

Agriculture, Fisheries and Biosecurity

Department of Industry, Tourism and Trade

The role of honey bees in cucumber green mottle mosaic virus (CGMMV) epidemiology

THE
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VM18008: Understanding and managing the role of honey bees in CGMMV epidemiology

In Australia, honey bees are regularly used to provide managed pollination services to cucurbit crops.

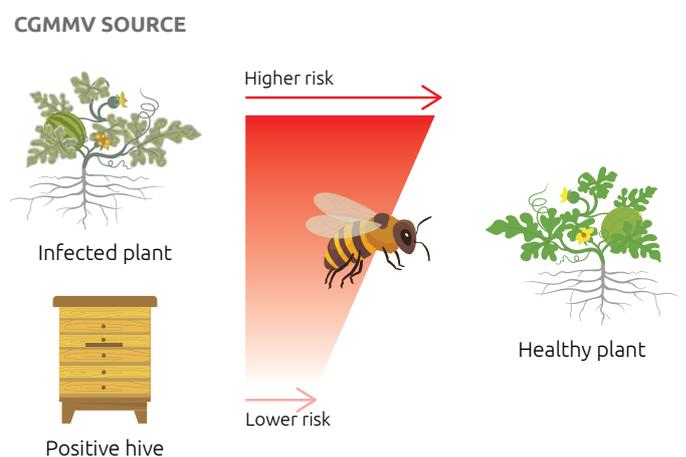
Honey bees are a mechanical vector of cucumber green mottle mosaic virus (CGMMV). CGMMV is a plant virus and is not known to replicate in honey bees or in their hives. If honey bees visit a flower on a plant infected with CGMMV and then visit a flower on a clean cucurbit plant, they are likely to transmit the virus. CGMMV accumulates in honey bee hives when bees collect nectar and pollen from plants infected with CGMMV.

Once inside a honey bee hive, CGMMV can remain viable in honey and pollen for at least 6 months. This could be of concern if you are working your hives and place CGMMV-positive hive material on the ground.

However, the CGMMV on forager bees is not able to be transmitted for the same period. If a bee hive is moved away from a source of CGMMV infected plants, after some time the honey bees from that hive are unlikely to introduce CGMMV into clean plants.

The risk of pollinating honey bees transferring CGMMV by moving hives between cucurbit crops is low if you have a resting period of one month between sites.

Figure 1: Honey bee CGMMV transmission pathways



Biosecurity management of hive materials and the external surfaces of hives (ensuring they are clear of soil, debris and plant material) is still necessary to manage the risk of transporting CGMMV on equipment.

Chlorine treatment for hive tools and external surfaces

Sterilization of vehicles, equipment, plant trays, tools and footwear with potassium peroxydisulfate or freshly prepared 1% sodium hypochlorite (NaOCl) bleach can help limit the spread of CGMMV.

Repeated use of chlorine solution will damage hive tools, bee suits and boxes. It is recommended that you rinse these items with fresh water after the completion of treatment.



Honey bees are able to transmit CGMMV during pollination activities and cause infection in healthy plants.



Principles of CGMMV management in apiaries

Successful apiary management practices minimise the introduction and possible spread of CGMMV within a beekeeping enterprise.

Management practices aim to:

- prevent or control the introduction of CGMMV into bee hives
- increase the likelihood of being able to trace detections back to the source
- reduce the likelihood of hives becoming a source of CGMMV infection.

The principles of apiary management are:

- using appropriate biosecurity practices to minimise the likelihood of CGMMV introduction, such as not working crops known to be CGMMV-positive and resting hives at least 5km away from known CGMMV-positive sites
- keeping concise and accurate records on hives and loads, to enable trace back to determine the source of the disease

- physically separating loads based on the sites they have worked
- removing CGMMV-positive material from hives, for example, changing frames and spinning off honey immediately after a known exposure to plants infected with CGMMV
- storing equipment and consumables on the apiary so that bees cannot access it
- ensuring hive components are only interchangeable within a load
- making sure honey supers are separated at the extraction plant and not interchangeable between loads
- cleaning hive equipment between loads to ensure all wax and honey debris is removed, typically by using hot water or steam cleaning.

Note that although these techniques will remove honey and wax, which may be carrying CGMMV, they have not been demonstrated to decontaminate CGMMV. If possible, have separate equipment for different loads.

Management practices

Management practices are context-specific and can be developed to suit commercial or individual needs.

- Ensure you understand how bees and hives are exposed to CGMMV.
- Make sure you have a clear understanding of how your management systems operate.
- Ensure clear permanent marking and identification of hives (individually or in loads) and their components.
- Keep accurate and concise records for all apiary activities.
- Keep physical separation between loads of hives that possibly contain CGMMV and those that don't contain CGMMV.
- Attend to hives that contain CGMMV last in the workflow, and use separate hive tools and bee-keeping gear for these hives.
- Restrict movement of people, vehicles and animals to any hives you suspect contain CGMMV.

VISITORS

**PLEASE RESPECT
HONEY BEE BIOSECURITY**

This apiary belongs to:

Beekeeper:

Contact:

**Call in the event of an emergency
Do not enter this apiary without prior approval**



For more information, go to horticulture.com.au:

- Factsheet: Cucumber green mottle mosaic virus and honey bees (VM18008)

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