

## STERILISING EQUIPMENT CONTAMINATED WITH AMERICAN FOULBROOD SPORES

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Under New Zealand legislation (National American Foulbrood Pest Management Strategy Order 1998) specifies that all bees, bee products and appliances associated with an American foulbrood (AFB) diseased colony must be burnt. The only major exception to this ruling is people sterilising equipment in accordance with their Disease Elimination Conformity Agreement (DECA). If you do not have a current DECA that specifies how you will sterilise equipment rather than burn it, you must burn all equipment associated with an AFB diseased colony.

Fortunately, relatively large numbers of spores are needed to infect a colony with AFB. Because of this any sterilising technique is not required to remove every last spore, but only to lower spore counts to levels that will not cause re-infection. High and low risk equipment, based on the likelihood of being infected with high spore levels, can be treated differently.

After handling American foulbrood (AFB) infected equipment, gloves, bee suits and the decks of trucks etc, which are all likely to be carrying low numbers of spores, are best cleaned by washing them thoroughly. Some beekeepers use disinfectants (e.g. Dettol, Savlon, Methylated Spirits) to try and sterilise their gloves, however most disinfectants do not kill AFB spores. Spores can even survive being soaked in methylated spirits or alcohol. Washing gloves in soapy water is probably the best treatment as it dislodges most of the spores that may be present.

Hive tools are best cleaned in a hot flame. This can be achieved by removing the lid from a smoker and pumping the bellows until the material inside is burning vigorously. The hive tool should then be held in the flame for several minutes (Figure 1). Some beekeepers use a small gas burner to scorch their hive tool. This has the advantage that it is quicker and probably does a better job.

Figure 1 Sterilising a hive tool

There are three approved methods for salvaging infected beekeeping equipment for those beekeepers with a DECA. It is illegal to use any other methods. The economics of sterilising equipment rather than burning it needs to be considered carefully. In many cases when realistic labour costs are taken into account as well as the condition of the equipment, it is usually cheaper to burn it.

The most common method used to sterilise infected hive parts is paraffin wax dipping (Figure 2). Hive parts need to be dipped in paraffin wax at 160°C for ten minutes. The time and temperature is very important so a thermometer and timer should be used. Even at this temperature there may still be the occasional AFB spore that survives. However, there will not be enough live spores to infect a colony when the equipment is used again.

A great deal of care also needs to be taken to ensure the wax doesn't get too hot or boil over if a fire is being used to heat the wax. Many beekeepers have met their local fire brigade after mishaps with their paraffin wax dippers, and a few have lost buildings when the burning wax flowed under walls. It is a good idea to have on hand a cover that can be placed over a wax dipper to put out any fires, and an extinguisher to put out spilt wax that may be on fire. It is important also to wear protective clothing because of the high temperature of the wax.

Figure 2. Paraffin wax dipper.

To check that the paraffin dipping is working the boxes should be painted immediately after dipping with a special colour. The hives the treated boxes are put on can then be followed closely to see if they become re-infected.

Floorboards, boxes, lids, excluders and wooden or metal feeders are the most common items of equipment that are sterilised by the wax dipping method. Frames are better burnt, whilst the wax is too hot to dip plastic hive components in.

Plastic hive parts and frames of foundation can instead be sterilised using sodium hypochlorite. Janola<sup>®</sup> contains 3% sodium hypochlorite while some swimming pool products contain about 35%. Sodium hypochlorite is mixed with water and so has very limited penetrating power. Anything that is to be treated needs therefore to be free of wax and propolis. Because of the air pockets that develop in cells it is not possible to sterilize drawn comb using hypochlorite.

Equipment to be treated should be immersed in at least 0.5% hypochlorite for 20 minutes. Care should be taken with dipping metal as hypochlorite can dissolve some metals as we have found out to our cost. Similarly, continually dipping leather gloves can be expensive as it causes them to rot. Sunlight breaks down sodium hypochlorite so it is important to keep it in the dark.

The third approved sterilisation method is irradiation. This is a method commonly used in Australia. We have only one irradiation plant in New Zealand situated near Wellington. If it is going to be used it is important that all the equipment is sealed in plastic so that bees do not get access to it. Irradiation has the advantage that comb can be treated as well. Brood comb should however be burnt rather than treated.

There are a number of other methods that are used overseas to attempt to sterilise AFB infected equipment e.g. scorching boxes and steam chests. These are not recommended and should not be used because they are not sufficiently effective.