

A HIDDEN THREAT? ASSESSING THE POTENTIAL OF WILD INSECTS AS RESERVOIRS FOR *MELISSOCOCCUS PLUTONIUS*, THE CAUSATIVE AGENT OF EUROPEAN FOULDBROOD

Manon Bovier¹, Alexis L. Beaurepaire², Vincent Dietemann^{2,3}, Lars Straub¹, Benjamin Dainat²

¹Institute of Bee Health, Vetsuisse Faculty, University of Bern, Bern, Switzerland

²Swiss Bee Research Centre, Agroscope, Bern, Switzerland

³Department of Ecology and Evolution, University of Lausanne, Lausanne, Switzerland

Abstract

The impact of pathogens from Western honey bees (*Apis mellifera*) in the ongoing decline of wild pollinators is increasingly scrutinized. By contrast, the extent to which wild insects may act as reservoirs or vectors of honeybee pathogens remains poorly investigated. *Melissococcus plutonius*, the causative agent of European foulbrood (EFB), stands among the most impactful bacterial diseases affecting honeybees worldwide. Despite strict and resource-intensive control measures - such as the destruction of colonies showing clinical signs and the disinfection of affected and neighbouring colonies - EFB is frequently re-occurring at the same locations or spreading to nearby apiaries. One possible explanation for these phenomena is the presence of environmental reservoirs of the pathogen in the vicinity of apiaries. Potential reservoirs include wild insects and the flowers visited both by managed and wild pollinators. Supporting this hypothesis, a recent study in the USA detected *M. plutonius* in 25% of the screened wild bee and wasp species, suggesting a wider prevalence of the pathogens among wild insects than previously assumed. The aim of the current study was to screen for the presence of *M. plutonius* over time and at varying distances of EFB-affected apiaries in Switzerland, a country that recently experienced an increased frequency of outbreaks of the disease. The results allow us to evaluate whether current control measures - colony destruction, interdiction zones around affected apiaries and repeated colony health inspections within a 1 km radius - are sufficient to prevent disease recurrences and spread, and to better assess the potential role of wild bees and flowers in pathogen transmission.