

## American Foulbrood Disease (AFB)



Central Ohio Beekeeper's Assn.

**"Rope test" showing AFB symptoms**

**Cause:** *Paenibacillus larvae*, a spore-forming bacterium.

**Effect:** American foulbrood (AFB) is one of the most widespread and the most destructive of the honey bee brood diseases. At first, the population of an infected colony is not noticeably decreased and only a few dead larvae or pupae may be present. The disease may develop slowly, weakening the colony over time or it may advance rapidly and seriously weaken or kill the colony quickly. AFB almost always results in death of the colony.

**Symptoms:** Affected cells look moist and dark in color. The dying larva inside shrinks and the normal convex capping becomes concave. Worker bees may chew holes in this sunken capping and eventually remove it altogether. The brood pattern on an infected frame will look spotty because of the mixture of diseased and healthy brood cells. Cells with dead larva can be punctured with a matchstick, piece of straw, etc. and the contents drawn out into a brown thread or rope. If this "rope test" shows brown cell contents that stretch out to one inch before breaking, this is very suggestive of AFB. The ropy cell contents may also have a rotten smell.

**Transmission:** The bacterium that causes AFB forms long-lived spores (a resting stage for the bacterium). These spores are fed to young larvae by the nurse bees, where they grow and multiply in the gut, causing the larva to die soon after it has been sealed in its cell. When the larva dies, new spores have already formed. Spores are spread throughout the hive by bees cleaning out these infected cells. The honey in an infected colony can also become contaminated with spores and can be a source of infection for any bee that eats it. For example, as a colony becomes weak, it cannot defend itself from attacks by robber bees from strong nearby colonies; these robbers take contaminated honey back to their own colony, continuing the cycle of infection. The beekeeper also may inadvertently spread the disease by moving contaminated comb, honey, and equipment. Drifting or swarming bees from an infected colony will also spread the disease.

**Control:** AFB is difficult to control because the bacterium that causes the disease can remain alive in its spore form for more than 50 years! This spore is resistant to antibiotics, heat, and disinfectants—all the things normally used to kill bacteria. Although the antibiotic oxytetracycline (trade name Terramycin) may be used to prevent AFB, **the only way to control an existing AFB infection is to burn affected hives.** Frames and comb should be completely destroyed, although wood more than 3/4 inch thick may be scorched and reused. It is illegal to import used beekeeping equipment into Hawai'i or to transport it inter-island without an inspection and permit from HDOA.



**Dark, sunken, perforated caps may be a sign of AFB.**



**Spotty brood pattern on a hive frame can be a symptom of many diseases, including AFB.**