

# Sentinel watch

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Voluntary sentinel apiarist Richard Oliver

Like the canary in the coalmine giving an early alert of gas, sentinel apiaries aim to detect new and exotic honey bee pests and diseases at a very early stage so that action can be taken to prevent or limit their spread. Their value in Australia has recently been demonstrated when varroa mites were seen in sentinel beehives in the Port of Newcastle, New South Wales, enabling a prepared strategic plan to be enacted to try to stop the spread of the mite and perhaps even eradicate it.

Launched in 2010, Britain's sentinel apiary programme is targeted to detect the statutory exotic pests, the small hive beetle (*Aethina tumida*) and *Tropilaelaps*, evidence for the presence of each of which can usually be found in the hive. It is one of several Defra (Department for the Environment and Rural Affairs) measures designed to keep out exotic pests.

Today there are almost 200 sentinel apiaries in England, Wales and Scotland. Some are enhanced sentinel apiaries (ESA) directly managed by the National Bee Unit (NBU) and monitored three times a year while others are voluntary sentinel apiaries (VSAs) managed by beekeepers who have been invited by local bee inspectors to take part and are monitored twice each year.

Each sentinel apiary sends debris from the hive to the Central Science Laboratory at Sand Hutton, near York. The debris is an excellent indicator as anything falling from the hive may include dead or alive exotic pests or their body parts or their eggs.

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## Sentinel distribution

Although there is a good spread of sentinel apiaries across the country, the sites are chosen to reflect the most likely areas for pests and diseases to first appear, so seaports and airports are well represented along with areas that pose particular risks, such as wood yards using imported timber (see Panel). ESAs tend to be in the highest risk areas, while VSAs are more widely spread – about 15 in each of the eight NBU regions, giving remarkably thorough coverage across the country.

So that the distribution of sentinels is optimal in terms of effectiveness, numbers, distribution and resource use, a detailed mathematical modelling research paper of 2017 has informed the NBU sentinel apiary distribution, especially the ESAs.<sup>1</sup> Not unexpectedly, South East England, especially London and its surrounds, is deemed to be the area posing the greatest risk. The number of apiaries that exist in an area is also taken into account – the higher the density, the greater the risk and likely speed of the spread of pests and infection.



Speed of potential spread of an exotic was a critical factor in the mathematical model in determining the total number of sentinels. The higher the number of sentinels, the faster the alert is likely to be raised and therefore the greater chance of limiting or stopping the spread of the exotic. Of course, the more sentinels, the greater the resources required, so a balance has to be struck.

Currently, in England and Wales, there are about 50 enhanced sentinel apiaries (ESA) and approximately 125 voluntary sentinel apiaries (VSAs) and in Scotland around 17 VSAs. In Northern Ireland there are none, but the NI Department of Agriculture, Environment and Rural Affairs (DAERA) encourages beekeepers to report anything suspicious and, if credible, an inspection will follow.

### Measuring success

One of the ironies is that the best possible scenario is that no pests or diseases are found in sentinel apiaries. As long, of course, as nothing has slipped through. Asian hornet traps aside, the good news is that the sentinels have so far turned up nothing, but regrettably no one is expecting that situation to continue for very much longer.

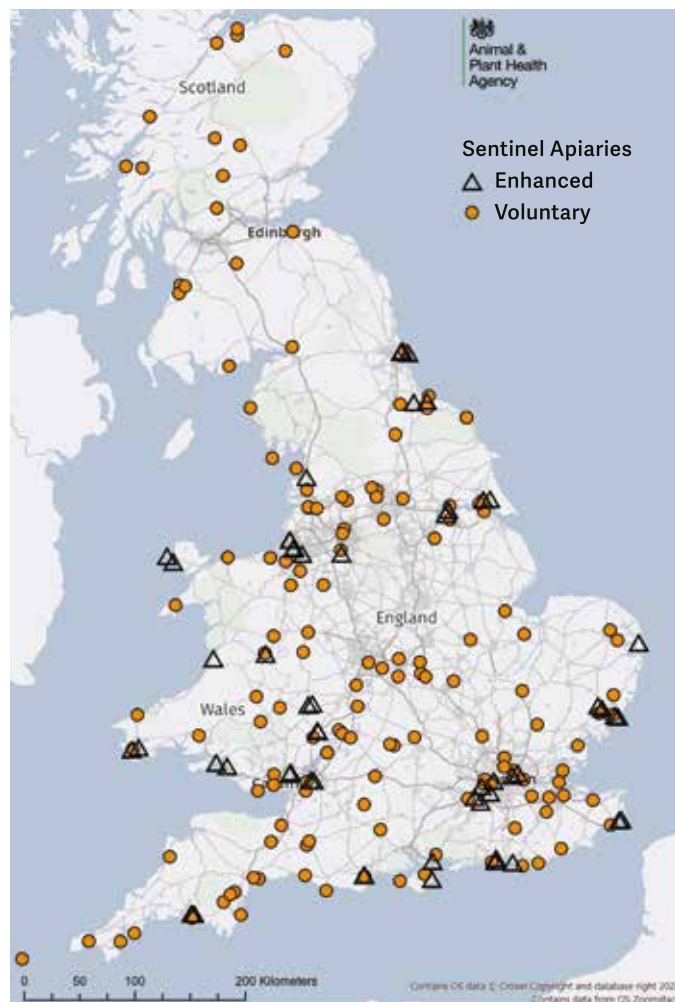
### Richard Oliver, a sentinel apiary volunteer in Wiltshire

With paid work behind him and his 70th year approaching, Richard Oliver let it be known to his family that he wanted to remain active doing something quite new, so his eldest son enrolled him on a beekeeping course (without paying for it, Richard notes wryly). During the course, he wasn't particularly enamoured by the prospect of keeping bees until he saw inside a hive for the first time.

As an experienced logistics planner in his career as a major general in the army, what he saw in the hive struck a chord: "The whole thing was extremely complex but, at the same time, incredibly simple. There were all these things happening together, and yet it seemed to work. I wanted to know why. I was hooked."

Within a year, he had passed the BBKA basic assessment and last year, ten years later, he had become a Master Beekeeper, only the second in his home county of Wiltshire. Now working through the syllabus for the National Diploma in Beekeeping, he is also his county's educational and examination officer, following the departure to Worcestershire of his highly valued mentor Sally Wadsworth.

In 2017, Robert Carpenter-Turner, the then seasonal bee inspector (SBI) for the area, was looking to replace a local voluntary sentinel



apiarist who had recently given up beekeeping. He approached Richard as his credentials were good – he already had several BBKA examination modules under his belt and was obviously a very competent and reliable beekeeper. (VSA beekeepers don't apply for the post; they are invited.) Richard's apiary location wasn't exactly what Robert had been looking for but, on the edge of Salisbury Plain with lots of military movement nearby and local market gardens in the vicinity, it was nonetheless good enough to be in a very useful position.



Once agreed, the National Bee Unit, which administers the scheme, sent Richard a package:

- sheets of black corrugated (Correx) card, similar to inserts that are used in some varroa screens, to be cut into 10x15cm pieces and placed directly on the floor where they provide potential hiding spaces for small hive beetles
- some Beetle Blasters, trays to be filled with oil and vinegar (avoided by bees) suspended between two outer brood frames to trap any small hive beetles that may be in the hive
- plastic bags to collect the hive floor debris
- two paper envelopes: one for floor debris and a Jiffy padded envelope for postage
- labels.

The following were also offered, but Richard already had them:

- wire to clear blockages (wax or propolis) from the Correx flutes
- uncapping fork to uncap pupae to examine for *Tropilaelaps* spp. mites
- Eppendorf tubes for containment of suspicious insect samples or diseased larvae.

From one of the seven colonies in his apiary in his garden in rural Wiltshire, Richard collects and send off the debris twice a year, the first between April and June and the second between July and September. Richard leaves his Correx cards in place in the hive throughout the beekeeping season for between one and two months. It's easy enough, says Richard, even though to access them he must move the brood box to one side.

Richard isn't asked to put out any form of trap for Asian hornets (*Vespa velutina*) or *Tropilaelaps*, but he can of course do so if he wishes.

What does Richard think of his sentinel role? "I think it's very important even though I am not quite on the front line in the way that people in Poole or Felixstowe are. It's interesting to do because it makes you more aware, it takes up minimal time."

The protocols to manage a VSA are not particularly arduous, says Richard, and like other volunteers he is appointed on a rolling one-year basis, liaising with Avril Earl, now the SBI for his area. Although there are no fees for the VSA beekeepers, their expenses are covered.

"I feel I'm helping the beekeeping community – actually, the wider community," says Richard. "Recently, we have all had a wake-up call hearing about the discovery of varroa mites in sentinel hives in Australia."

## Vespa velutina, Asian hornet, monitoring

Because *Vespa velutina* rarely if ever leaves evidence in a hive of its presence, relatively low-maintenance sentinels returning debris give no clue as to its presence, so a different methodology is applied. Baited traps, which need daily monitoring to release bycatch of native insects, are placed in areas thought to be high risk and also in other areas (especially in the south and east) if the traps can be checked daily to release any bycatch.



## Why speed of identification and reporting is so critical

In 1992, the reporting of the varroa mite in Devon, while admirable, was probably too late to prevent its spread. Just a few weeks later, it was seen hundreds of miles away indicating that it had been in the country, unnoticed and therefore unreported, for some time. By spring 1992, there was no way back and no way to stop the mite's spread to most of the UK.

To date in Australia, very early responses seem to have repelled four invasions of the varroa mite and action against a fifth is currently underway. This time the initial spread is much more widespread and the mite population sizes in colonies suggest that it's been on the continent for some time. Nonetheless, as soon as it was spotted in a sentinel apiary, a long-prepared eradication plan was launched. Although the stand-still zone has had to be enlarged, the eradication strategy may yet succeed (at the cost of many euthanised colonies).

## Examples of high-risk sites

Landfill sites associated with imports  
Hive-products importers  
Seaports  
Airports, including military airports  
Freight depots  
Fruit and vegetable wholesale markets

## Watching for three top exotic pests

Asian hornet, *Vespa velutina*  
Small hive beetle, *Aethina tumida*  
*Tropilaelaps* species  
One extrapolation from recent data suggests that we can expect an, as yet, unknown risk to honey bees to appear every five years.

With thanks to the National Bee Unit, especially Nigel Semmence and Avril Earl, for information and helping to organise the meeting with sentinel apiarist Richard Oliver.

1 <https://doi.org/10.1098/rsif.2016.0908>

- 1 Map of sentinel apiaries in the UK
- 2 Filling a Beetle Blaster to trap any small hive beetles
- 3 Hanging the Beetle Blaster between brood frames
- 4 Inserting the Correx card to collect falling debris

