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| **Bibliography** | Roberts, J.M.K.; Simbiken, N.; Dale, C.; Armstrong, J.; Anderson, D.L. (2020) Tolerance of honey bees to Varroa mite in the absence of Deformed wing virus, 575, In: Viruses, Vol.12 (5), 1-12, URL: https://doi.org/10.3390/v12050575 |
| **Associated conference** |  |
| **Abstract / Content summary** | The global spread of the parasitic mite Varroa destructor has emphasized the significance of viruses as pathogens of honey bee (Apis mellifera) populations. In particular, the association of deformed wing virus (DWV) with V. destructor and its devastating effect on honey bee colonies has led to that virus now becoming one of the most well-studied insect viruses. However, there has been no opportunity to examine the effects of Varroa mites without the influence of DWV. In Papua New Guinea (PNG), the sister species, V. jacobsoni, has emerged through a host-shift to reproduce on the local A. mellifera population. After initial colony losses, beekeepers have maintained colonies without chemicals for more than a decade, suggesting that this bee population has an unknown mite tolerance mechanism. Using high throughput sequencing (HTS) and target PCR detection, we investigated whether the viral landscape of the PNG honey bee population is the underlying factor responsible for mite tolerance. We found A. mellifera and A. cerana from PNG and nearby Solomon Islands were predominantly infected by sacbrood virus (SBV), black queen cell virus (BQCV) and Lake Sinai viruses (LSV), with no evidence for any DWV strains. V. jacobsoni was infected by several viral homologs to recently discovered V. destructor viruses, but Varroa jacobsoni rhabdovirus-1 (ARV-1 homolog) was the only virus detected in both mites and honey bees. We conclude from these findings that A. mellifera in PNG may tolerate V. jacobsoni because the damage from parasitism is significantly reduced without DWV. This study also provides further evidence that DWV does not exist as a covert infection in all honey bee populations, and remaining free of this serious viral pathogen can have important implications for bee health outcomes in the face of Varroa.
Keywords: Apis; Varroa jacobsoni; pollinator; virus discovery; iflavirus; RNA viruses; next-generation sequencing |
| **identifier** | | DOI: 10.3390/v12050575 |
| **Library Locations** |  |
| **files** |  |
| **External web link** | https://doi.org/10.3390/v12050575 |
| **File info** | 382.55 KB, PDF |