

Review of policies on managing and controlling pests and diseases of honey bees

Evidence profile on exotic pests and pathogens

This profile on exotic pests and pathogens sets out the main sources of evidence considered by the Review Group on Small hive beetle, *Tropilaelaps* mites and Asian hornet i.e., risk assessments and contingency plans and listed with links in Part 1. Part 2 summarises the main points from discussions on exotic pests and pathogens by the Review Group which identified additional potential exotic threats to UK honey bees, including Colony Collapse Disorder (note: comments are not attributed)

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Part 1 - Introduction, risk assessments and contingency plans

Introduction

Exotic threats to UK honey bees:

1. The Small hive beetle (SHB), *Aethina tumida*, is an invasive species originating from Africa which has proved to be a serious pest of honey bee hives in the USA and Australia. SHB is a notifiable pest of honey bees under EU legislation. It has not been detected or confirmed in the UK or in other EU Member States.
2. The Asian bee mites *Tropilaelaps* spp. are potential new threats to UK beekeeping. The mites are native to Asia and have spread from their original host the giant honey bee, *Apis dorsata*, to the European honey bee, *A. mellifera*. *Tropilaelaps* mites are notifiable pests of honey bees under EU legislation. They have not been detected or confirmed in the UK or in other EU Member States.
3. The Asian hornet (*Vespa velutina*) is an invasive species originating from Asia. It predated on honey bee colonies (and other insects) and causes significant damage to colonies. It is present in other Member States such as France and is likely to arrive in the UK, although timing is uncertain. It is not a notifiable pest of honey bees.

Risk assessments

The Review Group considered relevant details on biology, impacts and likelihood of arrival from the following risk assessments:

1. Risk assessment on Small hive beetle (commissioned by Defra and undertaken by Fera). Available on Defra's website at:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17051&FromSearch=Y&Status=3&Publisher=1&SearchText=PH0510&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

2. Draft risk assessment on *Tropilaelaps* mites (commissioned by Defra and undertaken by Fera). This risk assessment is close to completion and will be available on Defra's website in autumn 2012.

3. Non-native Organism Risk Assessment for the Asian hornet (commissioned by Defra's Non-Native Species Secretariat and undertaken by Fera's National Bee Unit). Available at:

<https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=51>

Contingency and response plans

The Review Group considered the key aspects of the response to these pests from the following contingency or response plans:

1. (the current version of the) contingency plan on exotics pests (Small hive beetle and *Tropilaelaps* mites) – on BeeBase pages:

<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=206>. This is currently being updated.

2. Response plan on the Asian hornet – on BeeBase pages:

<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=208>

Part 2 - Main points made by the Review Group on detection of, and response to exotic threats

General points on exotic threats

- (to increase likelihood of eradication of exotic pests) beekeepers needed to be able to detect them reinforcing the need for continuing awareness raising and education and training on exotic pests as already provided by the NBU and the beekeeping associations.
- Key questions/issues were:
 - whether resources should focus be on responding to an incursion or on training and educating beekeepers to detect and manage these threats?
 - whether we had the right balance in the response, in particular should more resources be allocated to optimise early detection given that there were few management/treatment options for beekeepers if the pest(s) arrived?
 - can we learn from other countries experiences with these pests to ensure a proportionate response?

Small hive beetle (SHB)

1. Are we doing enough to ensure early detection of this pest?

- Awareness of SHB should be raised and all beekeepers should be asked to look for SHB and send suspect samples to the NBU.
- The NBU's Exotic Pest Survey (which targeted high risk areas to detect exotic pests) and a robust network of 'sentinel apiaries' were key to early detection (alongside beekeeper awareness). These programmes could be extended further to include other randomly selected areas and to natural beekeepers. But it was not practical for all beekeepers to become 'sentinel apiaries' due to resource implications.
- In relation to the likelihood of sentinel apiaries picking up SHB before it becomes widespread, experience overseas suggested that once SHB was found it was fairly widespread. There was limited available evidence on the efficacy of sentinel apiaries in early detection of incursions of exotic pests.
- Given the lack of management options for this pest, there needed to be even more focus on early detection including training and education and a robust sentinel apiary programme, to increase the chances of preventing establishment and/or spread.

2. What are the barriers to effective eradication?

- The focus of controls should be on destroying colonies –treating larvae in the soil was a secondary issue.
- The lack of an approved soil drench was an issue. No product had been approved for use in the UK and this situation was unlikely to change given the wider environmental aspects.
- The use of lime was suggested as a possible alternative following research from Germany and America.
- Fera had been carrying out work on nematodes in the soil which would feed on

the larval stages; this was 100% effective and could be used for containment/management subject to labelling requirements. Although the nematode could be used prophylactically, further information on its effectiveness was needed.

- No off the shelf products are available for treatment in the hive. The only product currently available was a varroacide used in the USA (Checkmite) which could be used under a special treatment certificate from VMD for emergency treatment – it was not a long term solution.
- Should further work be carried out on lures? The NBU had developed a lure in the lab but this had not been successful in field trials carried out in South Africa (although the reasons why the lures were unsuccessful were not clear).
- A weakness in the contingency plan was relying on beekeepers' skills.

3. Response policies - eradication or containment?

- Although all infested colonies would initially be destroyed the policy was likely to move quickly from eradication to management/containment which would present problems for beekeepers as there were currently few/limited management options.
- There were concerns about the commitment of beekeepers to a destruction of infested colonies? Would they be tempted to try to save them instead?
- Given the likelihood of the response policy changing quickly from eradication to containment, there were concerns about whether it was sensible to put resources into eradication of SHB when the response would change to containment.
- The change in policy from eradication to containment would depend on how and when the first outbreak occurred. It was not possible or desirable to set arbitrary threshold levels in the contingency plan (in terms of number of outbreaks which would trigger a change in policy).
- The likelihood of rapid spread of SHB suggested that hive movement controls would not be worthwhile (for eradication or containment policies).
- SHB will spread rapidly. Beekeepers already found it difficult to deal with *Varroa* – how would they manage SHB?
- Experience in other countries with SHB should be considered in planning how to respond to this pest. SHB had been in South Africa for some time and beekeepers can live with it. There had been a lot of losses initially in the USA when SHB was discovered but it is now a management issue.
- The NBU needed to issue robust advice about management options.

***Tropilaelaps* mites**

Current response

- Early detection was important but there were limited pathways by which this pest moves in the environment given that is normally associated with honey bee brood.
- A key assumption for the response to this pest was that *Varroa* treatments and management practices would be used.
- The mites could be spread by beekeeping practices but were more straightforward to control than *Varroa* and there were more options to keep the

populations down such as husbandry measures to reduce brood. However, there was a question of whether treatments to which *Varroa* was resistant could be used and this needed to be clarified.

- Due to the mites slower spread, an eradication programme could be effective and continued for longer than in the case of SHB.

The Asian hornet

Current response

- The hornet's non-notifiable status could be included as an issue to be addressed in the consultation.
- Beekeeping associations and the NBU needed to work together to ensure that the messages/advice about this pest was consistent and helpful.
- Without impact costs from this pest it would be difficult to carry out a cost/benefit analysis of the options for government action on managing this pest.

Other exotic threats

The Review Group identified the following potential exotic threats:

1. Colony Collapse Disorder (CCD) - a condition that has been observed in the USA (but not in the UK or other EU Member States). It is characterised by large-scale, unexplained losses of colonies in particular sudden or rapid loss of adult worker bees in whose absence the colony cannot be sustained and eventually dies. This condition is not fully understood but the presence of Israeli acute paralysis virus and the closely related Kashmir bee virus has been correlated with the disorder along with other risk factors. Both viruses are present in apiaries in the UK but at very low incidence levels.

The review group agreed that the NBU should look for opportunities to monitor these viruses as part of their existing surveillance programme, and as resources allow.

2. A range of other known exotic pests or undesirable species such as Africanised honey bees, the Cape honey bee and various mites, although none has yet been found in the UK. The review group noted the importance of early detection and management of these species to safeguard honey bees (and other insect pollinators) in the UK.

3. Currently unknown species and other risks. Honey bees may face a range of deleterious impacts from not yet identified species and other risks. Such risks were recognised based on experience of emergence of previously unknown risks to honey bees over the last 16 years (SHB, the Asian hornet, *Nosema ceranae*). Based on this experience, it is reasonable to assume that one as yet unknown risk to honey bees could emerge once in every 5 years.