

Feral Bees in the UK: The Real Story

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The health of the UK's honey bee community

HISTORICALLY, IN THE UK, beekeepers have experienced considerable fluctuations in colony numbers, often associated with incidences of severe weather, but since 2001 we have seen a steady increase in annual losses. The current health status of the world's honey bee stocks is a matter of major international concern.

Reports of colony declines not only attract the attention of beekeepers, food producers, who rely on foraging bees to pollinate crops, and the scientific community but also it seems that the perceived threat of bee losses on a global scale has touched the consciousness of the public at large. Media interest in the many issues that surround bee health has never been greater, with 'bee stories' receiving almost daily high-profile press coverage.

However, in spite of all this intense focus on all aspects of bee health, an important fact is often overlooked: the UK's honey bee stocks are not just comprised of managed honey bees. In fact, there is a growing body of evidence that our managed *Apis mellifera* may share their foraging fields with a variety of unmanaged, feral or even wild native honey bees. Little is known about the distribution of these bees and still less about whether their numbers are also in decline.

WHAT IS A FERAL BEE?

It is currently not proven whether we still have native honey bee colonies in the UK. Such colonies would be of the native honey bee subspecies (*Apis mellifera mellifera*), surviving on their own either in remote wooded areas of the UK or in cavities scattered around the country.

A feral honey bee colony, on the other hand, is usually considered to be one that is surviving unaided by man, having escaped 'domestication' and returned to the wild. While undoubtedly some beekeepers would argue that their bees could never be described as fully domesticated, it raises some interesting questions. Are the unmanaged bee colonies that we find in the UK:

- i simply annual swarms from nearby beekeepers that, if left unmanaged, will ultimately die out?
- ii escapees from domesticated stocks, but surviving in the wild unaided (ie, feral honey bees)?
- iii genetically distinct indigenous British honey bees, persisting in their wild state (ie, native honey bees)?

WHY ARE FERAL BEES AND UNMANAGED BEES INTERESTING?

Much has been reported in the media about feral or



Peter Edwards

A colony located in a wall of a beautiful house in Clifford Chambers. A long collapsible pole with an entomological net fastened to the end proved to be an invaluable tool, although rather unwieldy!

unmanaged honey bee colonies being wiped out, yet there are also plenty of anecdotal tales from most parts of the UK of honey bee colonies seemingly surviving without any human intervention at all.

As beekeepers, we keep our managed colonies healthy by treating for disease and by feeding our bees through times of hardship. By contrast, feral bees live in an unmanaged state so, like any other wild creature, are subject to natural selection. Bees that are ill-adapted to local conditions or disease will die out, while those that are well-adapted will survive. The fact that feral honey bees have not been wiped out, and may even be reasonably widespread, is of interest to honey bee researchers.

This survival suggests that, although we must assume that the feral bees are exposed to the same pests, diseases and environmental pressures as their managed counterparts, at least a proportion of them are well able to cope in the absence of human intervention. Perhaps there are things that researchers and beekeepers can learn from these bees that will help us to protect our valuable managed stocks?

CATHERINE THOMPSON'S PROJECT

In 2008, with funding from the Biotechnology and Biological Sciences Research Council (BBSRC), Catherine took up the challenge to identify the races of unmanaged bees currently found in the UK; determine to what extent they are feral, native or recent swarms; map their incidence; and screen them for any pests and diseases that may affect their health.

In particular, she has been looking for answers to the following questions:

- ◆ Beekeepers report large losses of their managed colonies each year. So do unmanaged colonies fail to survive the winter at a similar rate?
- ◆ Does the race of the honey bee dictate its chance of survival? For example, are bees predominantly of the native genotype for the UK, the Black Bee (*Apis mellifera mellifera*) more likely to survive (as some black bee breeders suggest)?
- ◆ Do unmanaged honey bees differ in disease patterns from local managed colonies? Is this also linked to race?
- ◆ Does managed honey bee density in the local area affect the survival of unmanaged honey bee colonies?
- ◆ Is there anything special about the site where the unmanaged colonies are found to survive? For example does the site offer better nutrition? Is the landscape more diverse?

THE FIELD WORK

As you can imagine, a key component of this ongoing project is identifying sites where Catherine can find unmanaged bees to sample for analyses. In 2009 she enlisted the assistance of some local beekeeping associations, asking their members to let her know about any colonies of bees of which they were aware, that had persisted for at least one year in an unmanaged state. Thanks to their help, so far she has learned of more than 50 locations. She has already sampled 30 of these sites and looks forward to visiting more during 2010.

Each time she visits a site, she takes a short history of the colony from the landowner, farmer or beekeeper. She asks questions about how long the bees have persisted and the likely source of the colony: for example, whether it arose as a swarm from their own local apiary.

For the purposes of health screening and genetic analysis, she needs to collect approximately 70 adult worker bees from each colony. She harvests these as they fly in and out of the colony entrance, as this prevents damage to the brood. In fact, in many cases, sampling from the whole colony would be almost impossible, given the inaccessible nesting sites used by these bees.

She has found that each site is unique and therefore presents its own particular difficulties. Some colonies are positioned in the far reaches of clock towers while others, seemingly more conveniently placed, have tested her resolve with the fiery temper of their occupants. This clearly



Catherine Thompson

(left) A colony could be found in the back of this statue in the gardens of the National Trust property (right) A colony is located beneath the underskirt of this hollow bronze statue

has given Catherine's supervisor headaches in terms of health and safety issues, but he is still smiling.

Sites that Catherine visited in 2009 will be re-visited in spring and autumn of 2010 and 2011. This will allow her to assess winter survival, collect further samples and try to build a picture of longevity of feral colonies in relation to race and disease levels.

THE LABORATORY WORK

Genetic Analysis and Disease Diagnostics

To date, Catherine has collected just under 2000 feral bees, and these will now be subjected to genetic analysis to assess their race. This will determine whether they predominantly belong to *Apis mellifera mellifera*, or if they contain *Apis m. ligustica* (the Italian honey bee), or *Apis m. carnica* (the Carniolan honey bee) genes. It has been suggested that *Apis mellifera mellifera* bees are best adapted to the environmental conditions in the UK and therefore more likely to survive unmanaged than would be imported strains.

To allow Catherine to compare the levels of disease found within managed honey bee colonies with those that may occur in feral bees collected from similar locations, samples of each will be 'paired'. In other words, where feral colonies are found, she will also look at specimens of adult honey bees from apiaries being managed in the near vicinity. The viral diseases that she will be looking for include deformed wing virus, black queen cell virus, sacbrood virus, chronic paralysis virus, acute bee paralysis virus, Kashmir bee virus, Israel acute paralysis virus, and cloudy wing virus. She will also test for the presence of *Nosema ceranae* and *Nosema apis*.

In order to be able to complete this work, Catherine has been working closely with colleagues at the National Bee Unit (NBU), based at the Food and Environment Research Agency (Fera) in Sand Hutton in North Yorkshire. She has also been able to take advantage of their state-of-the-art molecular technology facilities, to determine bee races and also to diagnose the pests and disease that they contain. It

is anticipated that, ultimately, the findings of this feral bee work will complement the NBU's own study, seeking to look at the distribution of different honey bee races in managed colonies across England and Wales.

MAPPING FERAL HONEY BEES

Working with the NBU has allowed Catherine to identify locations where beekeeping practices are at a minimum. These areas are of interest because they are more likely to contain honey bee colonies that have not escaped from managed apiary sites. Any unmanaged colonies in these areas are more likely to be truly wild.

She short-listed sites by identifying areas at least 10 km from known apiary locations and by selecting for woodland areas which provide ideal habitat for feral colonies. This process identified three sites that are of particular interest: Ennerdale Forest, Tywi Forest and Wark Forest near Kielder. Honey bees were only found in Wark forest and this study will continue this summer

HOW CAN YOU HELP?

Catherine is hoping to find more feral colonies in 2010 to improve her sampling across the UK. She is particularly interested in areas with a low beekeeping density such as north-west England and North Wales. Also of interest are areas of intensive agriculture such as Cambridgeshire and Lincolnshire. So, if you know of an unmanaged honey bee

colony that has existed for more than a year and would be happy for Catherine to take a sample, please contact Catherine Thompson at fbs6cet@leeds.ac.uk. Alternatively you can visit her website: www.honeybeeproject.co.uk and report your site online.

Catherine can arrange a visit or alternatively advise on how best to collect a sample yourself and provide you with the appropriate equipment.

If you don't know of any colonies yourself, please spread the message to keen walkers or naturalists in your area and ask them to keep their eyes peeled for honey bee colonies.

This research is still at an early stage but Catherine looks forward to provide updates in future issues. 

About the Author

Catherine obtained her degree in Biological Sciences from the University of Durham before completing a Masters in Biodiversity and Conservation at the University of Leeds. It was here that she first became interested in feral bees, when she joined the Farmland Ecology Team.

Koos Biesmeijer and his students have worked for many years on bee ecology and behaviour, plant-pollinator interactions and recently showed that UK wild bees have been declining together with the wild plants that depend on them for pollination services. Other ongoing projects include interactions between managed honey bees and wild pollinators, the relative roles played by managed and wild insects in crop pollination and management of landscapes for beneficial insects (pollinators and natural enemies) in the UK, Kenya and India.

For more information about this work, please e-mail: j.c.biesmeijer@leeds.ac.uk. Work presented in this article has been running for one year and will be written up as part of a PhD thesis.

About the National Bee Unit

To find out more about the work of the National Bee Unit, please visit its BeeBase website: www.nationalbeeunit.com. There is also a general e-mail address: nbu@fera.gsi.gov.uk to which you can send any enquiries about honey bees. For enquiries regarding Bee Health Policy and Regulatory issues, please contact Bee Health at: beehealthinfo@fera.gsi.gov.uk

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Location of unmanaged honey bee colonies located in 2009

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