

Colony Treatment for Bee Disease and Mite Control



Bee disease is an unfortunate part of beekeeping that all beekeepers must deal with. The good news is that with some proven precautionary steps, your colonies can be protected from disease. The main diseases you should be concerned with are the following:

American & European Foulbrood

Varroa Mites

Tracheal Mites

Nosema Disease

Each disease has a specific treatment and treatment time. When treating your colony with medicine, always follow the manufacturer's directions on doses and times to avoid any problems.

Below is an article and guide on treating hives written by James E. Tew. This article explains all of the diseases, symptoms and treatments so you can not only spot the disease when you check your hive, but also know what to do.

TREATING HIVES

by James E. Tew

Honey bees certainly have their problems with pests and diseases. Honey bees hoard large amounts of concentrated carbohydrates and protein, they live in cramped, moist, quarters and best of all, they live in perpetuity. It's a great environment for a pest or pathogen.

If bees lost every battle with their specialized pests there would long since have been no bees. So obviously they do have some defensive measures that work reasonably well. Though predaceous mites have taken a great toll, honey bees are still in relative abundance. But judicious help from the beekeeper goes a long way in helping bees in their battles against some of these diseases and pests.

Broadly speaking, honey bees are affected by parasitic mites, bacterial diseases, fungal diseases, viruses, protozoa, and a host of predators such as wax moths and bears. Other than possibly requeening, you can discard from the list viruses and fungal diseases as problems with which the beekeeper can do little to assist. There are simply no adequate controls for these maladies within beekeeping at this time. That leaves bacteria, protozoa, mites, and other pests as areas appropriate for beekeeper assistance. Dealing with pests such as bears, skunks, toads, or birds, requires specific control measures that are outside the scope of this article. Though all threats to the colony's good health should be addressed, the most common problems, American Foulbrood and predaceous mites (Varroa and Tracheal mites) should be given the most consideration.

Treating bee colonies for various pathogenic problems can be, at once, both helpful and potentially hurtful to the hive population or possibly to the future honey crop. There are many variables that must be considered when developing broad scientific recommendations for disease and pest control and those considerations must be reviewed over a period of years and under different environmental conditions. It's not a quick procedure. In most cases, for statistical analysis to be relevant, untreated hives must actually be allowed to die, if necessary, to conclusively show that a treatment is effective within the treated population. Beekeepers have been warned time and again that looking for serendipitous treatments that are poorly researched is a risky procedure for the beekeeper, the bees, and the honey crop. Even if recommended and approved treatments seem to be increasingly ineffective, a beekeeper would be wise to stick with tested and documented control procedures.

American Foulbrood

Description and Spread The disease called American Foulbrood, or AFB, is caused by the bacterium *Bacillus larvae*. (There is a new name for this disease. Since it is not yet widely accepted we will use the more familiar name.) AFB has plagued both bees and beekeepers from the earliest days of U.S. beekeeping. *Bacillus larvae* is a spore-forming bacterium. Spores are extremely hardy and can survive in dormancy for thirty-five years or more. Spores are easily transported by either infested bees or infected equipment. Beekeepers moving contaminated equipment are, by far, the

greatest source of AFB spread.

Symptoms Visual signs of AFB begin to show up in the hive after young, susceptible larvae eat the spores that have been mixed in the brood food fed by nurse bees. If left untreated, infection spreads rapidly until the colony population is so weakened it dies during cold months by the ravages of the wax moth, or just by sheer lack of population, since all larvae die.

Symptoms of American Foulbrood

Brown, decaying prepupa or early pupal stage

Spotty brood patterns

Punctured, ragged often sunken cappings

Musty decay odor (somewhat like sour, wet boots)

Dead brood with the tongue sticking up from the carcass

Mucilaginous consistency of some pupae that will sting out about an inch when punctured

Dried pupal skins, in the form of a brittle scale, stick to the bottom sides of infected cells (difficult to see)

Treatment Burning infected equipment and destroying infected bees is the only way to completely eradicate AFB.

Though effective, total colony destruction is a radical recommendation. Presently, oxytetracycline hydrochloride (Terramycin®) is the only approved antibiotic for controlling the growth and development of *Bacillus* larvae within the gut of the larvae. It does NOT kill spores, therefore the disease may re-express itself shortly after antibiotic applications are stopped.

Treatment Doses Stop all antibiotic treatments six weeks before the nectar flow starts. It is important to confirm dose recommendations with your state apiarist. Dose rates and recommendations may vary from state to state.

Terramycin/Powdered Sugar Mixture: Mix one 6.4oz package of TM25 with 1.5-2.0 pounds of powdered sugar. Place this mixture on the tops of frames, along the outer edges of the brood frames. Usually, three dustings at 4-5 day intervals is considered to be one treatment per hive. You can retreat when all this dust has been consumed. Stop all treatments six weeks before surplus honey supers are added.

Antibiotic Extender Patty: Mix 1/3 pound of vegetable shortening (e.g. Crisco) with 2/3 pound granulated sugar. Add two tablespoons of TM25 to the mixture. Press into two half-pound patties and place on colony, on the top bars of the brood frames. Place between brood chambers if using two. Remove at least six weeks before adding surplus honey supers.

When to Treat Early Spring before supers are put on. Actually, treatments can occur any time that surplus honey is not being produced. So, if you discover an outbreak in Summer or Fall, remove honey super and either dust or use a patty.

Losing a colony is probably more expensive than losing a portion of your honey crop.

European Foulbrood

Description and Spread Essentially, European Foulbrood (EFB) is the little brother of American Foulbrood. Another bacterium, *Mellissococcus pluton*, is credited with causing the symptoms associated with EFB - though other bacteria probably play a role. The major difference between the two brood diseases is that EFB does NOT produce spores; therefore, its persistence and effect on honey bees is greatly reduced when compared to AFB. Though described as early as 1771, not very much is known about EFB. No doubt it is spread by both drifting bees and beekeepers. EFB attacks colonies in mid to late spring and has been occasionally called a stress disease. EFB is not normally considered to be serious, but since it resembles AFB, it should be treated with care.

Symptoms Infected larvae usually die in the coiled larval "C" shape while larvae infected with AFB die stretched out.

Initially larvae are yellow before changing to brown and eventually changing to black.

Symptoms Of European Foulbrood

Spotty brood pattern

Twisted yellow-colored larvae

Sour, somewhat putrefied odor

Larvae dries to a rubbery scale

Watery body fluids

Larvae dying in the extended position

Mucilaginous stringiness usually less than one inch

Treatment and Treatment Doses Treatment is the same as for AFB and on the same time frame, generally in late Winter or early Spring

Varroa Mites

Description and Spread The arrival and establishment of Varroa mites (*Varroa jacobsoni*) in North America is now historical fact. Within the continental U.S., there are no areas considered to be Varroa mite-free. Originally, the mite was a parasite on *Apis cerana*, the Asian honey bee. By inadvertent beekeeper spread, the mite is presently found throughout the world except for New Zealand, Australia, and Hawaii. Its first detection in the U.S. was in 1987. Varroa is a large tortoise-shaped mite that is colored rusty-red. The mite is a bit less than 1/16" across and is easily visible with the unaided eye.

Symptoms Initially the presence of Varroa is unnoticeable in the hive. Several months to several years may be required for mite populations to build up enough for them to be easily seen. By that time, both the adult and brood population is heavily infested and colony's death can occur rapidly.

Symptoms of a Varroa Infestation Colonies dying with abundant honey stores is a strong clue that Varroa mites were present in high numbers. Wingless or deformed bees that are either dead or maimed are also symptomatic of Varroa infestations. In such cases, mites can usually be found under the cappings enclosing larvae. Beekeepers within the continental U.S. should assume that Varroa mites are present within their colonies. Approved treatments should be initiated on a regular basis.

Treatment Use one Apistan strip (Active Ingredient - fluvalinate) for each five combs of bees or less in each brood chamber. Hang strips within two combs of the edge of the bee cluster (not necessarily the edge of the super). Apistan strips must be in contact with brood nest bees at all times. For best results, use strips when daytime temperatures are at least 50°F. Presently, there are no other legal treatment materials for Varroa at this time.

When to Treat Treat in the spring before honey supers are put on and in the fall after supers have been taken off. Leave strips in place 42-56 days (6-8 weeks). However, you should be monitoring your colonies throughout the season. If, during the Summer you find, using an ether roll, more than five mites, you should seriously consider sacrificing your remaining honey crop and treat immediately. Again, losing a colony is more expensive than losing a partial honey crop.

Tracheal Mites

Description and Spread Tracheal mites (*Acarapis woodi*) are microscopic and live within the honey bee's respiratory system (predominately the prothoracic spiracle). They were first described in England in 1919 and were not found in the U.S. until 1985. Research and development of information concerning the effects of Tracheal mites have been given secondary status while control stratagems for Varroa have been developed. There are differing opinions as to how much of a threat tracheal mites are to U.S. beekeepers - especially for those who keep bees in warm climates.

Symptoms Infested colonies have dwindling populations, do not cluster well, and often die in the winter (February and March), frequently leaving behind large amounts of honey. Infested adults may act irritated or disoriented. Weak adults may be found crawling aimlessly near the hive entrance. Microscopic examination of the bees' respiratory system is required to conclusively show the presence of the tracheal mite. Authorities disagree as to the seriousness of the effects of tracheal mites on honey bees. Simply finding tracheal mites within the dissected bee does not always mean that disease symptoms will be expressed within the colony.

Treatment Two materials, vegetable oil patties (Grease Patties) and menthol, are useful in suppressing tracheal mite populations.

(1) Vegetable shortening patties. Mix solid vegetable and sugar in a 1:2 ratio. The patty should be about the size of a hamburger patty (about 1/4 pound), and placed as close to the center of the brood nest as possible.

When to Treat with Grease Patties Treatment with grease patties can be continuous. (If Terramycin is added to control American foulbrood, patties should be taken off six weeks before surplus honey production.)

(2) Menthol Treatments. A 1.8 oz (50 grams) packet of menthol crystals in a porous bag (usually supplied) per two story colony, is put on in the spring or secondarily in the fall. Leave the packet on for 14-28 days with the entrance reduced. If it is above 80°F, put the packet on the bottom board. Below 80°F, place the packet on the top of the brood nest. Menthol vaporization can be erratic and may require fine-tuning in different areas.

Nosema Disease

Description and Spread Nosema is caused by the protozoan, *Nosema apis*. Nosema infections have been compared to high-blood pressure in humans. It may be within a colony's population for years but may not express any symptoms. Cool, wet spring seasons seem to aggravate the development of latent Nosema. Beekeeper manipulations and robbing or drifting bees are the primary means of the spread of Nosema. *Nosema apis* is a spore-forming protozoan.

Symptoms Extreme fecal markings on the hive's exterior is a common indicator of Nosema. However all dysentery infections are not due to Nosema. Bees, with swollen abdomens and unhooked wings, crawling in front of a fecal-spotted hive are general indicators of Nosema - though those symptoms could also indicate other non-related problems. Internal examination of the infected bee would be required to tell if Nosema is the causative agent.

Treatment The antibiotic Fumadil-B (fumagillin) gives excellent control of Nosema. Fumadil-B should be mixed in cool sugar syrup at label rates and fed as early in the Spring, and again as late in the Fall as possible.

Unfortunately, there are other diseases that commonly occur, for which there is no control. Currently, no chemical controls are available for the viruses causing sacbrood and bee paralysis. Also, the common fungal disease, chalkbrood, has no chemical control.

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