

European Union Pilot Surveillance Programme for Honey Bee Health: Part 1

Gay Marris and Mike Brown (National Bee Unit)

The background to the establishment of the EU Reference Laboratory for honey bee health

IN RECENT YEARS there have been accounts of ‘serious’ and sometimes very sudden losses of honey bee colonies in Europe (and also elsewhere). While these are cause for international concern, a comprehensive study into Bee Mortality and Bee Surveillance by the European Food Safety Agency (EFSA, 2009) concluded that honey bee health surveillance systems in Europe are ‘highly variable and generally weak’. As a result, few countries have any reliable data to allow losses to be properly quantified.

Although we are proud that the National Bee Unit’s (NBU’s) Apiary Inspection Programme for England and Wales was found to be of a very high standard (the best in the European Union [EU]), differences between national surveillance systems are so great that available data cannot usefully be compared between Member States. Moreover, there is insufficient knowledge of causative and risk factors associated with colony losses; declines are not only unmeasured in many parts of Europe, but also unexplained.

In February 2011, the EC officially appointed the Sophia-Antipolis Laboratory of ANSES, France (French National Agency for Sanitary Safety of Food, Environment and Labour, formerly AFSSA [<http://www.anses.fr/>]) as the EU Reference Laboratory (EURL) for honey bee health. Bee Craft published an article about this event in October 2011 (page 17). This mandate took effect on 1 April 2011 and will run for 5 years (until 2016).

The Birth of the Pilot Surveillance Programme

The first action of the EURL has been to address the knowledge gap by initiating a Pilot Surveillance Programme (PSP) to collect standard baseline data on colony losses and honey bee health from across the EU. In the autumn of 2011, Member States received an invitation to participate, stipulating monitoring procedures that would have to be followed rigorously in all countries taking part to ensure comparable data at the end of the project, not only at the national but also at the European level.

The NBU responded to this call on behalf of England and Wales. We submitted a full proposal, describing in detail how we would conduct national surveillance to contribute to the EU-wide dataset sought by the PSP. In late May 2012, we received the excellent news that our proposal met all the European Commission’s (EC’s) requirements. In total, 17 Member States were offered financial assistance for their respective PSPs on honey bee colony losses and all 17 accepted the challenge.



© Crown copyright. Fera National Bee Unit

Figure 2. Typically all colonies in an apiary will need to be sampled for the PSP

The National Bee Unit recognises the high importance of the PSP to our understanding of pan-European honey bee health and are delighted to be undertaking this work on behalf of the UK (England and Wales). The full list of participants comprises Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovak Republic, Spain, Sweden and the UK (England & Wales).

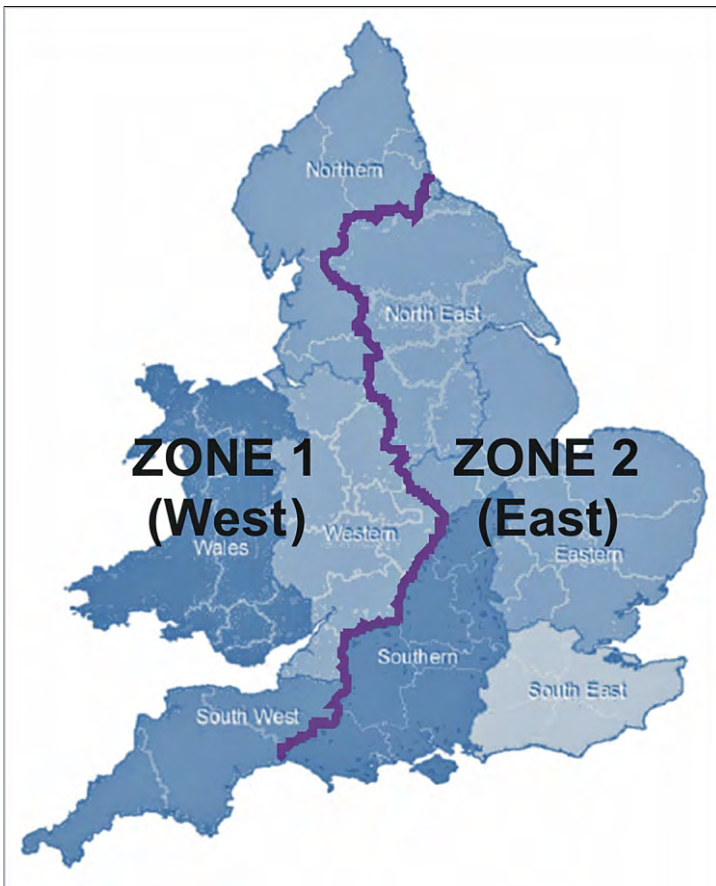
The EC Perspective on the PSP

In early June 2012, the EURL held a kick-off meeting for the PSP in Brussels. This was attended by representatives from all participating Member States, including Mike Brown and Gay Marris (NBU) on behalf of the UK. Opening the meeting, the EC Directorate-General for Health and Consumers explained how this is the first time that such a pan-EU surveillance project has ever been undertaken.

Key to the success of the project will be its harmonised approach, to which all Member States must adhere. To achieve its goals, the EC has made available a total fund of €3.75 million of which €3.3 million has now been allocated to participating Member States (of which the UK has been allocated €265,000). Although a project of this scale will undoubtedly prove complex, the EC Directorate emphasised the unique opportunity that implementing the EU PSP affords the international beekeeping community. The data from this project will be invaluable in informing the EC’s decision-making processes at the highest level.

The Population to be Sampled in the UK

For the purposes of the PSP, each participating country is required to ‘target’ the whole national beekeeping population in its surveillance regime and geographical coverage should address the whole country. Although this suggests that literally every single colony in every single apiary in every corner of England and Wales must be



Wales as two, broad, geographical zones, termed ‘East’ and ‘West’ respectively (Figure 1). Although due to national and regional boundaries, the density of beekeeping is unequal (West zone covering a slightly smaller sample population), this arrangement does still ensure coverage across all of England and Wales, without imposing over-great inspection loads on Appointed Bee Inspectors responsible for single regions (Tables 1 and 2). This also ensures that a sufficient number of apiaries identified as ‘at risk’ of exotic pest incursion (Small hive beetle and/or *Tropilaelaps* mites) are included in each zone (another requirement of the PSP).

In climatic terms, this zoning scheme allows us to take into account the large differences in rainfall between eastern and western UK, a factor known to contribute to within-season losses. Other Member States have adopted different strategies to achieve adequate geographical ‘representativeness’. For example, whereas the UK has divided the whole of the territory of England and Wales into two zones with total coverage of the entire land area, France has selected six illustrative regions in which to conduct its PSP. Both these approaches are acceptable to the EURL.

Choosing the Apiaries to Sample

One hundred apiaries will be sampled in each geographical zone, so the total number involved in England and Wales will be 200. Although we did consider working with a larger number of apiaries, in statistical terms, if 100 apiaries are

Figure 1. Division of England and Wales into two geographical sampling zones (West and East) for the EURL Pilot Surveillance Programme

included in our project, this is not in fact the case. What it does mean is that randomized sampling should be carried out in such a way that all beekeeping groups (ie, professional and hobbyist) are included in the regime and that the parts of the country visited properly represent the variety landscapes (urban or rural) found in the UK. We also have to visit enough apiaries (and colonies within those apiaries) to ensure that our results are, statistically speaking, as precise as possible.

Choosing the Geographical Area to Sample

With the above considerations in mind, we have chosen to consider the eight beekeeping regions of England and

Table 1. Division of England and Wales for EURL Pilot Surveillance purposes – land coverage per zone (km²)

ZONE	Regions involved	Land coverage (km ²)	Total (km ²)
WEST	Wales	20,766	73,630
	Western England	20,471	
	Northern England	19,830	
	South West England	12,563	
EAST	North East England	20,796	77,558
	Eastern England	27,592	
	Southern England	18,397	
	South East England	10,773	

Table 2. Division of England and Wales for EURL Pilot Surveillance purposes

*2011 BeeBase data; **2011 staffing levels for Appointed Bee Inspectorate

ZONE	Regions involved	No apiaries/region*	Typical no Inspectors/region**	Total no. apiaries/zone	Typical no Inspectors/Zone*
WEST	Wales	3350	11	13,930	29
	Western England	4066	6		
	Northern England	2325	5		
	South West England	4189	7		
EAST	North East England	3242	6	17,824	28
	Northern England	6030	9		
	Southern England	4491	7		
	South East England	4061	6		
Totals	8	31,754	57	31,754	57

sampled with a presumed colony loss prevalence of 20%, the 95% Confidence Interval for any observations are between approximately 12% and 28%. We thus concluded that a sample size of 200 apiaries offers a workable balance between a reasonable level of precision and a sample population that will be manageable in terms of inspection and diagnostic commitment.

Having decided how many to work with, we have generated a completely randomised list of apiaries from those registered on BeeBase and we have been writing to the beekeepers concerned asking them if they are willing to take part. The first 100 acceptances from each zone will comprise our sample population.

The number of apiaries that other Member States will include within their own PSPs are as follows: Belgium 150 apiaries, Denmark 194, Estonia 196, Finland 160, France 396, Germany 220, Greece 200, Hungary 196, Italy 390, Latvia 193, Lithuania 193, Poland 190, Portugal 145, Slovak Republic 198, Estonia 200 and Sweden 150. The total

Contact Details

The National Bee Unit
The Food and Environment Research Agency (Fera)
Sand Hutton
York YO41 1LZ
Office telephone: 01904 462510
gay.marris@fera.gsi.gov.uk

number of apiaries involved in the PSP in all participating Member States is just 3571 so if you are one of those few who have received an invitation to take part, you are in very select company. If you have accepted the invitation – a huge thank you! If you would like more information before making your decision, please get in touch with me. My contact details are below.

Choosing which colonies to sample

The UK programme is based on an assumption of pest/pathogen detection of 5% prevalence. This means that we have chosen to inspect sufficient hives to detect a pest or disease even if it is only present in 5% of colonies. (Most other Member States based their sampling regimes on an assumption of pest/pathogen detection of >15%.) Apiary inspection data from 2010–2011 suggest that 96.5% of all apiaries in England and Wales comprise 19 or fewer colonies (Figure 2). Thus, in the majority of cases we can reliably predict that all colonies in an apiary will require to be sampled under the regime prescribed by the PSP. If it happens that 20 or more hives are present, then 19 of these will be selected at random for sampling.

In England and Wales, the average number of colonies per apiary is about five, so the sample population expressed in terms of colony numbers is expected to be in the order of 100 apiaries x 2 zones x 5 colonies = 1000 colonies in total. *

[To be continued.]

HP ad