



IOWA BEEKEEPING INFORMATION
Iowa Dept of Agriculture & Land Stewardship
Office of the State Apiarist
Iowa Laboratory Facility
2230 South Ankeny Blvd.
Ankeny, IA 50023

American Foulbrood Disease (AFB)

Cause

Paenibacillus larvae: a microscopic, rod-shaped, spore-forming bacterium

Effect

American foulbrood is the most widespread and destructive of the brood diseases.

At first, the strength of an infected colony is not noticeably affected and only a few dead larvae or pupae may be present. The disease may not develop to the critical stage where it seriously weakens the colony until the following year, or it may advance rapidly and seriously weaken or kill the colony the first season.

AFB spores infect very young larvae by entering the gut, germinating, then multiplying and growing while digesting the bee larvae for nourishment. The honeybee larvae is killed in the process, but not before the bacteria have produced around 100 million spores. These spores are then readily spread from the original brood cell throughout the colony by the bees and by basic beekeeping practices. From the colony, the disease may then spread throughout the apiary, and further.

Symptoms

Death of an infected larva takes place after the cell has been sealed and the cocoon has been spun. First, the capping of the diseased cell becomes moist and darkens in color. Then, as the larva shrinks, the capping is drawn down in the mouth of the cell so the convex **capping becomes concave**. Worker bees may puncture this sunken capping and it may change from a normal pearly white color to a creamy brown, then gradually darkens. **These larval remains can be drawn out into a brown thread or a rope**. As the larva dries up, it becomes dark brown. The final state is a **very dark**

brown, rather rough scale that lies uniformly on the lower side of the cell and extends from just below the mouth of the cell down to the base. These scales stick very tightly to the cell and can be removed only with great difficulty.

The overall appearance of a brood comb infected with American foulbrood is spotty because of the intermixed diseased and healthy cells and also because the remains vary from the ropy moist larvae in cells with dark sunken or perforated cappings to the dry scales lying in open cells whose cappings have been chewed away completely by the bees.

Transmission

The bacterial spores are fed to young larvae by the nurse bees. They then germinate in the gut of the larva and multiply rapidly, causing the larva to die soon after it has been sealed in its cell. By the time of death of the larva the new spores have formed. When the house bees clean out the cell containing the dead larva these spores are distributed throughout the hive and more and more larvae become infected.

The honey in an infected colony becomes contaminated with spores and can be a source of infection for any bee that gains access to it. For example, as a colony becomes weak, it cannot defend itself from attacks by robber bees from strong nearby colonies; these robbers take back the contaminated honey to their own colony and start again the cycle of infection and robbing.

The beekeeper may inadvertently spread the disease by exposing contaminated honey to other bees or by the interchange of infected equipment (woodenware, comb) between colonies.

Drifting bees or swarms issuing from an infected colony may spread the disease.

**If you have any questions about disease symptoms or how to treat for diseases please contact the State Apiarist's office.
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