

## NEW APPROACHES TO A LONG-KNOWN DISEASE: SHOULD VIRUSES BE INCLUDED UNDER THE DEFINITION OF VARROOSIS?

**Marie-Pierre Chauzat<sup>1</sup>, Laura Espinosa<sup>2</sup>**

<sup>1</sup>OIE Reference Laboratory for European foulbrood, American foulbrood, Varroosis, infestation with *Acarapis woodi*, infestation with *Tropilaelaps* spp., infestation with *Aethina tumida* and Nosemosis; European Reference Laboratory for Honeybee Health - ANSES, Unit of Honeybee Pathology, Sophia-Antipolis, France

<sup>2</sup> Science and New technologies Department, World Organisation for Animal Health (OIE), Paris, France

Traditionally varroosis has been defined as the infestation of honey bees by the obligate ectoparasitic *Varroa* mites. *Varroa destructor*, the only species described to parasitize *Apis mellifera*, has spread from its native range since more than 40 years ago. It is nowadays present in nearly all countries with honey bees without exhibiting an adapted host-parasite relationship in the vast majority of cases. Varroosis, therefore, is currently considered to have the most negative impact on apiculture worldwide.

Along with the direct pathogenic effects of the mite feeding activity, it has been shown that *V. destructor* vectors different viruses that can be directly injected into the haemocoel of the host, causing a systemic infection. Mechanical and/or biological vectoring has been proven for viruses of the AKI-complex and Deformed wing virus (DWV). The synergistic action of pathogens is characterized by: (I) the remarkable increased virulence of the viruses and their involvement in large colony losses worldwide since the dispersion of the mite, (II) the diminution over time of the number of *V. destructor* mites required to cause colony damage, (III) the triggering of latent viral infections already present in the honey bee after its feeding activity, and (IV) some clinical symptoms observed in collapsing honey bee colonies, such as crawling and crippled bees with deformed wings and shortened abdomen.

Different studies have confirmed the important role of viruses in *Varroa*-induced colony collapse, but further knowledge is needed in order to clarify and contextualize the precise role and relative importance of *V. destructor* itself and the different viruses carried by the mite. In the varroosis chapter of the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* (2.2.7) viruses are not currently mentioned. Discussions should be held on their potential inclusion and the convenience, or not, to include molecular diagnostic techniques specially targeted to virus detection. Furthermore, the tests should be quantitative, because viruses can be already present in bees as latent infections, and different parameters like the pathogenic threshold of viral load, the type and proportion of samples to be taken from the colony and apiary, and specific transport requirements would have to be established and standardised.

Key words: Varroosis; Viral role; Deformed wing virus; AKI-complex; *OIE Terrestrial Manual*