

YOUR BEES DON'T HAVE TO DIE

HOW CAN WE BECOME TREATMENT-FREE WITHOUT KILLING OUR COLONIES?

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Keeping bees with my dad was fun when I was a kid in Northern Wisconsin. It was in the golden era of beekeeping – it was easy, the bees all lived, and I hadn't even heard about the varroa mite. Fifteen years later, while in school in Michigan, beekeeping didn't seem as fun or as easy. Every conversation that I had with beekeepers centered on figuring out why their bees were dying. Beekeepers were sick of losing bees, and sick of treating for varroa. They wanted treatment-free strong, northern bees. So I started rearing queens with the goal of raising these strong, northern bees that could thrive without treatment. I had been collecting swarms for years, getting the best queens from local beekeepers, and trying out fancy stock like Canadian Buckfast and Minnesota Hygienic. I had been reading up online, and I wanted to find the best bees that could survive varroa. At that time, there was a lot of support for the 'Live and Let Die' method – where you let your bees go with no care, and whichever ones 'survive naturally' are your new, better stock. I had some colonies that I thought had a lot of potential, so I let them go, hoping to find out which hives held my new, hardy, treatment-free bees. The outcome that spring was horrible, and really made me rethink why and how I want to keep bees. In this article, I am going to explain why the 'Live and Let Die' system doesn't work for my beekeeping (and probably yours too), and to give you a new method that can help you find your best bees while keeping you happy and your bees healthy.

ISSUES WITH THE 'LIVE AND LET DIE' TREATMENT-FREE BEEKEEPING:

1. My animals suffered.
2. I put the bees around me at risk.
3. It was really expensive.
4. It made me miss good genetics/ it didn't work for getting better bees.

1. Suffering bees.

My treatment free colonies looked great all year, but when I opened the hives for a late final inspection before winter, I felt sick to my stomach by what I saw. Spotty brood, melted larvae, and small, demoralized looking bees - colonies deep in the throes of parasitic mite syndrome. My thriving, booming colonies had been reduced to small clusters, working desperately to raise the few larvae that were left after the viruses had devastated most of the young. Full supers of honey for winter looked ridiculous now, sitting optimistically on top of colonies that were mere shells of what had gathered that nectar all summer. It didn't take a diagnostic expert to know that my bees were profoundly sick, and didn't have a chance that winter.

My husband and I have raised all sorts of animals on our little farm – pigs, chickens, rabbits, cattle, sheep, goats, ducks, dogs, horses – you name it. We have the same philosophy for all our animals: if it is under our care, we will keep it in good health. Every animal gets good food, clean bedding, and the attention they need. We would never let a sick ewe suffer and slowly die, or let a pig walk around with a devastating injury. I care for my bees, and it didn't make any sense to me to let them suffer and die slowly. (This is especially true now that I know that it is unnecessary – as you will read at the end of the article).

We know that colonies with high levels of varroa have all sorts of viruses, poor nutrition, and very little chance at living through any sort of winter, let alone having the energy to raise brood in the spring. Part of

the problem is that most beekeepers who lose bees to varroa-associated viruses never see it happen – they wrap up their big booming colony in the fall, and then clean up the deadout in the spring. It literally happens inside a dark box, and beekeepers can skip the sad suffering part. If you are thinking about *not* managing varroa mites in your colonies as a way to keep bees, I urge you to open the colony while they are in the dying process. Look those suffering girls right in their compound eyes, and reflect on how you want to provide for the animals under your care. It just doesn't feel right to call yourself a beekeeper while letting your bees die a slow, preventable, death.



A brood frame from colony with parasitic mite syndrome. If you look close you can see a bee with a mite on her thorax, a bee with k-wing, mites in cells, and melted-looking sick larvae. This colony was once thriving with lots of nurse bees and healthy brood.

2. Save the bees?

Like a lot of beekeepers, I take pride in knowing that I am providing pollination services to gardens and plants, and I like to think that I am doing some good by keeping bees. When I had sick colonies, however, I realized that my beekeeping was probably doing more harm than good to my environment. I was putting the pollinators around me at risk. When a colony is sick – like my bees with mites and viruses – it becomes weak. Weak colonies get robbed by bees from all the nearby colonies. We also know that bees are more likely to leave or abscond from a dying colony. Ever had a colony up and leave in the fall? Think about if you had varroa populations under control in those hives. Through drifting and robbing, sick colonies can act as a disease reservoirs, with your bees spreading disease throughout your area. Honey bee colonies are everywhere now days, and it is impossible to know every hive hidden in a back yard, or wild colony that was living happily in a tree until you came along and threatened them with your sick bees. Even worse, it isn't just honey bees that are at risk - we even see deformed wing virus spreading to bumble bees and some of our other native bees. Our native pollinators are already facing huge problems with habitat loss and pesticide exposure, and I don't want to be the one with the 'Save the Bees' bumper sticker that is quietly infecting my native pollinator population with new diseases. I'd really like my effect on the environment around me to be positive. I don't want my role to be the person that maintains disease and infection and makes it worse for nearby bees and beekeepers by perpetuating an epidemic in my area.

3. A bass boat would have been cheaper.

Even if you have an icy, shriveled little prune heart, and it doesn't bother you to let your bees die or to put the bees around you at risk, it shouldn't take long to figure out that the economics just don't work. Of the 24 treatment-free colonies I put into winter, about 6 made it through alive. This result isn't unusual for treatment-free beekeeping, and many people I talk to lose 50-100% of their colonies every year. Others using the 'Live and Let Die' method record losses of 95%. If I had kept my losses to my normal 15%, I would have come out of winter with about 20 hives of the original 24. I usually split my colonies in the spring, and make an average of 75lbs of honey from each split. From my 6 hives, that would be 900lbs of honey. From 20 overwintered hives, I could expect 3,000 lbs. My little experiment literally cost me one ton of honey. Let's say I didn't care about the honey, but was interested in bees. I can usually make 3 nucs from every overwintered hive. Now I have just lost over 40 nucs that I could have made available to beekeepers in my area looking for local bees (at a price of \$150 per nuc, I could have made a lot of money that I could have donated to honey bee research at MSU (<https://www.givingto.msu.edu/gift/?smid=A1109>), or have gotten a new fishing boat. We try to practice sustainable farming, and there is nothing sustainable about losses that high.

4. What kind of bees am I left with?

The reason we let our bees die without treatment is to find bees that can survive varroa. We think that it will work like textbook natural selection - we put in a pressure, the weak die, and the strong survive. Unfortunately, it is much more complex than that with bees, and this process may not lead us to the end that we want, and we may not actually improve our bees. There are a few reasons why.

- Most of us don't live in isolated environments. Either we or someone else are bringing in new genetics. If I replace my losses with bees from outside my apiary (packages or nucs), I am completely negating the bottleneck effect of the losses of the year before, and I am replacing the susceptible population. If I make splits and raise queens from my survivor stock, but I don't have an isolated mating yard, then those daughters are going to breed with whatever is out there, and I will have no idea if these new combinations can survive varroa. I'll have to let them die again to find out, getting me into a perpetual cycle of bee death.
- You aren't controlling how your bees manage varroa. Maybe your colony didn't have problems with varroa because it swarmed 4 times, so it constantly broke the brood cycle. This is one way to keep varroa populations from getting high, but now your neighbors have to pay thousands to get the colonies out from behind their siding and your township is putting up an anti-beekeeping regulation. You want bees that manage varroa in a way that is good for your future beekeeping – not just staying alive by any means possible.
- If you only select for a single trait, you lose a lot of other good things. Let's say you live in an isolated forest, and don't bring in any new genetics to your area, and you breed only off of your survivors and control their mating. There is a chance that you can get bees that are highly hygienic and can handle varroa. But what if they are jerks, and are so highly defensive that you can't work with them, or are susceptible to chalkbrood? It is really hard to breed other good traits back in once they are lost.
- You can kill colonies that you actually want by putting them under too much pressure. Natural selection results in a balance between parasites and their hosts. If a parasite is so bad that it kills all the hosts, then the parasite dies too. In a parasite-host balance, the parasites don't kill as much, and the hosts are able to tolerate some level of parasitism. In the long view, we are looking for bees that can live at this balance. We may have some great bees in our yards that can live with some varroa, and would thrive once we reach a balance with this pest. We would lose those hives, though if we let 12 hives crash around them. The disease pressure may be too high for them to handle, and we would lose the very bees that we want to keep.

I don't live in a completely isolated area, and since I use splits as a main part of my management, I am constantly creating new genetic combinations – colonies that are going to have different behaviors, and different abilities to handle disease. I also wanted to sell queens to beekeepers, and to have high quality queens for myself, so I knew I needed to have gentle, productive colonies as well. Just leaving the bees alone wouldn't likely give me the strong Northern stock that I was looking for.

**SO NOW I FEEL BAD FOR LETTING MY BEES DIE AND FOR
PUTTING OTHER BEES AT RISK, I'M BROKE, AND I STILL DON'T
HAVE THE BEES THAT I WANT. BUT... I STILL WANT TO FIND
GOOD BEES, AND I DON'T WANT TO JUST PUT CHEMICALS IN MY
HIVES ALL THE TIME. WHAT IS A BEEKEEPER TO DO?**

After that spring, I re-evaluated my goals as a beekeeper. I still didn't want to be on a cycle of treating all the time, and I still wanted to be working towards better bees. However, I also needed a way that my bees stayed healthy. I thought about why we navigate towards having unmanaged colonies in the first place - because it allows us to find out which bees can handle varroa (and other diseases) without treatment. What if we had a way of finding those bees without letting the rest of them die? Well, we do have that way, and I've been using it the last few years, and I've been able to find colonies that don't need treatment, keep my losses down, and work towards having better bees (all while taking good care of my girls).

Here is my new system for identifying treatment-free colonies while keeping healthy bees.

You will need the following:

- Some honey bee colonies
- A good system for taking notes
- A method for monitoring for mites
- A source for good queens

Briefly, you will identify those colonies that aren't doing a good job of managing varroa mites and other diseases, you will first get them back to health, and then requeen from a better colony. The big thing to remember is that the properties of the colony are a product of the genetics, and the genetics of the colony are dependent on the queen. If you don't like a colony, you don't have to kill a bunch of innocent workers, you need to switch the genetics – i.e. – just replace the queen. There is never a need to let a colony crash and die.

1. Start with some honey bees.
2. Start monitoring for varroa using a sugar roll or alcohol wash. For instructions on how to use a sugar roll for monitoring, visit <https://pollinators.msu.edu/resources/beekeepers/varroa-mite-monitoring/> (American Bee Journal, October 2016). Monitor each colony at least once a month – it doesn't take long after you get the hang of it. You will soon find what colonies are keeping the varroa population stable, and what colonies can't control varroa on their own.
3. Take good notes. Make sure you record swarms and supercedes, and any activities that you do (like splits or drone brood removal). This will give you more information on why mite counts are low. Think about what characteristics are important to you – varroa, gentleness, honey production etc., and find a way to record that for each colony. For example, use a 1 – 5 gentleness scale, and record what they act like each time you enter the colony. Write down how much honey you take

off from each colony, how they act on the frames, or if you just don't like the cut of their jib. If you just care about survival, then just keep a column for varroa counts.

4. Once you find a colony that has a disease, including high mites, treat that colony, and then requeen with a good queen. For a summary of naturally-derived treatment options for varroa see <https://pollinators.msu.edu/resources/beekeepers/managing-the-varroa-mite/>
5. Keep watching your colonies to make sure that varroa stays low, and you don't see disease. Make sure you have notes that indicate which colonies never needed treatment and stayed healthy. Those are the ones you want to make queens from.

Monitor, treat bees if there is a problem – requeen the colony with queens from your best hives that don't need treatment. All your bees stay healthy, and you don't lose colonies to preventable illness.

Here are some examples of what it looks like in practice.

Bill has 5 colonies in spring.

- He inspects each colony every 2-3 weeks to make sure they are queenright, have enough space, food and are free from disease. Most times that he inspects, he does a sugar roll for mites (less in the spring, more in the late summer when the risk is higher).
- In May, colonies 1- 4 look great, but colony 5 has chalkbrood.
 - He removes the queen from colony 5, and put her in a nuc as a spare/emergency,
 - He orders a hygienic queen from a local breeder to put in colony 5.
 - The chalk brood clears up.
 - Throughout the spring, he continues to monitor, but hardly see any mites in his sugar rolls.
- In June he see a few mites in some samples, but hive 1 never has any. He records all these counts in his notes.
- By July, Bill is starting to see more mites while monitoring, but always below the threshold of 3 mites/100 bees.
- In late July colonies 2 - 4 are above the treatment threshold.
 - He treats colonies 2 – 4,
 - Once the treatment is finished, Bill orders 3 queens for fall requeening of colonies 2 – 4.
- The rest of the season he keeps monitoring, and he doesn't get above threshold again, and doesn't see any other signs of disease.
- Bill ensures that everyone has enough food and bees, and buttons them up for winter.
- In spring, Bill had 5 out of 5 colonies live. He wants to start to raise his own queens, and looking through his notes, sees that hive 1 didn't need any treatment, and stayed healthy. He'll see how they do this year, and raise queens off of them to replace any queens from colonies that need them. Bill buys some queens from the same local breeder in the spring, using them to sell nucs from his colonies because he doesn't want to expand the apiary. He uses the money to take his favorite daughter fishing.

Beekeeper B has 5 colonies in spring.

- He inspects them occasionally, but mostly just leaves them alone.
- Colony 5 has chalkbrood, but doesn't do anything about it.
- He doesn't monitor, but notes that colonies 1- 4 are booming, and colony 5 seems slower.

- He closes them up for winter at the end of the season.
- His bees in colonies 2 – 4 succumb to varroa associated viruses, and colony 5 had too small of a cluster.
- In spring, Beekeeper B has one colony left, and he buys 3 more packages to replace his losses.
- He does this a few more years, and then quits beekeeping because it is too expensive, and he would rather spend the money on more fishing gear.

We all want to move to a place where we don't have to treat our bees, but we want to make sure it is because our bees don't need treatment, not because we are withholding care. Because we have the tools of varroa monitoring and requeening, we don't have a reason to let a colony die while we work towards better stock. Do right by your bees this year, by responsibly moving towards treatment free. To happy beekeepers and healthier bees!

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