

Abstract

Nationwide Screening for Important Bee Viruses in Belgian Honey Bees [†]

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Abstract: The ecological and economic importance of bees for pollination and biodiversity is well established. The health of bees is, however, threatened by a multitude of factors, including viruses. In this study, we screened 557 colonies from 155 beekeepers distributed all over Belgium to monitor the prevalence and distribution of seven widespread viruses in Belgian honey bees (*Apis mellifera*). Several of these viruses have been linked with an increased risk for colony loss. Although these viruses can severely impact honey bees and can even cause the death of larvae or adults, colonies with a low viral load usually appear asymptomatic (covert infection). The presence of viruses was determined by real-time RT-PCR. The three most prevalent viruses in Belgian honey bees are *Deformed wing virus B* (DWV-B or VDV-1), *Black queen cell virus* (BQCV), and *Sacbrood virus* (SBV). These viruses were found in more than 90% of the honey bee colonies, but often with a high Ct value, which indicates that they are present at low viral loads (less than 3 log₁₀ genome copies per bee). In certain colonies, however, DWV-B, BQCV, or SBV was detected with a low Ct value, representing a high viral load (in some cases, more than 7 log₁₀ genome copies per bee) and with an increased likelihood of development of clinical symptoms. *Deformed wing virus A* (DWV-A), *Acute bee paralysis virus* (ABPV), and *Chronic bee paralysis virus* (CBPV) were found in less than 40% of the colonies. *Kashmir bee virus* (KBV) was not found in any of the analyzed Belgian honey bees. Most of the honey bee colonies are infected with multiple viruses, albeit with low virus loads. The impact of viruses can however become critical in the presence of other detrimental factors such as parasites (*Nosema* sp., *Varroa* sp.) and pesticides.

Keywords: honey bee virus; virus screening; viral load



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