A) Infected larva (brown) with tracheal system visible through its integument.

B) Healthy larvae (pearly white, glistening, C-shaped).

C) Curled, discolored larvae, twisting up in the cell.

Photo courtesy of: Georgia Department of Agriculture, CC BY-NC 3.0 https://www.invasive.org/browse/detail.

Prevention and control

Various ways can be used to prevent and control this disease:

- **Sanitation:** Keep apiaries clean and tidy and do not discard propolis, combs or any other material on the ground where it may be picked by bees and taken to the hive. Such material may be disease contaminated.
- Avoid the use of old combs since they may harbour the disease.
- Avoid restocking with colonies that you do not have a history of. Rather, inspect colonies before you accept them and include them in your apiary.
- Thoroughly clean and sterilize used hives before using them.
- Avoid exchanging supers across hives; exchanging brood combs, unless you are sure of no infections.
- Arrange hives in a way to reduce drifting by bees, which may transmit the disease.
- For infected colonies: severe infections will warrant total burning/destruction of the whole hive structure and colony to avoid further spread.
- Disinfection: Hive tools and appliances should be disinfected to avoid spreading across hives during inspections. Disinfection can be done using JIK or any other disinfectant.

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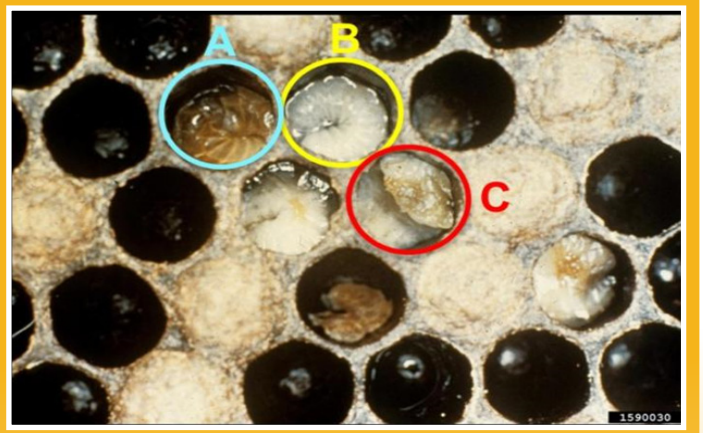
KALRO/NAVCDP Apiculture VC Brochure No.009/2024

REPUBLIC OF KENYA

Management of European Foulbrood (EFB) in Honey Bee colonies



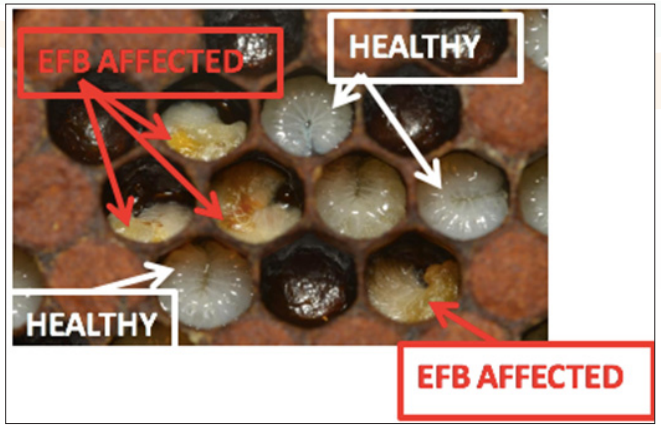
Management of European Foulbrood (EFB) in Honey Bee colonies

European Foulbrood (EFB) is a bacterial disease caused by *Melissococcus plutonius* pathogen that affects honey bee larvae at the uncapped stage.

The bacteria is transmitted through contaminated bee bread, nectar or diluted honey when fed to young larvae. All larval stages are susceptible to the disease as long as they ingest the contaminated meal. After being injested, the bacteria multiply in the midgut, killing the larvae typically within 4-5 days, before the cell is sealed. In more severe cases, infected larvae can die after the cell is sealed.

Signs and Symptoms

- Difference between populations of nurse bees and maggots, spotty brood pattern on brood frames, typically found on outside frames in the colony.
- Deficiency of pollen may be seen.
- Smell of sour, fish-like, rotten odour in the hive.
- Unsealed larvae are found in unnatural positions in their cells, usually about 4 days after hatching from eggs.
- Larvae lose their natural appearance of pearly-white colour and collapse as if they had been melted. The larvae turn yellowish-brown and eventually dries up to form a loosely attached brown scale.
- Twisted or curled upward larvae with a defined tracheal system that have white visible trachea.
- Deflated larvae located at the bottom of cells.
- Brown to black hardened larvae “scales”, located at the bottom of cells that are easy to remove



Healthy and infected honey bee larvae by EFB, Photo by ASLVT/Massimo Palazzetti

Detection of the disease

The presence of this disease can be detected using various approaches:

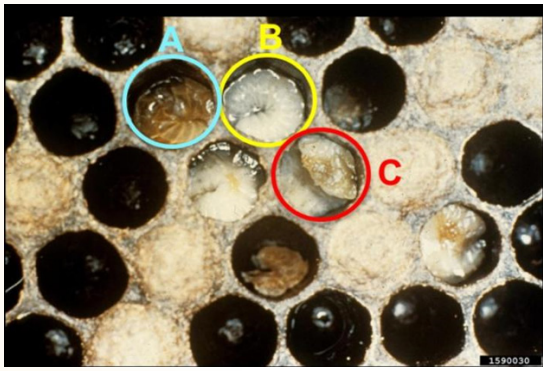
- Beekeeper can check brood combs. The brood combs infected by EFB have a spread and a patchy appearance with healthy brood cells intermixed with dead or dying cells. Check for irregular patterns of brood cells that are unsealed, and possibly with dead maggots.
- The larvae are mostly affected in the unsealed, curled-up stage, although in extreme cases broods of all ages may be affected. Thus the presence of patches of unsealed cells could give an indication of the disease presence and confirmations sought.
- The diseased larvae collapse and become dislocated from their normal position in the cells. Their colour changes from pearly white to yellow and finally yellowish brown.

Diseased brood (see dead brood in unsealed cells) by the EFB, Photo courtesy of Government of Australia, PADIS

Economic importance

The disease reduces the number of emerging worker bees, hence reducing colony strength. Under severe attack it can result in colony collapse.

Low disease load on the maggots can result in some of the maggots developing into adults- hence the adult worker bee may have some loads of the disease, which can spread in the course of its life.



A brood comb showing EFB-diseased and healthy honey bee brood.