



## Breeding for Varroa Tolerance in Irish honey bees

Dear beekeeper,

Welcome to the 2016 and the second full year of the joint NIHBS/NUIG breeding programme to increase the prevalence of honey bee colonies in Ireland that are tolerant of the parasitic mite, *Varroa destructor*.

The programme continues into another year with the support of all parties involved because it is seen as part of the best long-term approach to assist *Apis mellifera mellifera* in a recovery from *Varroa*. NUIG look forward to another year assisting beekeepers in the first moves towards improving the *Varroa* tolerance of their honey bee population however additional participants are essential if the programme is to yield a successful outcome for NIHBS members and other beekeepers.

### **A. EXISTING BEEKEEPERS: DATA COLLECTION FOR 2016**

If you have **already submitted** *Varroa* counts, thank you. Please **continue to do so using the same colonies** as before. We ask that all beekeepers who submit counts also include the very important **additional information** about the colonies. These are necessary to understand their characteristics in order that desired traits can be kept in the population.

**VERY IMPORTANT; PLEASE NOTE** : This year the *Varroa* counts will take place in two discrete windows of time as leaving it open-ended last year appeared to create some confusion.

**COUNT 1: Between the 7<sup>th</sup> and 22<sup>nd</sup> of May but before any anti-Varroa treatment.**

If you treat early, conduct the count before treatment irrespective of the date.

**COUNT 2: Between the 13<sup>th</sup> and 28<sup>th</sup> of August but before anti-Varroa treatment.**

If you treat early, conduct the count before treatment irrespective of the date.

Please conduct your count, complete the additional information in the inspection form, which has been revised to further simplify the process and submit it by either;

**email** to [nuigbeereseach@gmail.com](mailto:nuigbeereseach@gmail.com) (There is an Excel version available for this)

**Or**

**post** to Keith Browne, Room 203 Ryan Institute, Department of Zoology, NUI Galway, University Road, Galway.

### **BEE SAMPLES**

If you have **already sent samples of bees** to either NUIG, University of Limerick or Limerick Institute of Technology there is no need to send any further samples for the moment.

If you have not submitted samples or this is your first year taking part we would appreciate a sample of **10 bees from each colony** from which *Varroa* counts were done. An empty matchbox should suffice as a container and protect the bees in transit.

The humane euthanasia of bees is to place them in a fridge for a short while before freezing them. Some form of insulation also helps to keep them fresh whilst they are in transit.

Each individual sample of bees should be marked with the following four pieces of information please:

<b>Date of sampling</b>	<b>Apiary name</b>
<b>Beekeeper name</b>	<b>Hive number</b>

Finally, make sure your **contact address and/or phone** number is included in the package.

## **B. INTERESTED IN GETTING INVOLVED?**

If a significant number of beekeepers in Ireland conduct selective breeding for *Varroa*-tolerance then it is possible that the result will be an increase in the tolerance to *Varroa* across the entire honey bee population. Not all colonies would have to be *Varroa*-tolerant for a population-wide effect.

If you keep *Apis mellifera mellifera*, **even if you think they may be hybridised** to some extent, your involvement is required.

The procedure is quite straightforward and is described in detail in specific documents. Here are the main points:

1. At the same times **twice a year assess the percentage of *Varroa*** in your colonies using the sugar shaker method as described.
2. If the colony's percentage is **2% or under, preferentially use it to breed** from. Additionally, **don't treat** for *Varroa*, provided you are happy not to, in order to determine if the low percentage results from a colony trait rather than anti-*Varroa* treatment.
3. If the percentage is **over 2%** you **can treat** for *Varroa* as you normally would and preferably **not breed** from this colony or colonies. **Try re-queen** from low *Varroa* stock

We are looking for data from a **maximum of 10 colonies per apiary** however there is nothing to stop you from applying this protocol to your entire apiary. We are **also interested in data from apiaries under 10 colonies**. *We do not require counts from nuclei.*

Even if you decide recording the information and returning it to us is not possible for you, you can still use this selective breeding method and hopefully help increase the level of *Varroa* tolerance in the Irish honey bee population.

**If you are interested** in taking part in the *Varroa* counts and data collection please read the additional attachments carefully, particularly the inspection form and sugar shaker method. If you then decide you **understand the process**, can **spare the time** and **wish to proceed**, **please contact us as there are a limited number of places** in the experimental core group due to genotyping costs.

That said, if you wish to conduct the counts anyway and submit them we would be pleased to have the data, however we cannot guarantee your bees will be genotyped.

To conduct counts, **obtain one or two sugar shakers** from either your usual beekeeping equipment supplier or by contacting NIHBS and then follow the instructions in **A** above for existing beekeepers.

## **RESEARCH UPDATE FEBRUARY 2016**

We have looked at the initial data on *Varroa* received during 2014 and 2015. These data indicated that the Irish honey bee population varies in its response to *Varroa* although the cause of any possible tolerance to the parasite is still unknown. Now we aim to build on this information, to see how *Varroa* levels change over time and to see if the number of *Varroa* tolerant colonies increases. Using this data we also aim to re-queen some of our experimental colonies at NUIG with low-*Varroa* daughters for further investigation into their behaviour.

Following significant press coverage and requests on our social media feeds (Twitter @thebeegenes Facebook - The bee genes) there is also evidence emerging of feral colonies that may have existed, untreated, for some time in one location and these warrant investigation for *Varroa* tolerance. We have begun to investigate these reports and to genotype the colonies. We will now monitor their progress over the coming months and hopefully years. These survivor colonies may be part of the key to discovering a cause behind *Varroa* tolerance in this country.

More than 26 colonies from over 20 beekeepers around the country have been genotyped using mitochondrial DNA and provided us with the first insights into the level of genetic diversity that exists in the Irish honey bee population. This information is crucial to our understanding of how adaptable the population is likely to be, to deal with *Varroa destructor*, existing diseases and also any future pathogens. Although much more work needs to be done, preliminary analysis indicates a genetically diverse population which gives good scope for positive adaptations. In a European context, the Irish bees look to be a separate group, strengthening but not confirming the case for their uniqueness. Again, it is worth stressing that these data are very preliminary.

This year we will extend the study to investigate the some possible effects of the environment on the honey bee phenotype with an emphasis on how this impacts bee health. To this end, we are currently seeking a number of apiaries for in-depth, extended research.

I would like to continue with our assurance you that we are committed to following through with our research and to keeping the beekeeping community advised about progress as often as we can. Any information you provide will be treated as strictly confidential. Any data that is released in publications will not identify individuals or precise apiary locations unless permission is sought and freely given.

Yours faithfully

Keith Browne

**Please contact me at 091 494490/ 089 2004762 or nuigbeerresearch@gmail.com for any queries.  
We also welcome suggestions**