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## American foulbrood - barrier systems

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American foulbrood (AFB) is one of the major diseases of beekeeping in Australia. The bacterium *Paenibacillus larvae* is ingested by the developing bee larvae and multiplies to the point where it eventually kills the bee larvae. Fortunately it is a manageable disease as long as beekeepers follow a set of best practices. The core practice for all beekeepers is to regularly inspect the brood combs for signs of the disease. When colonies with infections are identified they should be removed from the apiary at the earliest opportunity to reduce the chances of transferring the disease throughout the beekeeping operation.

The primary methods of spread are by the transfer of infected materials into healthy bee colonies and by healthy bees robbing from diseased bee colonies. Apiary hygiene will ensure that any AFB infections within a beekeeping operation are kept to a minimum. Washing sticky hands and gloves between hives, not exposing combs to robbing bees, picking up hive scrapings (burr comb) and placing it in a sealed container immediately: all these actions combined will help to ensure a low risk of spreading disease even in an apiary with infected hives.

One of the principal means by which the disease is spread is via contaminated equipment. Unfortunately it is not always possible to know if equipment is contaminated with AFB spores, so it is better to be cautious to prevent spreading the disease from infected to healthy colonies.

One system of management worth implementing is a 'barrier system'. The working definition is simple: 'there is a degree of segregation of hives and apiaries within a beekeeping operation whereby material from one hive/group/apiary is only interchanged with that hive/group/apiary'.

An individual hive barrier system is where frames and boxes from the same hive are always returned to the same hive. This can be difficult to achieve in a large beekeeping operation, but not impossible.

Smaller hobby beekeeping operations are in a better position to keep supers and combs in single non-interchangeable units. Commercial beekeepers with mobile extracting plants are in a good position to extract honey on the site of the apiary and return the extracted frames and boxes to the same hives. This is the ultimate barrier system.

A more popular barrier system is usually practised by beekeepers with several truck loads of bee hives. The beekeeper defines groups of hives as individual 'apiaries', then each apiary is identified as a separate entity and materials are only interchanged within each apiary and not between the separate apiaries. Thus, in the event of finding AFB in one hive, you can be reasonably confident that the disease has not been transferred to another apiary by the transfer of contaminated equipment.

A barrier system can extend to a much larger population of hives/apiaries by including two or three apiaries within each group where material is interchanged, but the usefulness of this system then becomes much reduced.

If you are buying second-hand equipment, it is always a good practice to keep this material separate (barrier system approach) from all the other beekeeping equipment (boxes, combs, lids, bottoms) for at least twelve months. This should include at least two extractions of honey from any supers of combs.

### Hive/apiary identification

A number of methods of identifying individual hives or specific apiaries are possible. One of the most common is to paint all the materials (lids, boxes, bottoms) the same colour, having a different colour for each apiary.

If introducing the system for the first time into a mixture of coloured boxes, then stencil a large letter

or number on each hive/box, e.g. A, B, C. Some beekeepers have made the effort to individually bar code each hive. This technology is available and worth investigating if you desire a high level of information. For example, it would be possible using this system to keep track of the productivity and queen status of each individual hive.

## Downside

The very concept of a barrier system is, by definition, one that restricts the interchanging of material. Thus, there may be cases when one apiary is in need of extra supers and none are available for that particular load of bees, but supers are available from different loads. This is when a degree of discipline is necessary – the apiary requiring extra supers needs to be extracted rather than using the supers from another load of bees.

The potential shortage of supers can be overcome by increasing the number of boxes of combs per apiary, but this then creates the further problem of storing combs not in use.

For a barrier system to be effective, complete discipline must be imposed with no interchange of equipment and an efficient comb storage system to prevent wax moth damage.

## Conclusion

Barrier systems are a very common management strategy in agricultural systems, particularly in intensive livestock businesses. Commercial beekeeping is an intensive livestock system, with the opportunities for pests and diseases to become a major problem. By adopting a barrier system, you will reduce the risk of spreading pests and diseases throughout the beekeeping operation via the transfer of equipment, making the clean-up, particularly for AFB, that much more manageable.

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