

RECOMMENDATIONS FOR THE CONTROL OF HONEYBEE TRACHEAL MITES

The honeybee tracheal mite (*Acarapis woodi*) is now widely spread in Vermont. This mite, first found in the U.S. in 1984, has caused the loss and weakening of thousands of colonies, especially in northern areas.

This microscopic mite lives in the breathing tubes of the honeybee, where it punches a hole and sucks the hemolymph (blood). The female mite lives about 28 days in which time she will infest one bee with up to 14 eggs. The eggs hatch and the mites mature to the adult stage in approximately 14 days. The new adults then crawl out of the tubes and transfer onto other bees. The winter cluster provides the perfect conditions for the mites to crawl from bee to bee. The mites spread from hive to hive by the beekeeper transferring bees from hive to hive or by bringing in bees, queens, package bees, nucs or swarms from mite-infested areas. Robbing bees and wandering drones may also spread the mite.

If the mites are able to reproduce faster than the bees, the colony will weaken and die. Infested package bees, splits, or hives under stress from a poor queen, disease, or even bad weather, may not be able to keep up with a heavy infestation and are more likely to succumb than a strong, well-fed, healthy colony.

No unique visual symptoms have been documented as of yet, but in recent years, many beekeepers were finding winter-killed colonies still full of honey and very few to no bees left in the hive. Detecting this mite at low population levels is very difficult and unreliable. While there are probably isolated areas in the state that are mite-free, it is advisable to assume that most areas are infested, to some degree.

One material, which is not 100% effective, and may do more harm than good if not properly used, is Menthol. Menthol is a food product that is pharmaceutically pure and used to flavor foods, in over the counter medications, cosmetics, personal care aids and prescription drugs. Menthol exists in a crystalline state and starts to evaporate at approximately 70 degrees F and will melt to a liquid at about 102-105 degrees F. The resulting vapors, which start to come off the crystals at 70 degrees F, are heavier than air and tend to settle down into the hive. The best evaporation rate for menthol occurs at temperatures between 80 and 85 degrees F.

Follow the label directions. Use 1.8 ounces (50 grams) which is a heaping one third cup of menthol pellets per treatment. Put the menthol in a stapled envelope made out of window screen approximately 7-inch square, or use a commercial prepackaged packet. The colony of bees should be in one deep hive body or two deep hive bodies (or three shallow bodies), at most. You are trying to fill this chamber with a gas (the menthol vapor) and the smaller you can make the volume, the more effective the treatment will be. Place the packet to the rear of the top box over the top bars of the frames. The menthol will melt if it gets hot, running down the wax, killing all the brood in its path. An aluminum tray to hold the menthol will prevent any brood kill that might result if there is a melt down.

The temperature must get above 60 degrees F for the menthol to work. In most cases, the entrance should be reduced, and all upper entrance holes, and cracks should be plugged. If the temperatures get into the 80's or if the bees are only in one hive body, the menthol should be placed at the back of the bottom board. If the bees run out and stay clustered on the front of the hive, open up the holes to get some air into the hive, or place boards on the hive to provide shade. The treatment may have to be discontinued if the bees do not move back in. The bees must be breathing menthol vapors for a minimum of 15 days; however, it can be left on for a period of 20-25 days with no ill effects. After that time, the packet can be retrieved and any menthol that is left in the packet can be saved and used again for further treatments as long as the total amount of menthol used in this further treatment is 50 grams or 1.8 ounces. Not all the menthol will evaporate in this 20-25 day period. The bees will tend to propolize the packet; this is a natural occurrence. Care must be taken when retrieving the packets after the treatment period so as not to tear the packet, allowing the menthol to spill down into the hive and onto the developing brood. After the menthol is retrieved, it can be stored in an air-tight container and stored at less than 70 degrees F. Storing in a freezer will work well, as long as the menthol is well wrapped and sealed.

Weak colonies, package bees, and nucs should get a treatment in the spring and the fall. Ideally, all colonies will get one treatment in April and removed before the honey supers are added, and another after the honey is taken off. During the spring there is a natural decline in the mites as the older infested bee population is dying off and the young uninfested bee population increases. In the fall and winter the mites can increase dramatically as the bees stop flying and form a cluster. Therefore, it is most important to at least make a late August treatment before the winter bees are being raised. Beekeepers that usually take honey off after the middle of September will have to change their schedule in order to get the treatment on in time. Menthol can be purchased from most bee supply dealers.

Beekeepers in Vermont have had mixed results with Menthol. This is probably due to the often changeable weather conditions found in the spring and fall, which greatly effects the rate at which the menthol vaporizes.

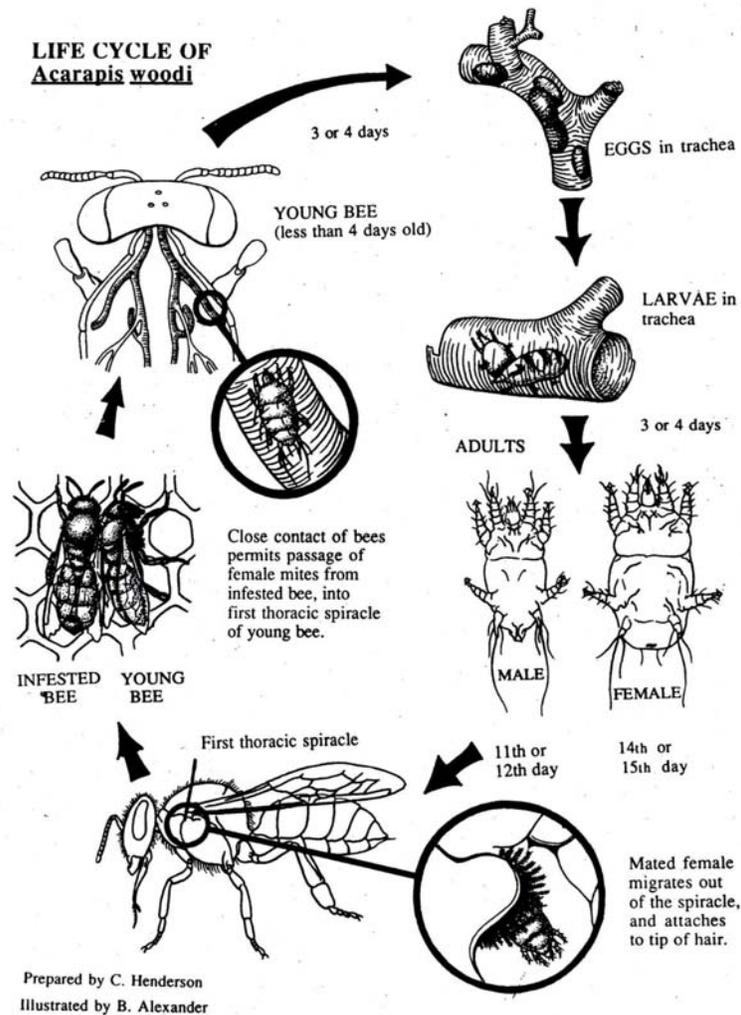
Another promising control measure is the use of vegetable oil patties. These patties are made by thoroughly mixing 2 parts granulated sugar and one part vegetable shortening (Crisco). Softening the shortening in a microwave oven will facilitate mixing. Another formula is 1 part vegetable oil (liquid) to 3 parts granulated (or powdered) sugar. Once mixed, divide into ½ pound balls, place between two pieces of wax paper, and press to form a flat, pancake-like patty. The patty can now be placed on the top bars of the upper box, or between boxes, depending upon where there are the most bees. The idea is to have the bees contact the patty material, thereby spreading a thin coating of vegetable oil on themselves and other bees. It appears that this thin film of oil prevents the mites from "recognizing" their host, especially newly emerged bees. These patties can last as long as 5 months in the hive, thereby providing a constant control measure against the mites. Late fall and early spring treatments appear to work well.

There are several new materials for varroa mite control that also appear to offer some tracheal mite control as well. They are **Apiguard**, **ApiLife VAR** and **Mite-Away II**. Check with the major bee equipment supply companies for details and prices. Watch the bee journals for news on these products and others in development.

Another strategy is to use tracheal mite "resistant" bees. After the initial "wave" of infestation passed through the country, queen breeders selected colonies that appeared to have survived without treatment. From these colonies, queens were raised and tested for several more years. There are now several queen producers that offer "tracheal mite resistant" bees for sale. The most popular strain is the "Buckfast" bee. Some commercial

operations in Vermont have reported good results with little or no control for tracheal mites, by using "Buckfast" bees. Check the bee journals for producers of "tracheal mite resistant" stock.

Probably the most reliable method of controlling tracheal mites will be to use a combination of the above mentioned methods. Each beekeeper will have to find the best method for their particular management system and local. Research is ongoing to find additional control methods, and hopefully we will see these results in the not too distant future.



This leaflet is for informational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Vermont Agency of Agriculture is implied. Recommendations valid as of publication date. The VT Agency of Agriculture can help with many questions about beekeeping. Contact: Steve Parise, Apiculturist, at 802-828-2431, E-mail: steve@agr.state.vt.us, www.vermontagriculture.com. (Rev 03/06)