

Southampton & District Beekeepers Association

www.southamptonbeekeepers.co.uk

How Do I? Information Sheet #5

Brood Disease

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Original Publication Leaflet: Foul brood disease of Honey Bees and other common brood disorders

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Healthy Brood

The queen lays eggs at the base of cells in the brood nest. These hatch after three days and develop into tiny translucent larvae lying at the base of the cell in a bed of milky brood food.

After six further days of development, the larvae have increased in size to almost fill the base of the cell. Healthy larvae are pearly-white in colour. They lie in a distinct 'C' shape, with the head and tail curled towards one another. The body of the larva can be seen to be divided along its length into a series of segments.



When the larvae are nine days old, the cell opening is sealed by adult bees with a cap of wax, and development into an adult bee occurs inside the sealed cell completing metamorphosis.

The wax cappings on healthy worker brood vary in colour from very light to dark brown (often referred to as digestive biscuit colour), and they are dry looking and slightly convex.

Drone brood can be distinguished from worker brood by its larger cells and domed cappings.

American Foul Brood

American foul brood is caused by a spore-forming bacterium called *Paenibacillus larvae*.

AFB is a notifiable disease under the Bee Diseases and Pests Control (England) Order 2006 and is subject to official control by a programme of apiary inspections carried out by the NBU.

Generally affects only sealed brood, sunken concave cappings, uneven brood pattern, 'pepper pot' or mosaic pattern, scales on bottom walls of open cells, brown decomposing larvae that 'rope' using matchstick test, moist dark perforated cappings.

A good way of remembering is that AFB = A (after sealing of the cell).

AFB Perforated and sunken cappings



AFB 'ropiness'



Wax cappings become sunken and perforated when adult bees nibble holes in them to try to remove the infected larva within.

Some cappings may become moist or greasy looking and slightly darker in colour than other cells.

If a matchstick is inserted and slowly withdrawn, the remains can be drawn out in a brown, mucus-like thread or 'rope' 10-30mm long. This is called the 'ropiness' test and is a reliable test for the presence of AFB.

Infected colonies are destroyed by burning under the supervision of a CSL Bee Inspector. The bees are killed, and together with the combs are safely burned in a deep pit.

European Foul Brood

European foul brood is caused by the bacterium called *Melissococcus plutonius*.

EFB is a notifiable disease under the Bee Diseases and Pests Control (England) Order 2006 and is subject to official control by the examination of colonies for signs of disease and compulsory treatment or destruction of diseased colonies.

EFB affects mainly unsealed brood, killing larvae before they are sealed in their cells.

Infected larvae, discoloured yellow-brown lying in abnormal positions in cell with 'melted' appearance.

An easy way to remember is that EFB = E (early infection before sealing of the cell).

EFB twisted and discoloured larvae





A very unpleasant odour may sometimes accompany severe EFB infection, depending on the presence of certain other species of bacteria in the remains of dead larvae.

European Foul Brood (continued)

The EFB infected larva moves inside its cell instead of remaining in the normal coiled position characteristic of a healthy larva of the same age.

Some dark sunken cappings may be present, but cell contents will not form a 'rope'.

The gut of an infected larva may be visible through its translucent body wall. It has a creamy white colour caused by the mass of bacteria living within it.

When a high proportion of the larvae are being killed by EFB, the brood pattern will often appear patchy and erratic as dead brood is removed by the bees and the queen lays in the vacant cells.

Several choices are available to the beekeeper. Infected colonies can be: "Shook swarmed", a CSL Bee Inspector can treat lightly infected colonies with antibiotic and severe cases of EFB are destroyed as with AFB.

What to do if you suspect foul brood

1. Close the hive.
2. Reduce the size of the entrance and take any other steps necessary to prevent the hive being robbed by other colonies.
3. Disinfect gloves and other beekeeping equipment with a strong solution of washing soda before examining other colonies.
4. Notify your out-apiary manager and association committee and agree a communication strategy.

Either:

- a) Contact the NBU to arrange a visit by your local Bee Inspector.
- b) Send a whole comb containing diseased brood wrapped in several layers of paper and sealed in a cardboard box so that it can not leak honey in transit to the NBU, with a note stating your name and address, the location of the apiary and the identity of the affected hive. Alternatively, an infected larva can be sent to the laboratory with all your details in a sample tube (such as an "Eppendorf" type tube). The NBU can provide samples to local associations and local bee health advisers.

You must not remove any hives, bees, or equipment from the apiary until the disease, if present, has been controlled. Place the apiary under Standstill.

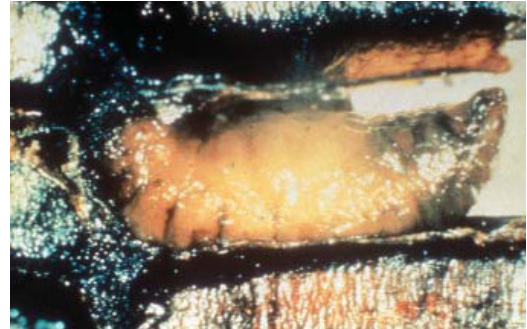
Common Brood Disorders

In addition to the foul brood diseases, there are honey bee brood disorders considered less serious such as sacbrood, chalkbrood, baldbrood, laying workers and drone-laying queens. It is important that beekeepers are able to distinguish between these and foul brood. These disorders will also affect colony productivity and can occasionally be serious problems for susceptible stocks of bees.

Sacbrood

Sacbrood is a very common virus disease affecting brood. In most diseased colonies relatively few larvae are visibly affected, and it rarely causes measurable harm to colonies. However, the signs can sometimes be mistaken for those of AFB.

Larvae that have died from sacbrood become like fluid-filled sacs, stretched on their backs with their heads towards the top of their cells. Adult worker bees eventually uncap them. Diseased larvae turn from the normal pearly white colour to pale yellow and the head curls up as the body dries to a thin, dark brown scale lying along the bottom wall of the cell. These are often referred to as 'Chinese Slippers'.



There is no specific treatment for sacbrood.

When much of the brood is obviously affected, the queen should be replaced by one from a colony showing no signs of the disease.

Chalkbrood

Chalkbrood is an extremely common brood disease caused by the fungus *Ascosphaera apis*. The thread-like, vegetative growths ('hyphae') of the fungus invade the body tissues of infected larvae, killing them after they have been capped over in their cells.

Adult bees usually tear down the brood cell cappings to remove the dead larvae. These appear as hard, chalky-white or mottled grey remains ('mummies') lying along the length of the cell. They are often noticeable on the hive floor or at the hive entrance.

There are no specific treatments available on the market for chalkbrood, re-queening with a queen from a chalkbrood-free colony is recommended.



Bald Brood

Normally pupae are sealed in their cells under wax cappings until they are ready to emerge as adults. Colonies with bald brood may have small patches of live and normal looking pupae in cells that are incompletely capped. The partial capping frequently has a raised lip that protrudes from the comb.

The cause of bald brood is not always clear; however, the most common reason is infestation of brood combs by wax moth larvae. These can often be found tunneling below the surface of the comb close to patches of bald brood and should be removed.



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