

Are honey bee diseases shared amongst Australian pollinators?

Background

Australia's honey bees are unique; they are free from Varroa mites and appear to be relatively healthy. If Varroa does arrive (Fig 1), diseased hives and feral honey bee colonies will be the most vulnerable. Reductions in honey bee populations could affect pollination of many food crops, so our native pollinators may have an even more important role to play in the future.



Figure 1: Varroa mites (*Varroa destructor*) are currently absent from Australia; they cause massive problems among honey bee populations in other parts of the world.

Native pollinators are not directly attacked by Varroa mites, but the viruses the mites carry might spread to them from honey bees. Previous studies have shown that 5 viruses are present in Australia's honey bee populations, but we don't know how common they are in individual bees or if those viruses are spreading between different pollinator species.



Figure 2: Collecting insects for disease screening in a NSW apple orchard.

Objectives

To determine:

- How common are viruses and fungal pathogens in honey bee foragers (Fig 2).
- If pathogens carried by honey bees are also found in other Australian pollinators visiting the crops at the same time (Fig 3).



Figure 3: Different pollinators often visit the same flowers, especially during mass flowering events e.g. the spring bloom of fruiting crops, providing an opportunity for diseases to spread.

WESTERN SYDNEY
UNIVERSITY



frontiers
Strategic partnership initiative

POLLINATION
FUND

Results

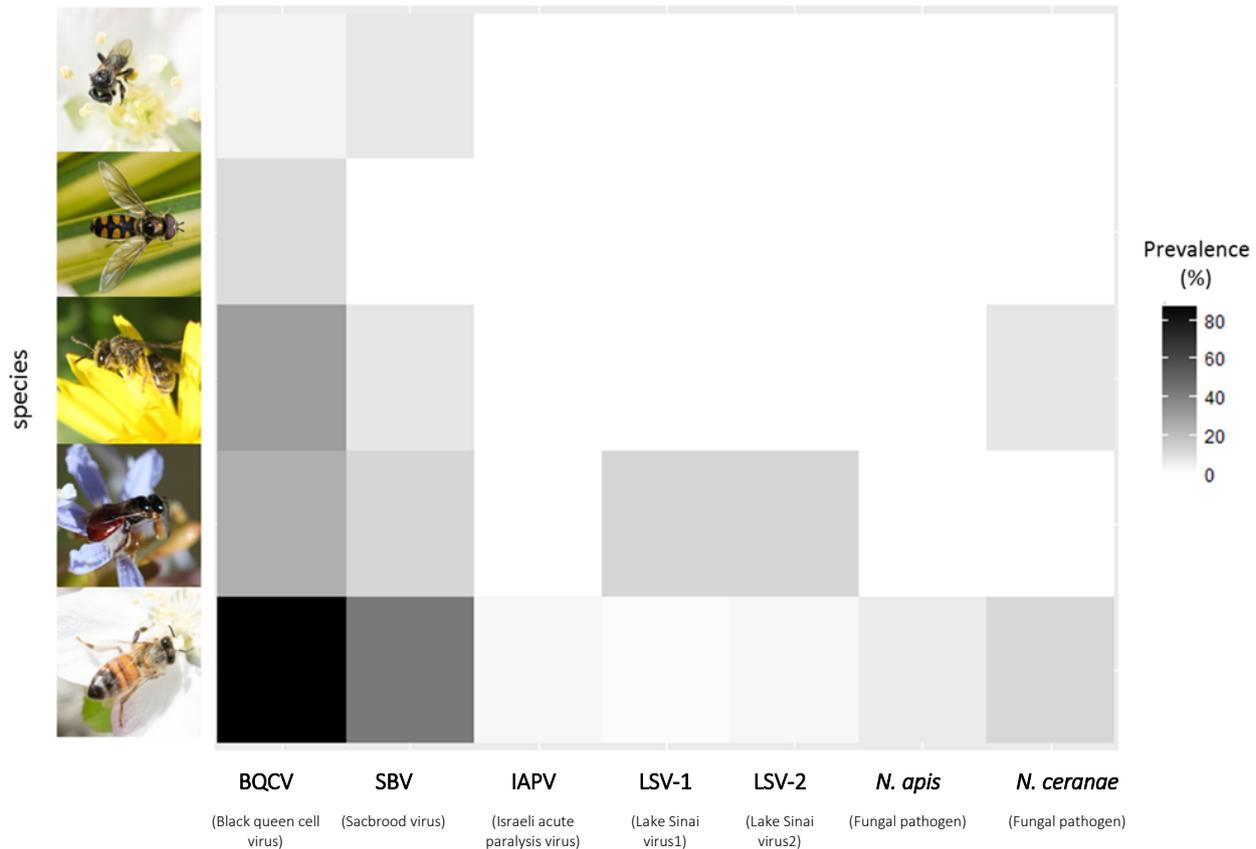


Figure 4: Heat map representing the proportion of each pollinator group (stingless bees, hoverflies, ground nesting bees, reed bees and honey bees, respectively from the top) that tested positive for 5 viruses: BQCV, SBV, IAPV, LSV1, LSV2 and two fungal pathogens, *N. apis* and *N. ceranae*.

Research findings

- Nearly all individual adult honey bees tested positive for BQCV; SBV was also common (Fig 4).
- These same viruses were the most common in other species, including native bees and hoverflies, suggesting viruses might be passed from honey bees to native pollinators.
- The most likely time for viral transfer is when insects are visiting the same flowers.

Keeping pollinators healthy

- Healthy honey bees harbour fewer diseases to spread into other species.
- Perform regular hive health checks.
- Register your hives according to state guidelines and stay up to date with biosecurity protocols.
- Ensure only healthy hives are moved for providing pollination services.

References and Acknowledgements:

Brettell, L.E., Riegler, M., O'Brien, C. and Cook, J.M. (2020). Occurrence of honey bee-associated pathogens in Varroa-free pollinator communities. *Journal of Invertebrate Pathology*, 171, p.107344; Roberts, J. M., Anderson, D. L., & Durr, P. A. (2017). Absence of deformed wing virus and Varroa destructor in Australia provides unique perspectives on honeybee viral landscapes and colony losses. *Scientific Reports*, 7(1), 6925.

Healthy bee populations for sustainable pollination in horticulture is funded by the Hort Frontiers Pollination Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Western Sydney University, Bayer CropScience, Syngenta Asia-Pacific and Greening Australia, and contributions from the Australian Government.

Fact-sheet prepared by Laura Brettell, Western Sydney University. Photo credits: Amy-Marie Gilpin, James Cook and Western Sydney University.