

The Random Apiary Survey (RAS) – Final Results

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This survey gave an accurate picture of the prevalence of honey bee brood diseases

TO GET an accurate estimate of the prevalence of honey bee brood diseases and to monitor pathogens, including up-and-coming species, in adult bees, in 2009 the Department for Environment, Food and Rural Affairs (Defra) and the Welsh Government (WG) commissioned a two-year survey of apiaries across England and Wales.

What was the incidence of foulbrood disease?

Brood disease prevalence across England and Wales, was 1 in 400 apiaries (0.25%) for American foul brood and 1 in 80 apiaries (1.25%) for European foul brood.

How did NBU risk-based inspections for foul brood compare?

Reassuringly it is good to note that, the NBU risk-based inspections detected far more foul brood disease compared to the random inspections. The figures suggest that risk-based inspections are 1.5 to 3 times more efficient at finding AFB and 3 to 4 times more efficient at finding EFB compared to random inspections.

Was foul brood disease found in unexpected places?

Not only was less foul brood disease found in the RAS inspections, but most was located in areas that the NBU had already identified as high risk. Very little disease was found in apiaries that were thought to be at low risk of having foul brood. These results demonstrate that the NBU's current understanding of which apiaries in England and Wales are at risk from foul brood is sound.

At this point it is important to remember that this knowledge of risk is based on the quality of information that we have within BeeBase, the database of beekeeping statistics for England, Wales and Scotland. We rely on the great cooperation we get from beekeepers, signing up to BeeBase, and on registered beekeepers reporting suspect symptoms of foul brood diseases to us so that we can work together to tackle outbreaks quickly and effectively. If you haven't already done so, you can sign up online at: www.nationalbeeunit.com, or email: nbu@fera.gsi.gov.uk, or telephone our offices on 01904 462510. You will be joining 26,000 other registered beekeepers (over 7,000 of whom signed up since the start of the RAS), and you will be making a really positive contribution to the collective health of our national honey bee stocks.



A worker honey bee suffering from Deformed Wing Virus

Are apiary risk ratings useful for finding foul brood disease?

The risk-based inspection programme currently allocates high (red), medium (amber) and low (green) risk classes to every known apiary, even before a visit takes place. NBU inspectors prioritise visits to the highest risk sites before visiting other lower risk sites. It was possible to look at all disease 'hits' found during the risk-based apiary visits, to see whether more disease was being found in higher risk apiaries. Interestingly, AFB was found at 1 in 100 high risk, 1 in 300 at medium risk, and 1 in 600 at low risk apiaries. Similarly, EFB was found at 1 in 16 high risk, 1 in 70 medium risk and 1 in 200 low risk apiaries. It is reassuring to know that these results suggest that the apiary risk classes used by the NBU are useful for targeting disease.

What about the prevalence of emerging pathogens in adult bees?

There has been much worry amongst beekeepers concerning emerging pathogens in recent years. These include Kashmir bee and Israeli acute paralysis viruses (KBV and IAPV), which have been suggested as risk indicators of Colony Collapse Disorder (CCD) in the United States. Also, *Nosema ceranae*, an Asian variant of the resident *Nosema apis*, has been linked to large-scale colony losses in Spain and Portugal. The good news is that KBV and IAPV were very seldom found in the adult bee samples collected from each apiary visit within the RAS.



It is a different story, however, when it comes to the prevalence of *Nosema ceranae*: this was found to be very well distributed across England and Wales, with more than one third of apiaries testing positive.

Do we know how pathogen prevalence may link to outbreak of disease?

While the RAS data illustrate the relative prevalence of the different pests and diseases covered by the RAS, it does not provide the same insight into their respective relative impacts. For example, even though the RAS found that *N. ceranae* was very common, we also know from subsequent analysis of our data, that the presence of this microsporidial parasite is not consistently linked to poor colony health.

Things were different for another major player, our old enemy varroa, which has long been cited as the public enemy number one when it comes to apiary health. Indeed, the RAS found, and again confirmed, that high levels of varroa mites were detrimental to the health of an apiary. Worse still, Deformed Wing Virus, which is associated with the mite (and also has a high prevalence), is associated with finding dead colonies in an apiary. Of the 19,000 colonies inspected during the RAS, a significant proportion was found to have problems with these two organisms. This supports the findings in Defra funded project *Investigating abnormal Colony Losses in England and Wales* (<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=177>), which showed DWV as the biggest risk factor associated with colony mortality (full project report available from Defra). So whilst there are some new kids on the block when it comes to pathogens, it is important not to lose sight of the ball and maintain the varroa vigil, and keep levels low to maintain productive colonies.

What do my personal results mean?

If your apiary was visited and sampled for this survey, then all your results are available on your personal pages of BeeBase. When you look at your results it is important to remember that the tests we use are incredibly sensitive, capable of detecting tiny amounts of any target pathogen. This means that the test can be positive, even in the absence of any disease symptoms. For example, molecular

screens used at Fera can detect a single nosema spore within an adult bee sample, so just because your bees tested positive, this does not mean that they will be on their knees with nosemosis. Honey bees often cope with multiple infections without showing symptoms, and pathogen prevalence can vary seasonally. However, if your bees become stressed, perhaps due to lack of forage or high levels of varroa, then the pathogens we have tested for can cause problems to the health of your colonies. We are preparing an advisory note on what your results mean, which will help to guide those who have participated in this survey to interpret their results. For a copy, please visit BeeBase or email the NBU office (nbu@fera.gsi.gov.uk).

Summary thoughts

In the current economic climate the spending of public money is quite rightly in the spotlight. When compared with our risk-based inspections data, the results of the RAS demonstrate that the NBU programme of inspections is efficient in finding disease and not missing unknown pockets of infection. That is not to say we cannot improve things. As always, the NBU is very grateful to all the beekeepers who help us and get involved in projects to improve our understanding of honey bee health. Without you, the RAS simply would not have been possible. Together, we have achieved a dataset unrivalled anywhere in the world, which will form the platform of future decisions regarding honey bee health and surveillance.

Acknowledgments

The National Bee Unit gratefully acknowledges the support of all the beekeepers in England and Wales who participated in this project, without whom we would not have been able to complete the work. Also thanks are due to Defra and the Welsh Government who funded the survey. *