



A view from across the Pond

Varroa destructor: Back in Fashion

Keith S. Delaplane

A few months ago in these pages I described the Managed Pollinator Coordinated Agricultural Project (CAP), a multi-institutional consortium in the United States funded by the U.S. Department of Agriculture and dedicated to the goal of understanding and mitigating the causes of bee decline and communicating that information to beekeepers. Our research agenda is ambitious, reflecting the presumption that bee decline is the product of many factors. If one checks out our website <http://www.beeccdcap.uga.edu/> one finds an emphasis on viruses, *Nosema*, honey bee genetics, toxicology, non-*Apis* bee health, as well as a strong extension delivery component, chief of which being our dedicated web repository of peer-reviewed extension literature at <http://www.extension.org/bee%20health>

I believe these objectives are logical, reasonable, and likely to produce something like an “answer” to why bees are dying in such large numbers in North America. I have also come to believe that these objectives are conspicuous for what they don’t emphasize – our old nemesis *Varroa destructor*. And I think I know the reason why.

For starters, I should face head-on the popular but dubious notion that science proceeds in a positively linear fashion, slowly but inexorably pushing back the frontiers of human ignorance. A monolithic self-correcting project on a planetary scale immune to human foibles like egotism, parochialism, hubris, subjectivity, narcissism, chauvinism, and peer conformity. Now as far as human institutions go, science does a pretty good job at pushing back the frontiers of ignorance. But there’s a problem with that part about “immune to human foibles” because – hold onto your seats here – scientists are human. Yes, that’s right. Human in every sense of the word and prone to every quirk, vice, and virtue of their kind in every other sphere of human endeavour. And that includes peer-conformity or, if you will, fashion-consciousness.

I first became aware of a kind of scientific “fashionism” in graduate school. The lesson was hard because I happened to belong to the group that was distinctly *not* in fashion. Bees were not the cool insects in my department. The coolest grad students worked on the coolest insects, and in the early 1980s in Louisiana that meant things like stink bugs, horn flies, and cotton boll weevils. Termites were somewhere between boll weevils and honey bees. But bees were – yawn – merely the white lab rats of entomology. Fast forward to

the 2010s and I’m pleased to find that I have moved into the cool camp. Honey bees are now the hot item, akin to butterflies, bats, and bumble bees, the subject of major news coverage and 8-digit government grants. I admit, this feels good.

Now if fashion whims can apply to insects, I think they can apply also to insect diseases and parasites. And this gets me back to my point – for a few years during the last decade the worldwide scourge of beekeeping, the parasitic *Varroa* mite, has taken a back seat to other disorders that for a while have dominated the attention of bee health scientists. These new disorders include a group of viruses, a newly-recognized species of *Nosema* and new chemical classes of pesticides with unknown and possibly insidious sub-lethal effects. My CAP colleagues and I were heavily under their spell back in 2008 when we were crafting our proposal, piling on innovation at the expense of the old and familiar, eager to impress reviewers with our command of the latest literature. It is these multiple new disorders that have galvanized the general opinion that bee decline cannot be traced to any one thing – and on that point I agree. Let me be plain – all of these factors are right and appropriate objects of study in the overall picture of bee health.

However, I have come to believe that *Varroa* commands the prominent place in the list of bee problems, to the point – I propose – of constituting the kingpin, the overarching preconditioning liability, the snowball that starts the avalanche. This blood-feeding, non-natural ectoparasite attacks bees at both the larval and adult life stages, shortening life span, altering behaviours, vectoring or activating a host of bee viruses, and suppressing immune systems. Moreover, the synthetic miticides used to control *Varroa* are themselves hazardous to the bees they are intended to protect.

It can be no accident that the global expansion of bee morbidities, pathologies, and compromised immune response has tracked the man-assisted and expanding range of *V. destructor*. The recent connection between *Varroa* and a region-wide bee decline was so plain to one group of authors that they put it in the title of their paper: “*Varroa destructor* is the main culprit for the death and reduced populations of overwintered honey bee (*Apis mellifera*) colonies in Ontario, Canada.”

I echo the summation of Peter Rosenkranz and co-authors when they said in a recent special issue, "No other pathogen [beside Varroa] has had a comparable impact on both bee-keeping and honey bee research during the long history of apiculture." In summary, it is simply non-controversial among the world's practicing bee scientists that *Varroa destructor* is problem #1.

It is, therefore, with no small pleasure that I report to the readers of *Bee World* that *Varroa destructor* is officially back in fashion. The most recent jump in its stock happened in concert with a scientific roundtable called by Drs. Peter Neumann and Vincent Dietemann of the Swiss Bee Research Centre and held at a lovely campus in Magglingen, Biel, Switzerland in November 2010. For four days some of the best minds in bee science convened to discuss research priorities on the biology, evolution, epidemiology, and control of *Varroa destructor* with the goal of issuing a call to government agencies and scientists for renewed attention to this most important of bee disorders. It is an encouragement to me that science, alloyed as it may be with the fashion-conscious foibles of its practitioners, is nevertheless asserting its self-correcting character and restoring priority where it is due. *Varroa destructor*: in fashion once again.

References

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- Rosenkranz, P; Aumeier, P; Ziegelmann, B. (2010) Biology and control of *Varroa destructor*. *Journal of Invertebrate Pathology* 103: S96-S119. Doi: [10.1016/j.jip.2009.07.016](http://dx.doi.org/10.1016/j.jip.2009.07.016)



The parasitic Varroa mite (4 on this bee's thorax) is a trans-global plague on *Apis mellifera*, having jumped onto this bee from its congener *Apis cerana*. *A. mellifera* has a thin arsenal of resistance genes for this non-natural parasite, so beekeepers are heavily reliant on synthetic miticides, many of which are themselves hazardous to bees. Thus, Varroa associated bee morbidity is an unholy mix of direct injury, mite-vectored or activated pathogens, suppressed immune systems, and non-target miticide effects.

Professor and Walter B. Hill Fellow Keith Delaplane, of the University of Georgia, USA has kept bees since his school days and is well placed to give view of world beekeeping. If you wish to know more about his work why not visit: <http://www.ent.uga.edu/bees/>



Varroa still a problem in the 21st century?



29th January 2011

University of Worcester, UK

Varroa is not a new problem; it was first identified as a serious pest more than half a century ago, and chemical and other control methods have been available for decades. Why therefore is it still a problem?

This major one day conference will bring together international authorities, who will outline our current knowledge about the biology of the mite and its interaction with other diseases, discuss the problems of chemical resistance, and suggest control methods, whether chemical, biological, biotechnical or by bee breeding, and offer practical solutions to enable beekeepers to live with the mite in the 21st century.

Amongst the speakers and topics:

- *Varroa biology* - Dr Stephen Martin (University of Sheffield).
- *Varroa and viruses* - Dr Joachim de Miranda (Queens University Belfast / Swedish University of Agricultural Science, Uppsala).

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