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VIRAL EPIDEMIOLOGY OF THE ADULT *Apis Mellifera* INFESTED BY THE *Varroa destructor* MITE

Sara Bernardi[1]* and Ezio Venturino[1]

Dipartimento di Matematica "Giuseppe Peano", Università di Torino, Italy.

s.bernardi@unito.it (*corresponding author), ezio.venturino@unito.it

ABSTRACT

In recent years worldwide apiculture is threatened by the spread of the ectoparasitic mite *Varroa destructor*.
The model we present here describes the epidemiological effects of acute paralysis (ABPV) and deformed wing viruses (DWV) on adult bees, transmitted by the mite *Varroa destructor*.
The results show that only these alternatives are ultimately possible: only the healthy bees thrive, the bees show an endemic disease while mites disappear, extinction of the healthy bees and finally coexistence in the infected hive of both bees and mites. These outcomes correspond to the ones in fact observed in natural honey bee colonies.
The model predictions state that the viral infection is endemic whenever the mite population is present. Also, if at all possible in practice, a reduction of the transmission rate among bees would reduce the risk of the *Varroa* invasion of the bee colonies.

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