



B-PLUS

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CHALKBROOD AND MORE

There is some talk that Chalkbrood is more common this year than in several previous years. Let us look at some possible reasons that it may be more common this year, and also some help that you can give your colonies now and some hope for the future. First, chalkbrood is a fungal disease caused by a spore forming organism called *Ascosphaera apis*, which kills the larvae late in their development. The white "chalk like" mummies are usually seen before the cells are capped. Occasionally you see some that are grey to black as these mummies have developed through the spore forming stage, and the spores are black. As a fungus, chalkbrood does best when it has cool, wet conditions. Thus we often see an increase during cool, wet springs such as we had this year. This disease also seems to do better in those colonies that have a high brood to bee ratio. Again a condition that normally occurs in the spring when the colonies are raising large amounts of brood for the number of workers present. In most years the incidence of the disease drops off when the temperatures rise and when there are more workers to tend the brood.

There are some reports of disease rising to levels of 5 to 10 percent. At these levels the fungus is causing economic loss to the colony as these bees are lost at the critical spring build up time of the colony. What are the things that a beekeeper can do? The first is to help ensure that the colonies are as strong as possible, which cuts down on some of the stress for lack of attention to the larvae. Next, keep old combs to a minimum in the hive. Recent research by the U.S.D.A. Lab in Madison, Wisconsin has shown that package bees established on foundation or super combs had the least amount of chalkbrood disease. Those combs that were fumigated with ethylene oxide (ETO) were intermediate and highest was with old combs. There may be genetic differences in the stock's susceptibility to the disease. We have seen some cases where it appeared to be more common in certain strains of bees than others. Certainly, the fully developed hygienic stocks are better able to keep the combs clean.

Finally, there are some chemicals that are being field tested for control of the disease. Maybe we will have a treatment in the not too distant future. And More... The idea of removing old combs usually brings comment from many sources. I will have to admit that until recently I have not been one to get excited about removing old combs from brood chambers as these combs seemed to serve well and the brood looked more or less normal. However, there may be several reasons for looking at old comb removal in some detail. Old combs have been attributed to:

- 1) Darken the honey stored in them.
- 2) Make the bees smaller because of the old cocoons.
- 3) Have more drone cells.
- 4) Store or keep chemicals including pesticides.
- 5) Harbor diseases.
 - a) Chalkbrood
 - b) Nosema
 - c) American Foulbrood (AFB)

The case against using dark combs for honey is somewhat mixed. Apparently, if you use really dark, old combs then it does not affect the honey. It is the combs that are somewhat in between that darken the honey the most. Though if we are talking about brood combs then the fact that they might darken the honey is not of much concern. There also has been several studies on the effect of old combs making the adult bees smaller because of the accumulation of the cocoons and varnish that you find in them. I guess if you took this argument to its conclusion the cells would eventually become "microscopic". The bees do clean and remove much of the debris found in cells so that if there is reduction it is not very great. Old combs often do end up with more drone cells as the consequence of being damaged or stretched. It is also possible that a colony could have too many drones. However, the colony will persist in having some drones as it is important to the species that they produce reproductives. In a natural situation the percentage of drones is about 17%. This may be too high for the beekeeper, but trying to keep all drones out is like trying to pump the ocean dry. Relax and think of how the drones will help develop the next generation of bees. The case against old combs as a reservoir of chemicals and pesticides is mostly circumstantial. When it has been studied the wax has been shown to be an excellent "sink" for many of these materials. Glen Stanley, State Apiarist of Iowa, said that when his family started a concerted comb replacement program they had the best colonies in years. Part of that success could have been the removal of diseases too. When we look at diseases we see a similar story as for pesticides - the case for chalkbrood was given above. There is ample evidence for nosema disease being harbored in old comb. In fact, when beekeepers started to use ETO for AFB control they began to notice an improvement in wintering which they have attributed to the reduction in nosema. This summer we have been conducting an experiment on AFB control. While it was not part of the experiment we have noticed that the bees cleaned up the disease much faster in new combs than in the older dark ones.

The bottom line is that we should take seriously the systematic replacement of combs. If we would put some frames of foundation into the brood chamber each year we might reduce all of the hazards given above and maybe swarming as well. It is too bad that the price of wax is not sufficiently high to compensate us completely for the labor of comb removal and the new foundation.

Disease Comparison Chart

Honey Bee Diseases

A Comparison of Symptoms

Symptoms	AFB	EFB	Sacbrood	Chalkbrood
Appearance of brood comb.	Sealed brood; Discolored, sunken, or punctured cappings	Unsealed brood. Sealed brood in advanced cases with punctured cappings	Sealed & unsealed brood. Scattered cells with few punctured cappings	Scattered white cells often near edges of comb
Age of dead brood	Mature sealed larvae or young pupae	Usually young unsealed larvae; occasionally older sealed larvae	Mature sealed or unsealed larvae	Mature sealed or unsealed larvae
Color of dead brood	Dull white, changes to light brown, to dark brown or black	Dull white, becoming yellowish to brown, dark brown to black	Grayish becoming brown to black. HEAD DARKER	Usually CHALK WHITE , a few may be black with spores
Consistency of dead brood	Soft, becoming sticky to ROPY	Watery to pasty; rarely ropy. Larvae usually TWISTED	Watery and granular; skin forms a sack	Hard; "chalk like"
Odor of dead brood	Slight to pronounced glue-pot odor	Slightly to penetratingly sour	None to slightly sour	None
Scale characteristics	Lies uniformly flat on lower side of cell Adheres tightly to cell threadlike TONGUE of pupal scale definitive	Usually TWISTED in cell. Does not stick tightly to cell wall. Rubbery	Head curled up. Does not adhere to cell wall. Lies flat on lower side of cell	" MUMMIES " easy to remove from cells. Often seen on bottom board, or in front of colony