

Good News for Treatment-Free Beekeeping

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Natural *Varroa*-resistant bees: a queen with her attendants.
Photo: Clive Hudson

Introduction

We are enthusiastic beekeepers and have been for 37 seasons. We enjoy hearing from other beekeepers about their experiences and sharing our own. Our good news is that we have just completed our 13th successful year of treatment-free beekeeping. We enjoy our beekeeping with National hives exactly as we did before *Varroa* arrived without using any treatments, and our bees are absolutely fine. We can support this statement because, in addition to our own judgement, all our 22 colonies were passed as healthy after a thorough inspection by our Seasonal Bee Inspector in August 2021.

It has been a good season for our association, Lleyn and Eifionydd BKA, North Wales, which resumed outdoor meetings. To the best of our knowledge members keep their bees without using any miticides and we know of over 500 colonies in north-west Wales that are treatment-free. One of our members, David Heaf, has written a book, *Treatment-Free Beekeeping*, published by Northern Bee Books, which includes a chapter on 'The Gwynedd experience.' We enjoy helping new beekeepers, who are delighted to discover they can keep our local bees without the need to use any chemicals to control *Varroa*.

Natural *Varroa* resistance

The really good news is that the key mechanisms used by bees to control *Varroa* mites have now been discovered. As ever with science there will be more details to be found, but, after decades of international research the way bees can manage *Varroa* has been explained. In the UK Prof. Stephen Martin, who has been researching the 'Varroa problem' for over thirty years, and his colleague Isobel Grindrod at the University of Salford have co-authored a *BBKA News Special Issue on Natural Varroa-Resistant Honey Bee*, available at <https://www.bbka.org.uk/shop/bbka-special-edition-natural-varroa-resistant-honey-bees>. This excellent booklet explains how honey bees and *Varroa* mites can co-exist. The authors state in the foreword, "The honey bee and natural selection have provided a lasting solution to the *Varroa* problem. Our aim is understanding this and helping inform beekeepers so they, in turn, can help their bees."

In summary, it is now known that honey bees have developed and modified their innate hygienic behaviour to detect *Varroa*-infested cells, open those cells, uncap them and recap, and thereby disrupt the breeding cycle of *Varroa*. This behaviour reduces both the number of mites in a colony and the effect of the associated viruses. The booklet also gives a 'Practical guide to measuring recapping rates, mite removal rates and mite reproduction'. More detail on natural *Varroa*-resistance can be found in the supporting academic paper: <https://royalsocietypublishing.org/doi/10.1098/rspb.2021.1375>

An interview with Isobel Grindrod, available at <https://www.bbc.co.uk/programmes/m000yfkv> gives a very clear explanation of the behavioural traits being used by honey bees to cope with the mites. Our transcript of this interview is available at <https://beemonitor.org/>

There has been an increase in the number of treatment-free beekeepers in the UK over the last ten years, and four associations across the UK now have over 70% of their members treatment-free according to a recent survey: *Distribution of treatment-free and treating beekeepers in the UK* by Alexandra Valentine, University of Salford (pers. comm.).

What steps are necessary to become a treatment-free beekeeper?

Below are accounts of four beekeepers from different areas of the UK and Ireland, who have kindly agreed to share their experiences of becoming treatment-free beekeepers and to suggest ways into chemical-free beekeeping.

Joe and Chris Ibbertson are members of Northamptonshire BKA. When the brothers started beekeeping eleven years ago they read the scientific literature and decided they did not want to put chemicals into their hives; they were treatment-free beekeepers from 'day one'. After some higher than average losses in their third and fourth winters, their colonies have gone from strength to strength. Joe and Chris are not concerned about losing weak or failing colonies, saying: "good riddance to them". They are confident that they can replace losses by breeding from their best colonies and collecting swarms from feral or wild colonies. They currently have 22 colonies in National hives, and are taking an enthusiastic interest in wild living colonies with the Boughton Estate Honeybee Conservation Project (see: <https://twitter.com/behchoneybee>).

The capability of free-living colonies to survive for three years or more is a good guide to the viability of natural *Varroa*-resistant bees in your area. We take the perspective that successful adaptation in a natural situation is the optimum setting. Irrespective of your approach, there is only one thing to do: stop treating. In our opinion no meaningful adaptation will be made with treated colonies. Our recipe for success:

- Low density apiaries.
- No transfer of hive materials between colonies.
- No feeding; leave honey for wintering.
- No combining of colonies.
- Removal of weak or failing colonies.
- Reproduction from the longest surviving and best colonies.
- Work together with a like-minded group.

Moving to a treatment-free regime is possible for all beekeepers,

but your approach will determine the sustainability of your journey to success. See: Northamptonshire Treatment Free Beekeeping at: <https://www.facebook.com/groups/1263819240358228/>

Kate Jones is Chair at Lleyn and Eifionydd BKA and over-winters seven National hives at two sites on the fringe of the Snowdonia mountains. When Kate started beekeeping, she did as advised and treated with Apiguard. Oxalic acid was never used because of an unease of opening hives in mid-winter. Kate has not treated her bees with miticides for ten years.

Kate can only ask you to consider her thought process in her move away from *Varroa* treatment; throughout this process the welfare of the bees was paramount. The decision was ultimately based partly on management themes drawn from other parts of her life, such as a move in agriculture to managing parasites with targeted anthelmintic use, rather than their complete elimination. A rudimentary understanding of population dynamics facilitated Kate's considerations; for example, that treatment creates the perfect conditions for the remaining *Varroa* to rebound in numbers, rather than achieve sustainable numbers within the hive.

Kate is lucky to have a husband to bounce ideas off and ultimately came to a decision not to treat. They took the leap of faith and stopped treatment; reassurance came when the bees continued to thrive. Initially, drone brood was removed when the *Varroa* levels were increasing, but they no longer do this and numbers of deformed wing virus cases have also fallen each year. This has been a personal journey, ultimately all beekeepers have the welfare of their bees at heart and, as such, need to decide whether to treat or not.

John McMullan is a member of Fingal, North Dublin BKA where he was Honorary Secretary for 25 years. He keeps five colonies in Modified Commercial hives at his home apiary and other hives at an out-apiary in Co. Galway. John studied parasitology for his doctorate and has taken a long-term interest in developing a regime that facilitates *Varroa* tolerance in honey bees. He started keeping bees in 1994 and became a treatment-free beekeeper in 2010. Notable points are:

- All treatments stopped in 2010 and by 2020 over two-thirds of beekeepers in the area had stopped treating.
- Selection for *Varroa* tolerance and for all bee conditions was occurring within a largely fixed gene pool. There was no specific selection by beekeepers, including for low mite numbers. The colonies were left to find their own evolutionary path to tolerance.

- Initially there were some purges of bees with deformed wing virus in late summer, which is part of a selection process.
- All colonies are raised from existing stocks with little mass-production of queens.
- Drone congregation areas are seen as a local beekeeping resource, with each beekeeper contributing to their enhancement. John has always used solid floor hives and believes that it has contributed to reduced mite production in drone cells.*

[* McMullan J. Adaptation in honeybee (*Apis mellifera*) colonies exhibiting tolerance to *Varroa destructor* in Ireland. *Bee World* 2018; 95(2):39-43. doi:10.1080/0005772X.2018.1431000

Also see part 5: McMullan J. (2021) *Having Healthy Honeybees, the beekeeping and science*. NBB, UK, ISBN 978-1-912271-90]

- Recent imports of non-native, mainly Buckfast, bees by new beekeepers coming from outside the area has

prompted the local association to commence a programme of small-scale production of black queens to try to offset some of the fallout from these importations.

- Over the past decade, colonies have become generally more docile and bare-handed beekeeping is common.
- Community co-operation is critical as beekeepers are dependent on each other for the health of their bees.

Steve Riley is Chair and Education Officer at Westerham Beekeepers, covering the Surrey/ Kent borders in the south-east of England. Since 2017, Steve and six other members have led a project to stop using chemical miticides and identify *Varroa* traits in honey bees. It is a cautious, step-by-step approach that is proving very successful. There are currently over 160 untreated colonies across thirty apiaries, including neighbouring beekeepers in

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Left: Bees uncapping infested cells. Photo: Steve Riley, Westerham Beekeepers. Right: Uncapping and re-capping. Photo: T. Rudd, Westerham Beekeepers.

Croydon and Orpington. Their advice:

- Observe your bees for naturally occurring *Varroa*-resistant traits such as uncapping or chewing out infected larvae. Incorporate these traits into your hive record cards and breeding protocols.
- Work as a team with fellow beekeepers to support each other and share information. WhatsApp groups are very useful.
- Start cautiously with a small number of your hives. Either replace the summer miticide treatments with biotechnical measures such as queen frame trapping, or select colonies where you see resistant traits. Alternatively, buy a local nucleus from a beekeeper with proven *Varroa*-resistance or catch a swarm from a long-lived feral colony.

- Raise your own queens that are locally adapted to your climate and seasonal flora. Introducing external bees disturbs the adaptive genetics and risks vertical transmission of pathogens from queens, e.g. viruses.
- Encourage drone production from *Varroa*-resistant colonies; they are 50% of the genetics.
- Look for strong spring development in brood and foraging from non-treated colonies; these bees have over-wintered well and are your best breeding stock.

Westerham Beekeepers are happy to help with training through presentations or apiary visits for local groups. More information at: <https://westerham.kbka.org.uk/identifying-varroa-resistant-bees/>

Conclusion and acknowledgements

The experiences and suggestions described above show the variety of approaches and different paths to *Varroa*-resistant bees and treatment-free beekeeping; but there has been one constant. To our knowledge, all treatment-free beekeepers value and keep local bees. Following the example of many beekeeping associations in Ireland, our association, Lleyn and Eifionydd BKA, has made the case for a voluntary conservation area (VCA) to support the keeping of locally adapted bees in the area of our association. (see: <https://e-voice.org.uk/llebka/vca-voluntary-conservation-a/>) Both the Welsh and British Beekeepers' Associations formally support keeping bees from your local area. There is a widely held view that a stable population of locally bred bees will assist the development of their natural *Varroa*-resistance. Steve Riley has made the point that adaptation is happening and it is bee-led. He adds that the natural adaptation of honey bees to deal with *Varroa* has occurred in the thirty years since its arrival in the UK and, as beekeepers, we are privileged to observe a bee-led solution. Special thanks to our contributors: Joe and Chris Ibbertson, Kate Jones, John McMullan, Steve Riley, Alexandra Valentine.

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