

American foulbrood

What is American foulbrood?

American foulbrood (AFB) is a fatal microbial disease of honey bee brood caused by the spore forming bacterium *Paenibacillus larvae*. The disease is caused when young larvae ingest spores of the bacterium which germinate in the honey bee's gut. The brood usually dies at the pre-pupal or pupal stage.

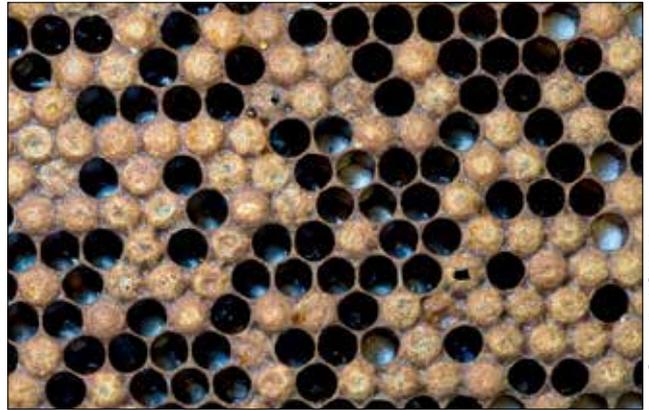
What should beekeepers look for?

Brood combs should be thoroughly examined for AFB at least twice a year, preferably in spring and in autumn, although AFB can occur in hives at any time of the year. Beekeepers should remove each brood frame from the colony and look for symptoms such as sunken, darkened and greasy looking, perforated cappings and irregular brood pattern in advanced infections. Look closely, as early infections may only have as few as one or two cells showing disease signs.

Brood infected with AFB generally die after the cells are capped and the affected brood becomes discoloured, changing from the healthy pearly white to a darker brown as the disease progresses. At this stage of infection beekeepers should conduct the ropiness test. Thrust a matchstick into the infected individual in the cell and if the semi-fluid remains are drawn out in a ropy thread it indicates the hive could be infected with AFB. After about a month, infected brood dry to a dark scale which adheres to the wall of the cell.

What can it be confused with?

AFB can be confused with European foulbrood (EFB). The majority of EFB infected larvae die before capping and appear coiled in their cells, unlike AFB where the majority of infected larvae die after capping. However, when EFB infected brood die at older stages they can be confused with AFB.



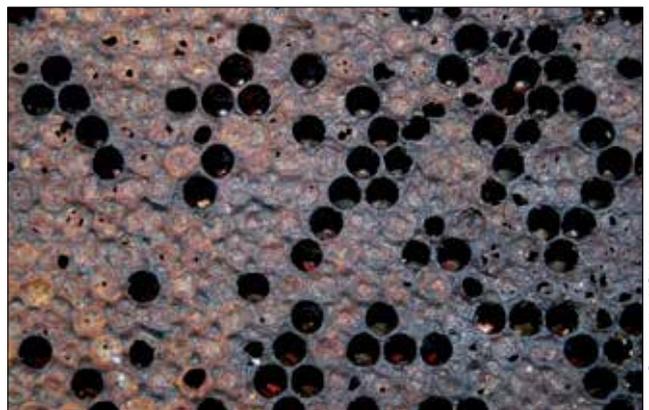
Doug Somerville, NSW DPI

Initial infection of AFB showing a few cells which are sunken and have chewed through cappings



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A common test is to insert a matchstick into the dead brood and if there is a 'rope' AFB could present



Doug Somerville, NSW DPI

Advanced infection of AFB showing a large area of sunken, dark and chewed through cappings



Another potential difference between AFB and EFB is that when the ropiness test is conducted, by placing a matchstick into the affected brood, AFB infected brood could be drawn out in a longer ropy thread than EFB infected brood. However, when *Paenibacillus alvei* (a common secondary invader in EFB) is present it may also cause some extra ropiness which makes EFB infected brood resemble AFB infected brood. Laboratory diagnosis is the only accurate means to differentiate AFB from EFB.

How does it spread?

The main methods of AFB spread are through the interchange of infected combs and hive components, by feeding colonies infected honey or pollen, by honey bees robbing honey from infected hives or from extraction sites, as well as by honey bees drifting from infected colonies into neighbouring colonies. The spores of the bacterium are very infectious to larvae less than 24 hours old and can remain dormant for over 50 years.

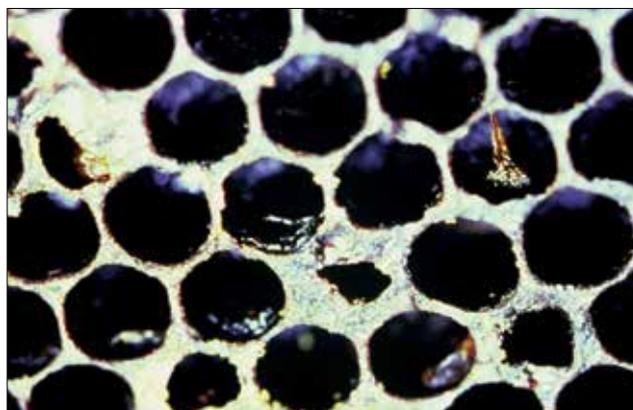
Where is it now?

AFB is present throughout Australia; however, it has not been reported or confirmed in the NT, or Kangaroo Island (SA).

How can beekeepers protect their hives from American foulbrood?

Beekeepers should always check brood combs at least twice a year for early signs of AFB. Brood combs should be replaced every 3-4 years as old brood combs can act as a reservoir of the bacterium. To greatly minimise the spread of AFB throughout hives, beekeepers should put in place a barrier management system and clean hive tools and apiary equipment between hives and apiaries. If AFB is found in a hive, thoroughly clean all hive tools, gloves and apiary equipment before inspecting other hives or another apiary. When AFB is detected, contact your local department of agriculture, kill the infected colony and either irradiate or burn infected hive parts in a pit and cover the remains.

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AFB infected cells showing brood drying to a dark scale on the side of the cell, and one scale having a 'tongue' can sometimes be observed

Michael Hornitzky



Black scale with a tongue is sometimes visible at the bottom of cell walls after the larva has died and dried out

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For more information about AFB, go to www.beeaware.org.au/american-foulbrood. The BeeAware website contains extensive information on AFB, including:

- Disease cycle
- Symptoms
- Detection methods
- Spread and distribution
- Similar pests
- Management options
- Additional fact sheets and videos