

HIVE BEETLE REVIEW

BACKGROUND

Five or six years ago some of my retired buddies decided to get a few beehives. Knowing I had kept bees and raised queens, they came to me saying, 'Freeman our bees are dying! What's wrong?' I had been away from beekeeping a long time and had not kept up with what was happening to the bees. I had heard of Varroa mites but knew nothing about them. When we looked at their few surviving hives, I was astounded to see hundreds of little black bugs running everywhere. That was my introduction to hive beetles.

I set up two small hives in my backyard to study and printed out stacks of the latest research on the internet. For whatever reason, our area in SE Arkansas has a really heavy infestation of hive beetles. A lot of people in the beekeeping industry were working hard to come up with an effective way to control the beetles. I bought every trap and chemical available and tested them on my hives. All the traps and chemicals killed a few beetles, but not nearly enough to keep them from killing the hives. From studying what others had done and observing bees and beetle behavior in the hives, I developed the concepts and a rough prototype for an effective beetle trap. From there, my buddy, Clyde Hammil, worked out the construction design.

This article is not so much about traps or chemicals, but a summary of what I've learned about SHB the last 4 or 5 years. Some of the common recommendations for hive beetle control *do not* stop the beetles from sliming or killing your hives. Beekeepers need to know how beetles slime their hives and what conditions are most dangerous to their hives.

HIVE BEETLE LIFE CYCLE

There is a lot of variation in the length of time it takes beetle eggs to hatch and the larvae to pupate, depending upon the temperature and humidity. There is also variation in the size of beetles depending upon the amount and quality of food available to the larvae. Small hive beetles are not 'young' beetles; they are just small because they were not well fed.

1. Adult beetles mate
2. Female beetles lay eggs
3. Eggs hatch (one and a half days to six days)
4. Larvae crawl through the hive eating pollen and bee brood for protein (everything else, too!)
5. *The larvae defecate or 'poop' almost continuously as they eat their way through the combs.*
This is what destroys a hive.
6. The feces or 'poop' generates yeast that ferments the honey.
7. Gas bubbles from the fermentation swells the honey and it runs out of the combs. Honey can even run out the front of the hive! It smells bad and the combs are covered with 'slime'.
8. After about 10 days, the larvae mature, and then move to the front of the hive and drop to the ground.



Pic 1 – Honey running out



Pic 2: Combs that have been slimed.



Pic 3: Bottom board under slimed combs

9. They bore into the ground a few inches and pupate into adult beetles. If they cannot bore into the ground below the hive, researchers claim they can crawl over a 100 feet to find suitable ground.
10. Hive beetles have difficulty pupating when the ground temperature is less than 70⁰ F. That's why beetle populations usually don't explode until summer. High humidity and high ground temperature is why we have so many beetles in the south.

COMMON SUGGESTIONS

One of the first things you will hear is to keep your hives in full sun. That is absolutely true and will reduce the beetle population in the hive. It will *not* keep the beetles from killing or sliming your hive.

I hear quite a bit about using ground drenches, nematodes and beetle traps outside the hive. All these are helpful in reducing the beetle population *in the area*, but they do nothing to protect your hives. See #8 in the Life Cycle list. The beetle larvae do all the damage to the hive and they are mature before they drop to the ground. The larvae have already ruined the hive *before* they drop to the ground. Any treatment on the ground or outside the hive is too late. For real protection, we have to *kill the adult beetles in the hive* so they don't lay eggs or produce a significant number of larvae.

Another thing we often hear is that a strong hive will take care of the beetles. That is only half true. When I first started studying hive beetle control, I saw hives that seemed to be thriving even with hundreds (thousands?) of adult beetles. Adult beetles do not destroy a hive. Dr. Collison (retired, MS State) explained that the bees in a 'strong' hive will herd the beetles into groups and keep them in 'jail'. The beetles do not lay eggs or the eggs are carried out by the bees. Either way, only an occasional larva is produced. (See #2 & #3 in the beetle life cycle.) *Remember, it is the larvae that cause all the damage to our hives!!* No larvae – no significant damage.

Our standard perception of a 'strong' hive usually works OK with up to two deep hive bodies. (Usually, not always!) When we open a hive for inspection, the smoke, daylight and confusion allows the beetles to 'break out of jail' and run through the hive. A 'strong' colony has enough *bees per frame* to chase the beetles, herd them back into groups and keep them 'in jail'. For a colony to

be able to do this, ***bees must cover 80% of every frame!!*** Otherwise, the beetles will lay thousands of eggs, larvae will be produced, the hive will be ruined and the bees may even abscond.

Definite problems arise when we add honey supers. A queen can only produce enough brood for the bees to cover 80% of all the frames in two deep hive bodies and maybe one medium super. What if you have two or three supers? There's a good chance a strong colony will have the beetles 'in jail' and little or no damage will be done. What if you open the hive to check the supers and find the honey is not capped and you put the supers back on? ***Trouble!!***

HIVE BEETLE NIGHTMARE – This actually happened to me!

Sat AM:

- Checked top super – 70% capped
- Checked second super – 50% capped
- Saw a few beetles (Didn't realize most were in 'jail'!)
- Put the hive back together for the bees to finish capping the honey

UNKNOWN TO ME

- o Beetles made a 'jail break'
- o Beetles immediately laid eggs everywhere
- o Bees were unable to herd them back into groups

Sun PM:

- Beetle eggs began to hatch into larvae (Hot, humid weather allows quick hatching)
- Larvae began eating and 'pooping'

Wed PM:

- Yeast began to ferment the honey

Fri PM:

- Honey swelled and began to run out of the combs

Sat AM:

- Found wet honey on the top bars and throughout the hive. Many frames were slimed.
- I was sad, sick, confused and wanted to cry.

SOLUTION - REDUCE THE SIZE OF THE HIVE!

Female beetles can lay 300 or 400 eggs per day. It only takes a dozen or so females to produce enough larvae to ruin a hive. If you open a hive that has beetles, reduce the size of the hive so that each frame is 80% covered with bees. For a small hive, that may be one hive body. Strong hives can usually protect two deeps and maybe one medium. ***During the honey flow, there are too many frames for the bees to protect from hive beetles!*** To reduce the size of the hive, capped honey can be extracted, other frames can be brushed free of bees and put on hives that don't have beetles or the frames can be stored in a freezer until they can be returned to the hive.

This does not mean you should not open your hives during the honey flow. There are times when we see indications at the front of the hive that something is wrong inside. That may be dead bees or larvae on the ground, very low traffic at the entrance when it should be heavy. We have no choice

but to open the hive for inspection no matter how many supers are on it. ***If you have hive beetles, have a plan in mind as to how you will reduce the size of the hive before you open it.***

Some areas in the South have so many beetles that it's not possible to protect your hives without a good trap. (Of course, I use my own beetle trap.) Some of the inside hive traps recommend using an attractant. It seems to me that bee brood and pollen (protein) are the most effective attractants to beetles and larvae. Other than from occasional curiosity, I've never seen beetles enter a trap *except when the bees were chasing them*. Beetles do not like being harassed so they are attracted to weaker hives with gentle bees.

If you don't have a lot of beetles,

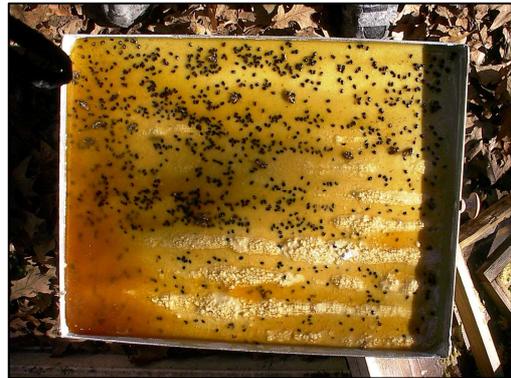
- * Keep your hives in full sun
- * Keep strong hives with aggressive bees
- * Plan to reduce the size of the hive if necessary

As I said earlier, we have a lot of beetles in our area so traps are necessary. Still, I keep my hives in the shade with very gentle bees. Since I study honeybees and queen rearing, most of my hives are less than strong. We are forced to leave traps on our hives year round.

When developing the trap, the two concepts that that showed the most promise were using a screened bottom board and an oil tray underneath the screen. I soon learned that the screen and the oil tray had to be full width and length of the hive body with no ledges anywhere for the beetles to run on. We made and installed the traps on my buddies' hives and they haven't lost a hive to beetles since.

I discovered the powdered sugar treatment works for hive beetles while dusting for Varroa mites. When we would go through a neglected hive, we always installed a beetle trap and sugar dusted to get an idea of the mite population. Every time we did that, we got an oil tray full of beetles.

Later, I discovered that my gentle bees don't always chase the beetles vigorously enough to run them out of the hive into the oil tray. If I see a few beetles, I sprinkle powdered sugar between all the frames. That irritates the bees (makes them aggressive) and they chase everything – me and the dog as well as beetles!



Pic 4 - Too much sugar, but it worked!

SUMMARY

1. To protect our hives, ***adult beetles must be killed inside the hive*** to prevent the production of larvae. Any treatment outside the hive helps reduce the area population of beetles.
2. For areas with heavy beetle infestations, the most effective trap design uses a full width and length screened bottom board with no ledges and a full length and width oil tray under the

screen. Note: If there are spaces around the oil tray, the beetles will lay eggs and raise larvae. This will produce more beetles than the tray is killing.

3. ***Be prepared to reduce the size of the hive*** anytime you open it so there are enough bees per frame to control the beetles.
4. If you have gentle bees or keep your hives in the shade, sugar dusting every five or six weeks will provoke the bees into chasing the beetle more aggressively.

These actions have eliminated hive beetle damage to our hives even though we have a lot of beetles.

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