry about overwintering.

That method works if the beekeeper has no desire to have a system that can work independently of giant bee farms and commercial producers. One who chooses that path must accept that there will be inputs every year and hope that the results of the hive, i.e. honey production and other hive products, will produce enough income to justify the expense. Each year this gets harder to do because the summer mortality rate of hives is on the rise. There is no guarantee that just because you are avoiding overwintering that you can keep them going all summer. There is also no guarantee that they will produce enough honey to be profitable even if they do survive. New package bees are increasing in price at an alarming rate, making replacement hives much more valuable. The beekeeper has quite a large investment in the bees first thing in the spring with no promise that he or she can make that up with hive products during the season.

So, let's set up a new beekeeper scenario: An enthusiastic new beekeeper reads a lot of information on the internet, signs up for some winter beekeeping courses and finds someone who can mentor him or her, at least part-time. Spring comes and the local bee club arranges for package bee purchases from a gigantic bee farm located a thousand miles to the south of the beekeeper's location. The new beekeeper is advised to buy at least two or three packages to ensure that at least one will survive the summer, let alone the first winter. The beekeeper also has to purchase all the hive equipment and tools and protective gear necessary to keep bees. By this point (in 2016), he or she has invested nearly $2,000, and hasn't even started. The bees come in, the new beekeeper puts them in the hives. If this is an average situation and he or she started with three packages, one will go queenless almost immediately, one will just abscond, or fly away, leaving an empty hive, and the third one will build up nicely and make a really strong hive. This really strong hive will produce a lot of honey the first season. It will be a little bit ornery, but the beekeeper feels it is worth it for the honey. The beekeeper collects about 60 pounds of honey and is ecstatic. He or she bottles it and gives it away to family and friends and sells a few jars. Oh no! The local bee club just said that he or she should have been monitoring for varroa all summer! Well, better late than never! So, now it is fall and really a little cool to be manipulating the hives, but the beekeeper wants to do this right. So he or she does a monitoring of the hive that requires opening it up and manipulating it in cold weather. Then, horrors! Varroa mites are

discovered at rates that require something to be done. Now a bewildering array of choices for varroa treatment are offered. The new beekeeper is overwhelmed, so chooses the easiest option, puts a strip of chemicals in the hive and closes it up for the winter. All winter long the beekeeper lifts the cover of the hive, anxiously looking in. He or she takes a stick and cleans out dead bees at the entrance. The beekeeper has placed candy boards and sugar water and takes a stethoscope and listens to see if there is buzzing coming from inside the hive. But alas, when spring comes, the hive is dead. What happened? We did everything right! We followed all the advice given at bee meetings and on the internet. What could have gone wrong? The even bigger question is: was it worth all the money invested? Honestly if I want a hobby that costs that much, shouldn't I just get a nice classic car, shine it up and drive around all summer? I can buy honey at the farmer's market much cheaper than that!

I think the problem starts right at the beginning. First of all, a new potential beekeeper needs to be very careful of what information he or she believes. It's OK to read it all, listen to it all and compare, but look to see if the results back up the theories, or if the failure rate is extremely high. If I sold any product that only 1/3 of it worked, how long would I stay in business? Which of course leads to the second huge problem – bad bees. In the livestock business no one could ever get away with selling such poor stock that only 1/3 of it survived to produce and then died after one season. The rest is management, which again goes back to the battling philosophies.

So, how does the other side do it, and is it any more successful? Let's start with information. The best information comes from years of experience, preferably successful experience. The well informed new beekeeper will find experienced beekeepers who have kept bees *successfully* over a period of years. The new beekeeper also will seek out articles and books written by successful beekeepers. Secondly, the new beekeeper needs to find healthy honeybee stock. Local is best, but may not be possible at first. This takes a bit of work and asking a lot of questions. Then, the new beekeeper needs to keep expectations modest and only start with one or two hives and carefully choose locations that give the bees optimum conditions for strong hives. Then when winter comes, prepare for it by making the conditions the best they can be for overwintering and then let nature take its course. Bees that survive will be good bees to propagate for the next season. Notice the emphasis has been on bee health and strength and not on varroa.

But does it work? Well, at least as well as the other side, so it shouldn't really be criticized in my opinion. Here are some of the objections to this method:

1. *If you don't treat your hives for varroa, they will infect other people's hives, so you are being an irresponsible beekeeper.* Well, researchers have determined that varroa can only spread between very closely spaced hives, closer than 100 feet. So, if you have your hives that close to someone else's hives, that is probably too close anyway.
2. *You are just killing your bees if you don't treat for varroa, so you are an irresponsible beekeeper.* It seems statistically that just as many hives die with treatment as without, so since treatment makes no real difference in hive mortality, that must not really be true.
3. *It is not scientific to keep bees that way, and science is the on track to find the answer that will save the bees and eradicate varroa, so you are putting a roadblock on the road to progress by promoting these backward methods.* I feel what the small beekeeper does in his or her backyard has no real impact either way on what is being done in scientific research facilities, so if and when they find the big answer, we can choose to use their information or not. I also feel that alternate ideas should not be a threat to something that really works. Something to think about.

We have digressed from varroa a bit, but it is all related. The average hobby or backyard beekeeper has to make an informed choice about how to manage his or her hives. The big problem is that the information that is out there is not balanced to display both sides of this issue. Almost all the information strictly adheres to the philosophy that varroa is the cause of all the problems in the beehive. Of course, my bias is very clear here, that I don't agree with that. One reason I have a problem with that idea is that we are ignoring all other health issues by placing all the blame on varroa. This has made us lazy and unresponsive beekeepers. We don't practice or encourage the art of observation to determine if the hives are looking and acting normal. We don't take careful measures to build up strong hives. We don't pay attention to the factors that are causing our colonies to be stressed and attempt to alleviate them. Actually the extreme focus on varroa has taken beekeepers "off the hook" of being careful managers of their hives. All they have to worry about is monitoring for varroa and treating for it several times a year. That is much easier than worrying about all those other issues! Unfortunately it hasn't resulted in more successful beekeeping.

So what factors do make a strong hive and reduce stress in the beehive? I have touched on these answers already, but here are the basics:

1. Strong, healthy bees from locally adapted stock, or from a region similar in climate.
2. Plenty of natural forage for food, this need to be constantly evaluated over the season.
3. Attempt to control hive density by monitoring carefully how much the hive is building up and storing resources and then spread hives out if the bees are not building up or producing enough honey.
4. Reduce the amount of hive disruption by the beekeeper to a minimum, but carefully observe hive activity in ways that do not disrupt the hive.
5. Always make sure you have a healthy, laying queen.
6. Leave enough honey on the hive for overwintering without the need to feed artificially.
7. Limit the use of wax foundation that is less than 30 years old (newer wax foundation is contaminated with miticide residues).
8. Encourage drone production in strong, good hives so those drones can saturate the mating areas and improve the feral population.
9. Practice splitting hives at least once a season to encourage a brood break and keep young queens in the hives. Let the hives re-queen themselves to take full advantage of the brood break. This also helps to increase the good genetics in your local area. Share these splits with other local beekeepers.
10. Eradicate aggressive hives. In livestock language this is called "culling". Bad stock cannot be allowed to propagate. There are simple ways to do this which do not contaminate hives or the environment.
11. Prepare the hives for winter, then do not open them until the weather is warm in the spring.
12. Do not take extensive measures to save weak hives. Let them die. Mark them as "no code". Bees that are worth keeping can take care of themselves.

A good beekeeper will know his or her bees and will have a good idea of the health of the hive at any point in the season based on observation. This leads to quick responsiveness to correct problems before the hive gets so weak it succumbs to varroa.