

Information Note

AFB infection - analysis of spread and possible risk locations

This note sets out the aims and key findings of a recently completed study of the pattern and spread of American Foulbrood (AFB) cases in England and Wales between 1994 and 2009. The study also looked for risk locations that may be consistently associated with AFB infection over time. The study was undertaken by the Food and Environment Research Agency and Newcastle University. The note explores the implications for bee health policy and the actions being taken in response to these findings.

The researchers are preparing a paper on the analysis for submission for publication in a peer-reviewed journal. This note is for preliminary information purposes only to assist those involved in taking appropriate biosecurity measures in the light of the main findings of the study, which is subject to peer review.

Rationale and aims

AFB is a statutory notifiable disease of honey bees which is monitored and controlled in England and Wales by the National Bee Unit (NBU). It is known to be spread by a number of routes including beekeeping practices and infected honey that contains enough AFB spores to cause disease. The NBU's disease control measures seek to eradicate infection and any associated AFB spores by burning of infected colonies and sterilisation of equipment.

The NBU's inspection data includes the location of diseased and healthy apiaries for the last 15 years and confirms that, on the whole, AFB disease occurs rarely. Around 1.8% of apiaries in England and Wales have had cases of AFB over the last 15 years. Maps of disease incidence over time suggest non-uniform patterns of AFB infection.

The study set out to examine the pattern and spread of AFB in order to understand whether AFB occurs at random across the country and over time, or whether patterns exist that may infer proximity to potential risk points which may be a source of disease. In particular, the study assessed the extent to which AFB incidents were clustered (i.e., formed patterns) and considered possible causes by identifying 29 putative risk points. The locations of these 29 risk points were identified by the NBU's bee inspectors and included 17 honey packing plants, 13 crude hive product importers sites (two of which were also honey packers) and one site used for the disposal of waste honey barrels.

Key findings

The key findings were as follows:

- the majority of AFB diseases clusters disappeared over time perhaps due to the vigilance of bee-keepers and the NBU's bee inspectors, and the destruction policy when disease has been detected, followed by increased local surveillance to check for, and manage recurrence of disease;

- AFB has a greater degree of clustering than European Foulbrood and some patterns of AFB infection could be due to localised spread of infection between apiaries;
- proximity to previous cases of AFB were significant predictors of risk of infection in neighbouring apiaries;
- three of the 29 locations potentially associated with clusters of infection showed a consistent association with diseased apiaries over time. These results suggest that apiary proximity to some commercial importers of honey or some sites used for the disposal of used honey barrels could be a risk factor for disease.

Implications of findings for bee health policy

From a policy perspective, there are three key implications from the results:

1. Localised spread of infection between apiaries may be due to foraging by bees but also may suggest between-apiary spread by beekeepers, emphasising the need for strict hygiene practices to reduce the spread of infection and/or spores by beekeepers.
2. The majority of potential risk locations (26/29) showed no consistent correlation with AFB, suggesting that most premises processing imported honey or crude hive products are operating without presenting a consistent risk to local honey bee stocks.
3. The consistent correlation of disease incidence with proximity to the location of two honey packing plants provides a reasonable basis for action to be taken by these plants (and associated disposal sites) to reduce the risks from these sites as potential future sources of infection. It is important to stress that the analysis shows a strong statistical correlation between incidence and the location of these two plants but does not prove that they are the cause or source of the AFB infections.

In relation to this third point, we do not currently have powers to routinely enter honey packing plants nor do we have powers to routinely control disease risks at these plants, i.e., in the absence of reasonable grounds for suspecting that AFB (the disease itself, not spores) is present on or in those premises, or confirmation of AFB in a hive. We have responded to the evidence (point 3 above) by informing the two plants about the analysis and have requested that they take action on a voluntary basis to reduce the risk of honey bees foraging on their honey stocks.

Subject to the actions being taken by the honey packers (see section below) and their success in voluntarily adopting biosecurity measures to reduce the risk, and any re-occurrence of local outbreaks of AFB, we will review what additional steps may need to be taken.

Actions being taken by the honey packers (where a consistent correlation was demonstrated with local AFB infections)

We have informed the two honey packing plants of the analysis and results, and requested that they take action on a voluntary basis to reduce the risk of honey bees foraging on their honey stocks.

We are currently in discussions with the two plants and are arranging to visit each plant over the summer to review what steps they are taking or plan to take. We have also been invited by the Chair of the Honey Association to attend their meeting on 30th June 2010 to report on the results of the analysis. The two companies involved have responded positively to our request for voluntary action. They have been clear that they do not need proof of a causal link for them to act, and they are making or plan to make improvements to their biosecurity on that basis.

For example, one of the plants has informed us of the actions they have taken over the last two years which include:

- Improvements in the reception and storage of honey. All drums are inspected on receipt. Specific actions are taken if they are damaged or leaking (by wrapping and/or providing new lids). Drum handling equipment has been improved to reduce risk of damage to lids.
- Improvements in waste disposal. For example a new drum crusher to reduce the volume of waste drums, making it possible to store waste drums in sealed skips in which they are removed from site. Vent holes in the skips and containers have been sealed to prevent bees from getting in. The drum crusher is washed down after each use.
- Improvements in housekeeping. For example, the yard is orderly and easy to inspect. Any spills or leaks of honey are dealt with as they occur. A daily yard check is carried out by a supervisor, against a check list. If any drums are found to be damaged or leaking, they are either sealed or, if this is impractical, processed straight away. Any spills are immediately cleaned up.
- Staff training. For example, all staff have been briefed on this issue including a poster campaign to maintain awareness.

The second plant, where honey is a modest part of the total operations on the site, has informed us that they practise good biosecurity including intake checks and yard discipline. Staff training includes managing insects during the summer season e.g., closed doors, clean up of spillages (product and sweetener syrups).

Implications of results for beekeepers

Beekeepers whose apiaries are located in AFB hotspots may wish to review their biosecurity practices to reduce the risk of infecting or re-infecting their colonies. If beekeepers are worried that their apiaries are located close to possible risk locations, they may wish to remind themselves of the symptoms of AFB and their responsibilities to notify their local bee inspector if they suspect disease. Further information and advice on AFB for beekeepers is on BeeBase www.nationalbeeunit.com, which includes maps of AFB inspections.

Bee Health Policy

Fera

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