PP-135 [Bee Health]
Prevalence of pathogens and parasites in Danish honey bees

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For more than 100 years beekeepers and the Danish State have cooperated to control American foulbrood. From a peak of 888 cases in 1956, in 2024 the numbers have fallen to just 14 apiaries, the lowest number on record. Today, the arrival of new diagnostic tools has allowed us to address the prevalence of further pathogens and parasites in Danish honey bees.

In 2023 and 2024, beekeepers across Denmark have volunteered samples for a survey. Approximately 700 samples have been analysed from more than 350 colonies without clear symptoms of disease. Ideally beekeepers have provided a pair of samples, approximately 60 bees and a piece of sealed brood comb, from which 60 larvae or pupae have been collected. The samples have been freeze-dried, grinded to extract DNA and RNA for the diagnosis of 6 vira, 2 bacteria, 3 fungi, 3 protist, 2 mites and 2 insect pests. Since the majority of the samples have come from apparently healthy colonies, this provides an unbiased baseline for the prevalence of pathogens and parasites, here we will focus on virus and bacteria.

The highest prevalence is for two viruses, sacbrood and deformed wing virus type B, both above 90 %. While the former is independent of varroa, the latter is closely linked to the transmission through varroa mites. In contrast the two bacterial pathogens Paenibacillus larvae, the cause of American foulbrood, and Mellisococcus plutonius, the cause of European foulbrood, have a low prevalence of less than 2 % positve samples and or apparently absent, respectively. We attribute this disparity to the efforts of most Danish beekeepers, to exchanging all waxcombs in their colonies each year, a highly effective method against bacterial infections, while apparently not affecting viral diseases.

The purpose of this survey is to support beekeepers in avoiding disease outbreaks in the future, by focusing on the most frequent pests. Clearly, the good practise of high wax hygiene helped control bacterial diseases to a low level, but different tools like breeding may be needed for combating viral and fungal diseases.