

**Title :** Insights into Viral Interactions between Bees and Mites in Northern Thailand

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## ABSTRACT

Bees are among the most important pollinators that play a crucial role in maintaining biodiversity and ensuring food security in ecosystems. However, viral infections are one of the major factors affecting colony health and the survival of bee populations. This study aimed to investigate viral diversity, analyze patterns of co-infection, and elucidate interactions among viruses, bees, and ectoparasitic mites in northern Thailand. Sampling was conducted in ecotone areas between forests and agricultural landscapes, covering five honey bee species, two stingless bee species, and two ectoparasitic mite species. Viral detection was performed using virome analysis in combination with reverse transcription polymerase chain reaction (RT-PCR) to identify viral taxa, confirm infections, and examine viral distribution across different host species. The results revealed a high level of viral diversity, including both previously reported viruses and novel viral lineages not yet documented in Thailand. In addition, multiple viral co-infection patterns were observed in both bees and ectoparasitic mites, highlighting complex interactions between viruses and different hosts. RT-PCR played a key role in the specific confirmation of viruses and enabled clear comparisons of viral prevalence and distribution between bees and parasitic mites.

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Overall, this study enhances our understanding of virus–bee–mite interactions and provides baseline information that can support pollinator conservation and sustainable ecosystem management in tropical regions.

**Keywords :** Agricultural crops, Honey bee viruses, Colony Collapse Disorder