

## SMALL HIVE BEETLE

### FORMIC ACID AS A REPELLANT FOR THE SMALL HIVE BEETLE:

#### HISTORY OF

#### OBSERVATION AND EXPERIENCES FROM RESEARCH IN FLORIDA:

FORMIC ACID DOES NOT KILL THE BEETLE, however, during regular treatments with MiteGone, it was observed that when acid was present in the hive, the beetle tended to leave the hive and then return after the acid was gone.

In one test where we put a pad on the bottom and there was debris on the bottom of the lifting pad about an 1/8", we found 50 dead beetles under the pad after six weeks. We try this trap several times but did not find any dead beetle.

#### CNCLUSION, THEORY AND KEY TO SUCCESS:

The theory behind this observation is that the acid repels the beetle either because the acid smells so bad so that the beetle leaves or because the acid somehow distorts the pheromones that attract the beetles to the hive especially to queen-less hives or hives in distress.

- Harsh application of formic acid will cause distress and attract beetles to the hives.
- MiteGone uses a low dose continuous release method which does not disturb hives but repels the beetle.

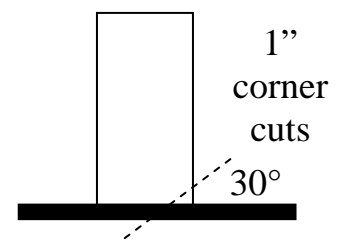
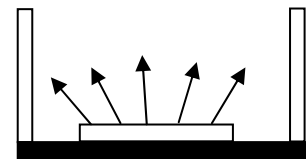
#### 2007 TEST RESULTS:

(see Scientific Evidence Fall 2007)

- Standard MiteGone treatment for mites: three half-pads in the top box will not disturb hives. It will repel the beetle for five to six weeks.

REPELLENT METHODS: We know that one MiteGone pad will hold 120-130 grams of acid.

- Laying the pad flat on the bottom board or placed in a tray under a screen bottom board will emit 2 grams of acid per day through the perforations. It will last 2-3 months.
- A pad placed vertically between the comb and the wall of the hive body standing on the bottom board with a one inch corner cut or mid notch will emit 1.5-2 grams a day and last up to 3 months.



## **Florida Beetle Experience:**

*Personal experiences from our research years in Florida with fungus and acid, and recommendations from Florida's State Apiarist Laurence Cuts and research inspector Dave Westerveld*

Before you try to fight the beetle you first need to know what it looks like, where it lives, and how it regenerates. The only real way to fight the beetle is to interrupt the beetle's life cycle and keep your colonies strong and healthy. A healthy hive can, on its own, successfully deal with the beetle. The beetle tends to attack colonies in distress and Queen-less colonies first.

The best conditions for the beetle larvae, pupa and adult beetle emerging stage is 70° F sandy moist soil, ideally to the depth of 6 inches; however, 2 inches of rocky soil or the debris of your bottom board will do as long as the temperature and humidity is good. Therefore, it is imperative to keep your hives clean.

I have to check if 1996 is the date of arrival of the beetle into Florida but I'm sure I saw a few beetles and had some in a vial then I saw the damage the beetle could cause to honey bee colonies and to honey houses.

My first real encounter in my borrowed hives was in 1998. I had twelve - six frame colonies established for a fungus test, set up behind an unused honey house in central Florida. They were all strong hives but by the end of the eight weeks, half of the hives were reduced to nothing. Two hives became queen less and died, one queen right colony with 20-30 bees had so many beetles that they ate the larva as fast as the queen could lay eggs. The reason for beetle destruction was that the ground was perfect for the beetle. The soil was moist, deep and sandy. Any time I picked up pine needles for my smoker dozens of beetles emerged from the ground.

I believe that 1998 was the last of the really bad years for Florida. During the next two years, Florida suffered drought and forest fire and the beetle almost disappeared. Therefore, if you have a dry and hot summer or cold and rocky soil, the battle against the beetle is half won. Unfortunately for Florida, the rain returned the following year and the beetle was back.

## **SO WHAT CAN BE DONE?**

**Chemical Control:** Using a strip of coumaphos under a corrugated piece of plastic worked very well against the beetle; unfortunately, it can cause contamination of the hive and eventually the beetle will become resistant to it.

**Use acid repellent installations as described on page 1.**

**Keep all other diseases under control:** Current recommendations are to keep the Varroa and other diseases under control and then the beetle will not become a problem. Strong healthy hives can deal with it themselves.

**Pheromones:** The beetle is attracted to weak queen-less hives by the pheromones the bees generate. The researchers at the University of Gainesville developed a trap for the beetle and used pheromones as the bait. Unfortunately, they do not have a manufacturer yet for this treatment.

**Guard Star:** Guard Star is a poisonous chemical that kills the beetle in all stages of development in the ground. In areas known to have beetles, especially if there were bees in the area before, it should be sprinkled in big drops rather than sprayed and applied before the bees are brought into a yard. Use it in permanent yards throughout the summer reproduction period. Each treatment should last 6-12 weeks; exact time is not known.

**Migratory Beekeeping:** Experience has shown that migratory beekeepers have very few problems with beetles as they leave them behind for local and stationary beekeepers to deal with.

#### **Honey House Practices:**

- Do not keep hives near your honey house
- Have only one or two queen less weak colonies on site equipped with the west beetle trap available from Dadant. It emits pheromones that attract beetles. If you see any trapped beetles it is time to spray GUARD STAR again.
- When pulling honey, do not bring any brood with it. Extract immediately and melt your cappings the same day
- Storing brood, dead or alive, capping, including dirty ground droppings is an invitation for the beetle. It will reproduce and lay gets in this debris. I have seen barrels of capping just boiling with beetle larva.

#### **In 2008, the Accepted Facts were:**

- Strong, vigorous colonies will keep SHB out – our tests confirm.
- The beetle will survive a winter in Minnesota.
- The beetle will finish its life cycle in the debris on the bottom board.
- The beetle is not a Deep South problem only anymore, but it can be controlled everywhere.

#### **Conclusion and Recommendations:**

- Don't let the beetle reproduce and kill you.
- Keep your honey house clean. Store unused brood and honey supers in dry and cold beetle tight or fumigated storage areas.
- Extract and render your wax the same day your bring it in.

- Keep bees in sunny, dry yards. Beetles love the shade damp places.
- Drench the soil around your honey house and bee yards with Guard Star.
- Install a few queen- less colonies with traps to use as test colonies so you know if you have, or do not have the beetle and how many beetles are you faced with.
- Keep your hives strong, healthy and clean.
- Keep your Varroa under control.
- Use formic acid to treat Varroa. As an integrated pest management system, it will also kill the tracheal mite, reduce Nosema, eliminate chalk brood, make your hive more hygienic, and by distorting/masking pheromones repel and deter the beetle from your hives.