

Stahlman beekeeping notes for 2021

Issue # 35 Summer Prep for this coming winter! (Part 1 – Diseases)

I have lost a number of hives over past winters. Sometimes it was due to a lack of paying attention to what was happening in my hives. For a period, I tried doing nothing – that always resulted in creating survivor hives. "If I treated a hive, I was defeating the purpose of "natural survival." As a queen producer, I wanted to graft from queens that showed the best characteristics a queen could have plus survive into spring with strong populations of bees. If a hive died, I just considered it as "mother nature" eliminating the weak stock. About the only thing I did was check hives for Disease and hygienic cleaning behavior. I still think that was okay when looking for queen breeding stock!

I am now treating for mites with various methods which include using chemicals. The loss of 50% of my hives of bees is not acceptable.

Inspection of all hives is important: This topic is divided into two sections (Diseases & Pest) Pest will be treated in Issue # 36

When we are thinking about hive survival there are two terms important to understanding what management technique we use in treating our hives. Signs of a disease are something one can see! However, symptoms are something we may not see. We see the word "Pathogens" tossed around rather freely today. **The most troublesome problem is pathogens can't be seen.**

If you take this topic seriously, I highly recommend the 5th Edition of "The Beekeeper's Handbook" by Diana Sammataro and Alphonse Avitabile. Chapter 13 covers diseases. Chapter 14 of that book covers in detail Pest of Honey Bees. These notes are not designed to provide all the information available on a topic. I want to help myself understand what I should be doing to keep my bees alive.

Any disease problem with a hive of honey bees must be taken care of immediately.

Thus, let me review a few points about what I have learned:

- **Virus:** This is a pathogen which can not be seen without an electron microscope. As far as I can detect, there is no cure for the viral infections of honey bees. Maybe Covid has taught us –clean equipment – separate bee hives (the six foot rule) – to reduce drifting - provide contact tracing (have a place to move hives that exhibit symptom). The best recommendations include good sanitation, comb replacement and requeening. Literatures suggest there are about 20 viruses lurking about that affect our bees.

A web site to visit: www.extension.psu.edu/viruses-in-honey-bees.

Signs to look for possibility of a virus problem: Bees with deformed wings, dead larva sunken to the bottom of cells, spotty brood patterns, dark waxy bees without hair and paralysis of bees. The Penn State site has excellent pictures to describe what you might look for when you examine a hive.

Management practice if virus is suspected:

1. Do not transfer frames of comb between hives. (Making splits from hives with virus spreads virus)
2. Move suspected hives away from other hives.
3. Disinfect hive equipment, remove any frame that contains dead larva (melt down to recover the wax and burn the left over slum-gum or burn the entire frame), and move the bees into clean equipment.

- **Bacteria:** We can see signs of bacterial diseases such as American foulbrood and European foulbrood. **They can be treated with antibiotics! However, over use of antibiotics in the past has resulted in laws that now require a prescription to use this method.**

This is one instance that the beekeeper may ask for another opinion from a state bee inspector. Brood diseases that may look like European or American foulbrood may in fact be caused by a virus.

A microscopic diagnoses of the bacterial cells is important before any beekeeper takes action to destroy a hive or the bees. Many states require AFB hives be burned!

Of the two bacterial diseases to be discussed American foulbrood is by far the more serious disease of honey bees. AFB spores can remain active many years. A.J. Cook back in the 1800's did an experiment to see how long AFB spores could remain active. He stored AFB comb in quart jars - a jar to be opened every five years to see if the spores would continue to germinate and cause the death of developing larva. This experiment was carried out for over 30 years and at the end of the experiment, AFB

spores were still able to germinate in the developing pupa to cause death. For this reason, American foulbrood is very contagious and is spread by robbing bees and beekeepers. **Never feed honey to bees that may contain AFB spores.**

State bee inspectors are responsible for reducing the spread of this disease – each state has laws governing the sale of bees and most require registration and inspection of bee hives. Bee inspectors are not policemen – they work for the Department of Agriculture to make sure beekeepers are educated and helped with the reduction and spread of AFB and other beekeeping issues. They often can be found giving talks to bee clubs and do make visits to help beekeepers who request their help.

A beekeeper must have an understanding of the progress of the difference between American foulbrood and European foulbrood. When working hives be alert to what may look "not right"! Thus, some brief comments about American foulbrood.

I will refer to American foulbrood as [AFB]. This is a contagious disease – other hives of bees can get it from a current hive with the disease. It is spread by nurse bees during food transfer. The [AFB] spores can be found in bee hives, hive tools used on bee equipment or bee gloves worn by beekeepers, and honey. House bees while cleaning cells pass the spores along to other bees they contact. The only way to stop the spread is to identify a hive with the disease and destroy it. Some beekeeper try a stop-gap attempt to treat the disease with antibiotics but that is not a permanent solution to the spread. Hive equipment can be put in a radiation chamber to kill the spores. Some beekeepers char the insides of hive bodies to save equipment. Frames from [AFB] hives should be burned. This is one reason beekeepers are warned about buying nucs or used equipment.

Do not assume a hive without a smell does not have AFB! I am often asked what a person should pay for used equipment. It certainly is possible to buy good used equipment. But any equipment exposed in a bee yard that has a hive with AFB has the possibility of having some AFB spores especially on comb in frames. Robbing of honey from a hive with AFB spreads the disease to all the hives with bees involved in the robbing situation. Thus, some used equipment is worth – nothing! (If one buy it and has to burn the equipment – the loss is born by the buyer). Why, because it may take a year or more for the disease to appear and by that time the seller can say, the disease was picked up while the equipment was being managed by the beekeeper.

Tell-tale signs: Field inspection

The sign of AFB is observed in capped brood. European foulbrood on the other hand shows signs of disease before brood cells are capped. This is an important distinction!

European Foulbrood



I am using a picture that shows stages of EFB.

- The brood dies before the cell is capped over.
- The brood will be discolored – normal larva are ivory white.
- Larvae are often contorted or twisted and flattened out.
- Larvae still have a worm like shape.
- There may be an offensive smell present if one smells the comb.
- EFB is often seen in the spring and early summer of the bee season.

American Foulbrood



- The larva die just as the cell is being sealed/capped.
- After the larva die, cells become moist and darken in color.
- Cappings sink and take on a concave look – no longer domed as normal cells look.
- Holes appear in cappings as shown.
- The larvae becomes a fluid sticky substance no longer a worm or pupa.
- The liquid mass is coffee colored (tan to dark brown)
- This mass eventually dries and become a scale which can be observed in old comb.
- Population in an AFB hive is seriously affected by the disease. Thus, the hive has a problem in later stages of this disease defending itself against robbing situations.

One distinguishing test is to use a match stick or cotton swab to stir the liquid mass. Lift the swab -- the sticky mass will rope as seen above. This is usually considered a positive test for

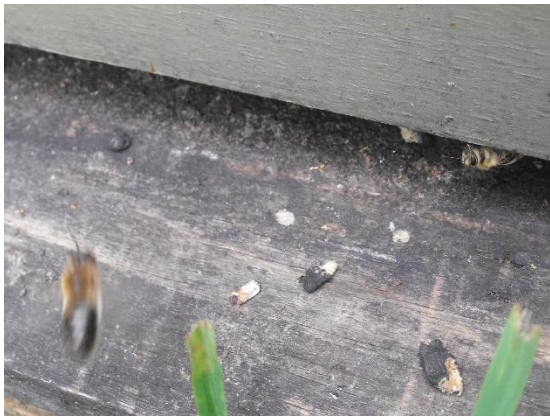
American foulbrood. Still a sample can be placed in a protective tube or plastic envelope for lab analysis.

This is not a disease that can be covered up. Eventually, beekeepers having a hive close to a hive with AFB will begin to see the disease appear in their hives. It is the reason we have bee inspectors in the first place. Because of state inspections, the AFB disease has been cleaned up with very low numbers of hives being detected at the present time. It is important to act immediately to stop the spread of AFB.

Hopefully, none of my readers will encounter a situation with AFB. EFB is more common and I have seen it here in North Carolina. I consider EFB more like a cold. It does effect a colony by reducing hive populations, but hives generally recover. EFB can also be confused with other diseases of the hive including virus diseases. Thus, EFB can be controlled by using sanitary measures. One hint: I often add bleach to my syrup mixture when feeding bees. It has antiseptic features which can reduce the growth of bacteria. See a later edition this year -- when I discuss feeding bees.

Requeening with hygienic stock is a possible solution.

Fungi: Some fungal spores are the cause of diseases like chalk brood and Nosema. Fungal spores are everywhere!



Chalk brood

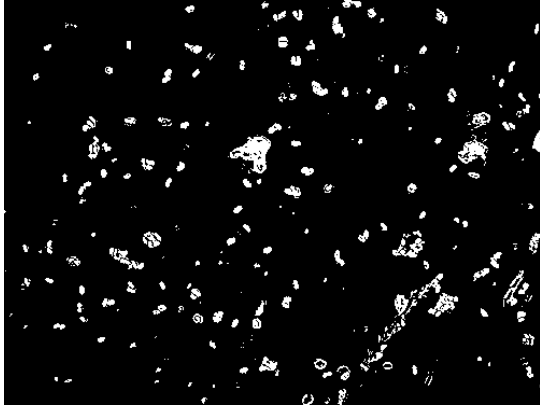
This is a disease that infects young larvae. Unlike EFB, the larvae turns to mummified chalk. Often one can find them in cells or as the bees remove them from cells on the bottom board or front of hive as the bees dispose of them.

Treatment may consist of requeening with hygienic queen lines, and following sanitary beekeeping practices.

Evidence seems to suggest that well ventilated and dry hives are less likely to get chalk brood.

Nosema is a more serious problem. I can remember Tom Webster, Kentucky State University researcher, saying "Nosema was more likely killing more hives over-winter than from any other cause."

Two species are found in the United States that affect honey bees.



Nosema spores as seen under a microscope. Only under microscopic examination can one get a positive diagnosis.

At one time, a beekeeper might assume that bees with diarrhea had the disease. It was easy to see brown staining on top bars, the face of comb as feces dripped down, and on the outside of the hive body.

My first exposure to seeing the gut of a honey bee removed was at an EAS meeting conducted by Dr. Webster. I learned that by examining the gut – a field test- is to pull the bee apart so the gut can be observed. If the color is grayish white in color and swollen, the bee most likely has the Nosema spores. The normal color is tan to yellow and the gut is not swollen. A lab diagnosis is required to distinguish *Nosema apis* from *Nosema ceranae*.

If a hive has Nosema one can not see it on the bee. Generally, the disease shows up with a hive failing to build up normally in the spring displaying signs of dysentery and a hive with dead bees outside the hive. The Beekeeper's Handbook by Sammataro and Avitabile has excellent drawings and text regarding Nosema disease.

Any appliances inside the hive that has excrement (Fecal) signs should be removed and burned. Those spores can not be removed because the best cleaning is not going to be completely effective. Do not sell or reuse equipment from an affected colony.

Currently there is a treatment to control the spread of the disease. It is called – Fumidil "B". Read the instructions carefully for its use. Generally, it is added to sugar syrup both in the spring and the fall. **Fumidil "B" does not kill the spores in the fecal matter.**

Not only do many hives fail to survive the winter, beekeeper's put package bees back into the hive equipment that has discharged fecal spores to greet the new occupants of the hive.

There are many causes for a hive to fail. Diseases must be identified and action taken immediately if discovered. To conclude this part – an inspection of a hive of bees is more like -- the beekeeper playing the role of doctor deciding the condition of the patient.