

# Differences Between American Foulbrood (AFB), European Foulbrood (EFB) and Parasitic Mite Syndrome (PMS)

## AMERICAN FOULBROOD

### Symptoms:

- Affects only capped brood.
- Spotty brood pattern.
- Larvae die in the upright position.
- Larvae turn from white to brown to black.
- Sunken, punctured/perforated cappings.
- Chocolate brown to black cappings may appear wet.
- Dead larvae exhibit “ropiness”. Select a brood cell that looks infected but not dehydrated (the prepupa/pupa structure is still evident and gooey). Take a stick or toothpick to swirl the contents of the cell and slowly withdraw it. If the contents draw out up to an inch in length (2.5 centimeters) then snaps back, the cell is most likely infected with AFB.
- “Pupal tongue” sometimes present. Extended pupal proboscis (false tongue) stretching from one cell wall to opposite cell wall (only see if death occurred in early pupal stage) – very positive sign of AFB but not always present.
- Dead larvae form black scales in the bottom of cells and are difficult to remove.
- May have distinctive sulfur-like smell.

### Check List:

- Does this seem to affect only capped brood?
- Does the dead larvae “rope” out from a match or twig when it is inserted into infected larvae and then removed?
- Are scales present and difficult to remove?
- Remember that not all of these symptoms may be observed at one time in a colony.

## EUROPEAN FOULBROOD

### Symptoms:

- Affects predominately uncapped brood.
- Spotty brood pattern.
- Larvae are twisted and contorted in cell – in the “stomach ache position”. Some larvae may be stretched out.
- Larvae turn from white to yellow to brown. May see yellow streaks.
- Tracheal system visible.
- Royal jelly will appear yellow-brown.
- Dead larvae form a rubbery brown or black scale that is easy to remove and often crescent shaped.
- Capped cells appear normal.
- Odor may be mildly sour, but not the distinctive odor sometimes found with AFB. Odor is not always present and may depend on secondary bacteria.
- Dead larvae may be slightly ropery and stretch out once or twice, but usually not much more than that. The threads are less than  $\frac{3}{4}$  inch long (1.5 cm). Scale may be rubbery.
- Hygienic bees may remove EFB infected larvae infected with vegetative form of bacteria quickly, thus removing bacteria from hive. (No spores from this bacterium, so if vegetative form is gone, bacteria is gone.)

### Check List:

- Does this seem to affect predominately uncapped brood?
- Are the larvae curled or twisted?
- Are their tracheal systems visible?
- Are scales present, rubbery, and easy to remove?

# PARASITIC MITE SYNDROME (PMS) or Varroa Mite Syndrome (VMS)

## Symptoms:

- Can affect larvae and prepupae at any age
- Spotty brood pattern
- Sunken, dark, perforated cappings on brood
- Larvae appear “melted down”, but is NOT ropy, sunken to side of cell. Larva can be removed with a stick.
- Scale may be seen, but it is easy to remove and not brittle
- Chewed down brood (hygienic bees uncap cell and cannibalize pupae)
- Multiple cells of pupa may have their faces chewed down (bees trying to stop brood production)
- Lack of eggs and developing larvae
- Varroa mites may be seen on bees, comb, and open brood cells
- Rapid decline of the adult bee population
- Remaining adult bees may be more aggressive
- May see more bees crawling or with Deformed Wing Virus (DWV)
- May see dead bees out front of hive
- Supersedure cells often present
- May acquire an odor and become discolored when secondary bacteria set in after larvae become chewed down, begin to change color and decay
- Affected larvae and prepupae may be white or yellow to light brown
- Colony deteriorates and dwindles away, finally dying
- Progressed sign of mite damage.

## Check List:

- Is there a high Varroa mite load? Varroa mites are always present (remember you may not actually see them on the adult bees).
- Does it appear to affect all stages of larvae?
- Are there adults with deformed wing virus?
- Are there mites on bees and comb?
- Are chewed down brood and prematurely aborted larvae present?

## References:

<https://afb.org.nz/parasitic-mite-syndrome/>

<https://beeinformed.org/>

<https://bee-health.extension.org/european-foulbrood:-a-bacterial-disease-affecting-honey-bee-brood/>

[https://honeybeehealthcoalition.org/wp-content/uploads/2019/06/HBHC\\_AFB-EFB-Final-061119.pdf](https://honeybeehealthcoalition.org/wp-content/uploads/2019/06/HBHC_AFB-EFB-Final-061119.pdf)

<https://txbeeinspection.tamu.edu/files/2018/02/Identifying-Brood-Diseases-trifold.pdf>