

Sugar shaking bees to detect external parasites

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Introduction

Sugar shaking bees is a method used to detect external parasites, such as varroa mites, tropilaelaps mites and braula fly, on honey bees. It is a quick and easy field method that does not kill the bees. The method was developed by Paula Macebo, a graduate student of the University of Nebraska, and removes 70%–90% of varroa present on adult honey bees.

The sugar shake technique relies on the separation of varroa from the adult bee, caused by the fine sugar particles. The varroa mite legs have sticky pads that help them hold onto the bees. It is believed that the fine sugar particles break down that bond, causing dislodgment. The sugar covering the bees stimulates grooming behaviour, assisting in dislodging the mites. The sugar–parasite mix is then separated from the bees and inspected for any mites.

This technique will not detect mites within sealed brood cells. It may also fail to detect very low infestations of varroa mites in hives. Thus regular monitoring should be conducted.

Selecting a hive for testing

When selecting a hive within an apiary in order to perform the sugar shaking test, try to choose a weaker hive as it may have been weakened by a varroa mite infestation.

Equipment required

- Lidded jar, preferably plastic, approx. 500 g size, with a lid containing lots of 3–5 mm holes (drilled or gauze) to allow sugar and parasites to be tipped out leaving the bees behind.
- Tablespoon

- Cup (approx. 250 mL)
- Icing sugar or icing sugar mix
- Large sheet of paper or plastic (e.g. newspaper sheet)
- Container to hold water (a small bucket or ice-cream container)
- Protective clothing, smoker and hive tool
- Magnifying lens

Equipment required will vary depending on the technique used (refer to the 'Procedure' below).

Procedure

1. Remove the lid of the jar and put 1 tablespoon of sugar (icing or icing mix) in the jar. This is adequate to mix with about 300 bees (300 bees = approx. ½ cup of bees). If more bees are tested then more sugar will need to be added in similar proportions.
2. Place a large sheet of plastic or paper on the ground beside the hive to be tested.
3. Open the hive and remove a frame from near the centre of the brood area.
4. Check for the queen. If present place her back in the hive.
5. Shake the bees off the frame onto the sheet then scoop or pour about 300 bees into the jar containing the sugar.
6. Replace the lid on the jar quickly to prevent the bees escaping.
7. Roll and shake the jar containing the bees and sugar for approx. 2 minutes, ensuring all bees are coated in sugar. Be careful not to lose any sugar while rolling.
8. Leave for a few minutes and then roll again. The longer the bees are rolled in the sugar the more effective the sugar shaking method will be for removing varroa.
9. Invert the container and shake out all the sugar (and mites) leaving the bees behind in the jar.



The sugar can be shaken into a bucket of water or onto a sheet (preferably white). Be cautious of the wind blowing everything away.

10. Release the bees at the hive entrance in case the queen is present. Inspect the empty jar thoroughly for mites.
Proceed to either step 11 or step 12.
11. If the sugar was shaken into a bucket or container of water the sugar will dissolve and the varroa will float on the surface. Inspect the water surface thoroughly for varroa. A white container will aid in seeing the varroa.
OR
The water can be gently stirred until all the sugar has dissolved, then poured through a filter paper, for example a coffee filter. The filter paper can then be carefully inspected for varroa.
12. Inspection for varroa can also be done on a large sheet of paper (preferably white). The sugar needs to be very finely spread across the paper to ensure any varroa present are seen and not covered over with sugar.
OR
The sugar can then be put through a very fine sieve that will capture the varroa while allowing the sugar to fall through. The contents of the sieve can then be examined or tipped onto a white sheet for examination. Wind can be a major problem.
13. If varroa are present, or suspected, collect all specimens from sampling and put in a sealable container/zip-lock bag. Include on or in the container/bag a label giving full details. Also identify the hive from which the sample was taken. Full details should include:

Date collected
Collector's name
Location collected
Contact details of collector
Hive owner's details (if different from collector's name)

14. Inform NSW Department of Primary Industries (NSW DPI) immediately on the Exotic Disease Hotline: 1800 675 888.

15. NSW DPI will be able to advise you where to send your samples and what further action may be required.

If your eyesight is failing it is recommended that you use a visual aid (glasses or magnifying lens) when inspecting for varroa.

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