Small hive beetles (SHB) are little black bugs about the size of a Lady Bug. Originating in South Africa, SHB were found in Florida in 1998. With the sale of package bees and migratory beekeeping, they quickly spread across the southeastern states. They have now been found in northern states and states west of the Mississippi. Beekeepers are finding that hive beetles can destroy a healthy hive more quickly than Varroa mites. A lot of people tell me they are ready to give up beekeeping because of the beetles in their area. This article explains how to control hive beetles and why it’s so difficult.

If a colony has hive beetles, you are likely to see them when you remove the top cover. These beetles were found in just one corner of the top cover!

This was certainly a heavy infestation of hive beetles! An older gentleman in our association had been unable to care for his hives. Several members decided to help put his bee yard back in
order. He had already lost 6 of his 10 hives. This hive had a lot of adults, but no larvae. I will present my understanding of why this happens and how a hive can survive with this many adult beetles present. Indeed, this hive was reasonably strong. (That’s a clue!)

ADULT BEETLES

- These are the black spots we see running around when we open the hive. Beetles vary in size. Larger beetles were reared under better conditions – more available food, warmer temperatures and higher soil moisture than the smaller ones. When adults first emerge, they have a brownish red color which changes to black as they get older.
- Adults are able to fly several miles looking for honey bee colonies. They enter bee hives around dusk.
- Adult beetles eat pollen, honey, bee brood and bee eggs. Pollen yeast attracts beetles. Adult beetles do little harm to a bee hive.
- As adult beetles mature, they hide in cracks and corners away from light.
- Given the opportunity, adult females will lay hundreds of eggs in irregular clumps. Beetle eggs look similar to bee eggs but are a bit smaller. The eggs hatch into larvae in 1 to 6 days.
- Adults live five or six months. They do not reproduce in cold weather. Instead, the adults seek warmth and food within the honey bee cluster. Astounding!

HIVE BEETLE LARVAE

- **IT IS THE SHB LARVAE THAT RUIN THE HONEY AND DESTROY THE HIVE.**
- SHB larvae are about half an inch long with a forked tail and three pair of legs under the front.
- The development time from egg to adult varies with food supply and weather conditions. The period important to beekeepers is the time from egg to larva. Eggs usually hatch in two or three days, but it may take six days. Under good conditions, eggs can hatch in little more than one day. Remember this because it is one of the conditions that allow hive beetles to kill a healthy hive in a week.
- SHB larvae eat honey, pollen and bee brood. They defecate as they feed through the combs causing the honey to ferment and ooze from the comb. Picture 5 shows wet honey that has leaked from the super above. The bees will not or cannot eat the fermented honey. As fermentation spreads and progresses, the bees are likely to abscond.
The SHB larvae mature in about 10 days, crawl out of the hive and drop to the ground. They bore a hole into the soil, and pupate for 3 or 4 weeks. The reddish, brown adults then emerge and look for a beehive to call home.

If you see only a few larvae crawling around, you may save the hive by immediately putting combs with beetle eggs or larvae in a freezer for 48 hours. Remove enough boxes and frames from the hive so that the bees are crowded and completely cover every comb remaining.

If you see clumps of larvae as in Picture 6, it will be difficult to save the hive. The bees are likely to leave and even robber bees don’t want the fermented honey. Picture 7 shows a comb of honey that has completely fermented. Picture 8 shows how wax moths quickly come in and finish destroying the combs.

WHAT TO DO??

My approach to hive beetle management is to kill the adults inside the hive to prevent the production of beetle larvae. Ground treatments cannot save our current hives. As we have seen, by the time the larvae reach the ground, the damage is already done. Ground treatments could possibly help as part of a long term strategy to reduce the overall population of beetles.
Another part of my approach is to use the least amount of the least toxic chemicals possible in my hives. Some people use roach bait and other poisons inside their hives to control beetles. I just can’t bring myself to eat honey that’s been sitting next to rat poison. Besides, it’s illegal.

To kill beetles inside the hive without poisons, I developed a screened bottom board trap with an oil tray underneath (www.freemanbeetletrap.com). It’s designed so the screen covers the full length and width of the inside of a hive body. This eliminates any ledge between the hive body wall, the wire screen and the oil tray underneath. Beetles will use such ledges to make a sharp 90° turn and escape bees that are chasing them. Having a full width screen and oil tray AND eliminating any ledges is the key to an effective beetle trap.

Picture 9 is an actual photo taken in mid-summer of the 24 hour beetle kill on a heavily infested hive. All the little black dots are dead beetles.

**SPRING PROCEDURE FOR BEETLE CONTROL**
Since beetles do not reproduce in cold weather, install an oil trap before the winter cluster breaks up. Normal swarm control inspections on warm days will scatter the bees and beetles enough for the bees to chase the beetles into the oil tray. With any luck, you can kill all the beetles before any supers are added for swarm control or nectar storage.

As the weather warms, beetles from the surrounding area are likely to fly into the hive. It is normal to see a few beetles in the oil tray on your weekly inspections.

**CAUTION!!**
Finding beetles on the top cover before supers are added is an indication that the bees are not aggressive enough toward the beetles. If practical, re-queen with a hygienic queen. Hygienic workers tend to actively chase the beetles AND to work harder at housekeeping – such as removing beetle eggs and larvae.

**COMMON PRACTICES FOR HIVE BEETLE CONTROL**
- Install oil traps before the bee cluster breaks up in the spring
- Maintain strong hives. Unite weak colonies. For the purpose of beetle control, a strong hive is defined as one that has enough bees to fully cover all the frames in the hive. A nuc is a strong hive if all the frames are covered with bees.
- Keep hives in full sun
- Keep hives, bee yard and honey house clean
- Extract honey as soon as it’s removed from the hive. Beetles can ruin entire stacks of supers sitting in a honey house waiting to be extracted.
Moving hives to a different location may disrupt the beetle population cycle
Never place infested equipment on hives that do not have beetles
Monitor hives for the presence of hive beetles
Monitor colonies for hygienic behavior. If the bees are not actively chasing the beetles, replace the queen.
Limit hive inspections when extra supers are on the hive.
If beetle larvae are found, remove enough supers and frames to crowd the bees on the remaining frames.
Freezing the combs kills both beetle and wax moth eggs and larvae. This is not practical for more than a few hives.

**Honey Bee and Beetle Behavior**

Adult beetles avoid light and hide from the bees in cracks and crevices. Honey bees chase beetles. They cannot kill the beetles because of their hard shell. The bees literally herd the beetles into groups and do not let them escape - see Picture 10. Corners, cracks around the ends of the frames and the top cover are favorite places for the bees to keep beetles herded together. The bees act as ‘prison guards’. As long as the bees keep the beetles grouped together, very few larvae are produced. This is why some hives may have hundreds of adult beetles and still not be seriously damaged by them.

A common observation has been that beetles often lay a lot of eggs after a hive inspection. Now we know why. During a hive inspection, boxes are separated, frames are removed and in the confusion, *the beetles get out of ‘prison’*. When we put the hive back together, if there are not enough bees to fully cover all the combs and quickly herd the beetles back into groups, the beetles will have an opportunity to lay hundreds, even thousands of eggs. If those eggs are allowed to hatch into larvae, the hive will likely be destroyed.

**WHAT THIS MEANS FOR THE HONEY FLOW**

When do we normally have more combs on a hive than the bees can cover? During the honey flow, of course. By definition, the honey flow means more frames and supers. Bee population seldom exceeds 80,000 – enough to fully cover about 20 deep combs. My experience indicates that a strong hive can patrol two deep brood boxes and one medium super. Inspections are necessary, but if the hive has *more than one super, we have to be prepared to take supers off the hive if we see beetles on the top cover or beetle larvae in the hive*. A dozen or two beetles can kill a hive in a week!
If only adult beetles are present, it may be enough to just remove all the capped honey and any empty frames. Unless the bees are crowded, there is still a risk of losing the honey crop or even the hive.

*If beetle larvae are present, the hive is in great danger!* I would remove enough supers to crowd the bees on the remaining frames. Immediately extract any capped honey before the larvae ruin it. Do not put the infected supers on hives that do not have beetles. If freezer space is not available for the uncapped honey, place the supers in full sun side by side – not stacked. The sunlight will help keep beetles out. Robbing will begin rather quickly, but that’s better than completely losing the hive.

Here’s what has happened to many beekeepers in mid-summer – myself included.

- The hive population decreases a bit because the honey flow has ended and brood rearing has slowed down. The bees can fully cover only 15 or 16 frames, but *that’s hard to detect*.
- The hive has two deep brood boxes and two or three medium honey supers with 50% uncapped honey.
- The bees have been able to keep the beetles herded into groups and have not allowed them to mate or produce larvae.
- The beekeeper decides to look at the honey supers to see if the bees are making any progress on capping the honey.
- Three beetles are seen on the top cover and killed. The top super is removed and set on the cover. Removing a few frames shows no progress on capping the honey.
- Removing a few frames from the second super shows no progress on honey capping.
- The hive is put back together and the beekeeper leaves.
- In the confusion of the inspection, the beetles get away from the guard bees. Because we did not realize there were more combs than the bees could patrol, the beetles are able to lay a few thousand eggs.
- In summer time conditions, the beetle eggs can hatch into deadly larvae in less than two days.
- In another two days, the larvae mature and grow enough to scatter across the combs eating honey and bee brood while defecating almost continuously.
- Another two days and the honey begins to ferment and leak from the combs. See Picture 5.
- The next day – *one week after the inspection* – the beekeeper checks the hive again and finds disaster. With luck, the bees can be saved, but the honey crop is probably lost and a lot of clean-up will be required on the equipment.

I hear this sad story every week from people who have had hives destroyed by beetle larvae. Thankfully, this doesn’t happen every time, but hives with non-hygienic bees or in heavily infested areas are at great risk. For a completely healthy hive to be destroyed in one week is mind-boggling for a beekeeper that doesn’t understand what happened and why.
SUMMARY

- Kill adult beetles early in the spring when the bee cluster begins to break up
- Install hygienic queens
- *It is the beetle larvae that will destroy your hives.*
- Keep an oil trap on the bottom of the hive to catch beetles as they fly into the hive
- As much as possible, do not put more frames and supers on the hive than the bees can fully cover or at least actively patrol. This is usually not possible during swarm control season or during the honey flow. Be prepared to crowd the bees if necessary. *We need a high concentration of bees compared to the number of combs available.*
- Left undisturbed, a strong hive of bees will *usually* keep the beetles herded into groups and not allow them to produce larvae. Hive inspections disrupt the guard bees and allow the hive beetles to escape. A strong hive with hygienic workers may be able to regain control in a hive with two deeps and two medium boxes – but don’t count on it! Watch for beetles and larvae.
- Limit hive inspections during the honey flow, but remember that inspections are necessary to properly manage your hives. Make your plans *before* you open the hive. Do you have freezer space? Will you extract capped honey?

- **ALWAYS WATCH FOR BEETLES!!!**

HIVE TOP TRAP

We have developed a prototype for an oil trap that fits on top of the hive that does not spill oil onto the bees. It catches beetles in the top!! We still have to run tests and trials to be sure it works. This will NOT replace the trap on the bottom. My hope is that it will protect the honey supers. Visit our website for updates – [www.freemanbeetletrap.com](http://www.freemanbeetletrap.com). Call me at 870-853-2412 or send an e-mail to jfreeman1944@yahoo.com and we’ll talk about honey bees!

This first one looks a little ‘ratty’, but it’s a prototype and it killed beetles in top of the hive!