



## National Bee Unit

### Disinfecting a hive after disease

July 2024

Honey bee colonies are subject to infection by a range of diseases. These include microsporidia, fungi, viruses and bacteria. Honey bees are social insects and readily transmit infections between one another, so it is essential to recognise the signs of disease and know how to reduce their impact. A key factor in preventing the spread of infection is disinfecting equipment that has come into contact with disease. This fact sheet provides some advice about disinfecting hives and equipment after an outbreak of disease.

### When should you clean and disinfect your beekeeping equipment?

It is best practice to clean and disinfect beekeeping equipment:

1. when you bring it in from the field for storage (e.g. at the end of the season) or before reuse;
2. whenever it is necessary to move items between colonies;
- 3. before using second-hand equipment;**
- 4. after your apiary has suffered a disease outbreak.**

This fact sheet deals with the process of disinfecting equipment involved in points 3 and 4. For guidance on general hygiene and keeping equipment clean, please read our fact sheet entitled [‘Apiary hygiene and quarantine’](#).

When disease has been encountered in the apiary, all equipment must be thoroughly decontaminated. This process differs from routine hygiene as many pathogens, especially the foulbroods, will require more stringent cleaning measures.

The pathogen that causes American foulbrood (AFB) requires particularly rigorous disinfecting measures as the bacteria form spores that are resistant to some cleaning products, and extremes of temperature and humidity. For this reason, we strongly recommend that all second-hand equipment is disinfected before use, to a standard necessary to kill AFB spores. This is because the spores can remain inert in the environment for decades, still able to cause an AFB outbreak if they come into contact with honey bee brood.

# Cleaning and disinfecting brood boxes and supers

## Pre-cleaning

Dismantle the hive and, if possible, place all its component parts into a large domestic chest freezer (-20°C) for at least 48 hours before cleaning. This will kill insect pests, such as wax moth.

After removal from the freezer, place the hive parts onto sheets of cardboard or newspaper inside an upturned roof to catch any debris that becomes dislodged as you work. Begin by scraping the boxes as thoroughly as possible, using a paint scraper, hive tool or other suitable instrument, to remove any wax and propolis.

Be especially careful when cleaning the internal corners of the boxes and the frame runners, as these provide ideal nooks and crannies for pests and pathogens. You may wish to consider removing dirty frame runners altogether and replacing them with new ones when you reassemble the disinfected hive. If you plan to disinfect your equipment by scorching (see below), remember to remove all plastic runners. During the process of scraping, bits of wax and propolis will fall onto your cardboard or newspaper sheets, and all this should subsequently be destroyed by burning when you have completed this part of the cleaning process. You will also need to disinfect your scraper before you put it away.

Once the hive components are free of obvious dirt, they can be disinfected.

## Scorching with a blow torch

Scorching is only suitable for wooden boxes; please do not attempt this on plastic or polystyrene hives. Please wear safety glasses, appropriate footwear and gloves, and perform the procedure only on a solid, stable surface. Ensure you are working in a well-ventilated area, away from wind or sources of ignition, and keep a bucket of water on hand in case the wood begins to smoulder.

Light the blow torch and scorch the timber until it darkens to a uniform coffee-brown colour and use the tip of the blue flame to make sure any remaining propolis boils off. There is no need to burn the timber, but be especially thorough in the corners, and in cracks. If the wood begins to smoulder, quickly douse it with water.



**Figure 1:** Equipment can be disinfected using bleach diluted to 0.5%, and wooden boxes can be disinfected with a blow torch. Images courtesy Ian Nichols, Crown copyright 2024.

## Bleach

Bleach is suitable for disinfecting plastic and polystyrene hives. Brood boxes, supers and other beekeeping equipment can be effectively disinfected using bleach. The active ingredient in bleach is sodium hypochlorite, which is present at a concentration of between 3 to 5% in household bleach. Research has shown that immersion for twenty minutes in a solution of 0.5% sodium hypochlorite kills AFB spores and other bacteria.

Please wear protective clothing, gloves and eye protection when handling bleach and ensure it doesn't come into contact with skin. Please never mix bleach with any other cleaning products as it may form hazardous gases, and only use bleach in a well-ventilated area, as use of bleach in an enclosed environment can cause lung irritation.

To bleach hive components, dilute the bleach to a concentration of 0.5% sodium hypochlorite in cool water. Any propolis, wax or other organic material present can interfere with the ability of bleach to disinfect a material, so it must be thoroughly scraped before soaking. For disinfecting one or two boxes, a suitable tray, such as one used for potting plants, can be used and each box wall treated individually, before rotating to treat the respective walls; each surface should be soaked for approximately 30 minutes. After immersion in bleach, be sure to rinse the equipment down with copious amounts of hot water and leave to dry outside in the sunlight. This will ensure that no bleach residue remains on the surface of the equipment.

Bleach is less effective in hot water as the sodium hypochlorite decomposes faster when heated, but hot water can be used to wash off any bleach residue after disinfecting.



**Figure 2:** When disinfecting or washing large items, a large container is needed. In these images, a large plastic storage box is used to clean a nuc box. The box is scraped of any organic material before being submerged, one side at a time, in the bleach. Lids or blocks of wood or concrete slabs can be used to hold items down and stop them from floating. Images courtesy Ian Nichols, Crown copyright 2024.

## Cleaning and disinfecting hive components

### Queen excluders

Queen excluders need to be cleaned and disinfected in different ways, depending on the type used. Begin by removing debris by scraping with a suitable tool. It is easier to remove propolis when it is cold, as propolis will be brittle under these conditions. A wire brush is very useful to remove bits of wax and propolis. Wire excluders can then be scorched using a blow torch; but if they are soldered be careful not to melt the solder joints.

If foulbrood has been present, zinc slotted excluders must be destroyed by burning. For other diseases, it is possible to scrub these clean with a solution of soda crystals (also known as washing soda or sodium carbonate). This needs to be concentrated (1 kg of soda crystals dissolved in 4.5 litres of hot water); a dash of washing up liquid in the mix also helps. Please wear suitable protective clothing, eye protection and rubber gloves.

Plastic excluders can be disinfected in the same way as plastic hives and components, using bleach, as described above.





**Figure 3:** It is important to scrape away as much organic material as possible before disinfecting. Various tools may need to be used, especially with tricky items such as queen excluders. Images courtesy Ian Nichols, Crown copyright 2024.

## Brood and super frames (without wax)

If you would like to re-use brood frames, the wax can be cut out and rendered down; for more information on this process, please read our fact sheet on [‘Replacing old brood comb’](#). The empty frames can then be scraped clean before disinfecting. Lay some newspaper down on the surface where you will be working, and scrape all the frames as thoroughly as possible, so that any excess propolis or wax falls onto newspaper underneath; this can then be burnt once you have finished.

Frames can then be cleaned using a solution made up with soda crystals. This is made up using 1 kg of soda crystals dissolved in 4.5 litres of hot water with a dash of washing up liquid. Immerse the equipment in the solution, while using a wired brush, or similar tool to scrub off residues until the tools are clean.

For a more effective clean, the soda solution can be heated in a large container, such as a steam boiler, to over 80°C. The frames are submerged in the hot soda solution for a few minutes or until the frame is clean of any remaining wax and propolis. A scrub with a churn brush will help. Remove the frames from the soda solution, rinse them down with water to remove residual sodium carbonate and then leave them to dry. Protective clothing, gloves and eye protection should be worn when working with hot soda solution.

## Brood and super frames (with wax)

Some frames that are in good condition, can be re-used without the need for disinfecting. The wax may be kept if it is treated with acetic acid before re-use or storage. However, acetic acid is only effective against chalkbrood and nosema; although it will also kill wax-moth, preventing infestation of stored comb. Acetic acid is not effective against AFB, European foulbrood (EFB) or viruses. Brood frames that have been in contact with AFB or EFB should not be re-used, but should be burned.

For a step-by-step guide to using acetic acid on frames, please read our fact sheet entitled [‘Fumigating comb’](#).

## **Other equipment**

Hive tools should be cleaned regularly, ideally in a washing soda solution made with 1kg of washing soda/soda crystals dissolved in 4.5 litres of hot water. Placing a hive tool in the smoker to ‘sterilise’ it is not an effective method for getting rid of microorganisms.

Plastic equipment or components such as feeders and plastic frame ends can also be scrubbed in a soda solution. Open-ended correx plastic sheets are difficult to clean inside, so it is a good idea to seal up open ends prior to use. This does not apply to harbourage traps for monitoring for small hive beetle, which can be destroyed if necessary.

## **Beekeeping clothing**

### **Gloves**

Leather gloves are difficult to clean and should be avoided in general. As they are difficult to thoroughly disinfect, if they come into contact with foulbrood, they should be disposed of. We recommend the use of nitrile gloves or washing up gloves for colony inspections, as these can be cleaned between examining colonies, or disposed of and a new set put on, thus reducing the risk of spreading infection. If you have come into contact with disease while wearing nitrile or washing up gloves, the gloves should be disposed of. Ensure the gloves are sealed in a bag before disposal to prevent foraging honey bees from being attracted to them and contracting disease.

### **Bee suits**

Bee suits should be laundered regularly at a high temperature. If disease has been encountered in the apiary, they should be washed immediately before visiting another colony. A small quantity of soda crystals mixed with the detergent during washing helps to remove propolis. Make sure that fencing style hoods are tucked inside the suit during washing, and that all zips are done up to avoid damage. Hats and veils with metal rings in cannot be washed in a machine.

If using wellington boots, these can be scrubbed in a washing soda solution as described above. Other footwear should be cleaned of mud, propolis and honey splashes and wiped off in a suitable manner.

## **Destruction of old, damaged and infected equipment**

It is important to remember that it may not always be practical or safe to clean, disinfect and re-use beekeeping equipment once it has become contaminated, or is too old and/or



damaged to withstand a rigorous cleaning. Sometimes the best option for equipment is destruction; especially if it is difficult to effectively decontaminate it after a serious infection.

EFB and AFB are serious brood diseases of honey bee and are statutory notifiable diseases. This means if an infection of a colony with either disease is suspected, there is a legal requirement to report it to the National Bee Unit (NBU) who will provide confirmatory diagnosis. For more information on foulbrood disease, please read our advisory leaflet entitled '[Foulbrood disease of honey bees](#)'. AFB, and some cases of EFB will be managed with colony destruction. In this case, your local Bee Inspector will euthanise the bees and burn infected frames. Do not attempt to deal with a foulbrood infection alone.

Wooden equipment can be burnt in a pit about 45 cm deep, and the pit must be covered in afterwards to prevent any access to unburnt honey.



**Figure 4:** Unfortunately, sometimes the only course of action is to destroy infected equipment. Image courtesy Ian Nichols, Crown copyright 2024.

When plastic hives become unserviceable because of damage or wear, and has not been in contact with infectious diseases, then it may be suitable for recycling. Your local authority can give advice about this, which tends to vary according to authority and region. Uninfected material can also be disposed of in landfill sites. Landfill is not an option for infectious material as it may contaminate the environment. Plastics must not be burnt except in a specialist plant. There are specialist companies that deal with the disposal of infected plastic materials, but they normally require plastics to be divided according to type before acceptance. They should be contacted for further information.

**National Bee Unit**

APHA, Room 11G03, York Biotech Campus,  
Sand Hutton, York YO41 1LZ

Telephone: 0300 303 0094

Email: [nbu@apha.gov.uk](mailto:nbu@apha.gov.uk)

Web site: [www.nationalbeeunit.com](http://www.nationalbeeunit.com)

July 2024

© Crown copyright 2024

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. To view this licence visit

[www.nationalarchives.gov.uk/doc/open-government-licence/version/3/](http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/) or email  
[PSI@nationalarchives.gsi.gov.uk](mailto:PSI@nationalarchives.gsi.gov.uk)