Performing an alcohol wash to determine *Varroa* mite populations in honey bee colonies

A parasitic mite, *Varroa destructor*, is a significant pest of managed honey bee colonies because they are competent vectors for a variety of pathogens, such as deformed wing virus, and are a major source of colony death. Thus, accurately monitoring the population of *Varroa* mites in your honey bee hives is crucial to successful colony management. Measuring these levels throughout the year allows for informed decisions regarding the timing of mite treatments, what types of treatments to use, and how effective the treatments were at reducing *Varroa* mite populations.

Although other methods exist, the alcohol wash is widely considered to be the most accurate method of monitoring *Varroa* populations. While using this technique, please be aware that it will result in the death of approximately 300 bees. It is important to note that this number is insignificant to the colony health because an average colony of bees contains more than 50,000 individuals. Thus, sacrificing these bees does not harm the overall health and productivity of the colony and provides information that is crucial to the survival and productivity of the colony.

Supplies Needed

To perform an alcohol wash for *Varroa* mites, you will need the following supplies:

- **Mite washing device**
  Device may be constructed or purchased.
- **5-gallon bucket**
  Available at most hardware stores.
- **500 mL isopropyl/rubbing alcohol, 25% alcohol by volume or greater**
  First aid section of most supermarkets.
- **One-half (1/2) cup measuring scoop**
  Kitchen section of most supermarkets.
- **Tea strainer (small enough to fit inside funnel)**
  Kitchen section of most supermarkets.
- **Funnel (large enough to hold tea strainer)**
  Kitchen section of most supermarkets.

How to perform the mite wash

1. Select two frames of brood and check carefully to make sure that the queen is not on these frames. (Figure 1)

2. Place the 5-gallon bucket on the ground and briskly shake or brush the two brood frames into the bucket. (Figure 2)

3. Tamp the bucket on the ground to force all bees to the bottom. Collect one-half cup scoop of bees, depositing them in the mite washer. (Figure 3)

4. Quickly pour alcohol into the mite washer, using enough to completely cover the bees. (Figure 4)

5. Using your wrist, shake the mite washer in a circular motion for approximately one minute.

6. After one minute of shaking, gently shake the bees for a few additional seconds so any last mites trapped in the bees will fall out. Remove the upper portion of the mite washer containing the bees and count the mites in the bottom half. (Figure 5)

7. If there are more than 10 mites in the bottom half of the washer, it may be helpful to rewash this sample to ensure that all mites are washed off.

Fig. 1. Check carefully to make sure that the queen is not on the frames.

Fig. 2. Brush the two brood frames into the bucket.

Fig. 3. Collect one-half cup scoop of bees.

Fig. 4. Pour alcohol into the mite washer.

Fig. 5. Count the mites in the bottom half of the mite washer.

Helpful Hints

- After counting the mites, the alcohol may be strained and reused.
- Discard the bees contained in the top half of the mite washer.
- Place the strainer inside the funnel and then place the funnel back into the top of the bottle of alcohol.
- Gently pour three-quarters of the alcohol from the bottom of the mite washer through the strainer and funnel.
- When only one-quarter of the alcohol remains, gently swirl the mite washer in a circular motion and quickly pour the remaining alcohol through the strainer and funnel.
- Any mites remaining in the washer may be removed with your fingers and discarded.

Fig. 6. Place one-half cup of bees into a bag.

When performing mite washes on more than a few colonies, it may be helpful to collect the sample of bees in the field and perform the mite washes at a later time at another location.

- Follow the first two steps of the mite wash as before.
- Place a one-half cup scoop of bees into a plastic zippered sandwich bag. (Figure 6)
- Using a permanent marker, write the date, location and number/name of the colony on the bag.
- Proceed to collect mite samples from the rest of the colonies to be checked. Place the samples in a cooler on ice. If the samples are not to be processed on the day of collection, they may be frozen for as long as necessary.
- Once all samples are collected and you are ready to process them, proceed with steps four, five and six as before.
- Strain and rebottle the rubbing alcohol as described above between each sample.

Interpreting the Results

When measuring mite populations, many beekeepers and scientists refer to mite levels in terms of mites per 100 bees, or percent infestation. The one-half (1/2) cup sample of bees you processed contained roughly 300 bees. To find the percent infestation of your colony, simply divide the total number of mites from your alcohol wash by three.

- To aid beekeepers in knowing when it is time to make a mite treatment, researchers have developed a treatment threshold of three mites per 100 bees, or a 3% infestation.
- This threshold balances factors, such as the monetary cost of treatment, with the effects of mite levels on colony survivorship.
- If your alcohol wash reveals 3% infestation or greater, strongly consider treating your bees for a *Varroa* mite infestation.

Considerations for Treatment

- Select a treatment that is legal, labeled for honey bee use and known to be effective. This protects your bees, you and the people who consume your hive products. Consult with your local beekeeper's organization for more information.
- Carefully read and re-read all instructions that come with the treatment you select.

Remember, the label is the law, so apply the treatment exactly as described on the label instructions. It may be helpful to consult the manufacturer's website for more information.

- It is generally considered good practice to treat an entire apiary if most colonies are at or near 3% infestation level. As bees drift between colonies, treating only one or a few hives may be ineffective in managing *Varroa* mites.
- Consider the time of year. It may be appropriate to treat in early fall even if mite levels are below 3% as they will quickly rise during these months. It is crucial to keep mite levels low as your colonies create the bees that will carry them through winter. Failure to keep mite levels in check during the fall may lead to overwinter colony loss. In the southeastern United States, it is generally appropriate to treat near the beginning of August.
- Check mite levels two to three weeks after the treatment period has ended to ensure *Varroa* mite populations were sufficiently reduced.

Further Information

- For instructions on how to construct a mite washing device, enter "LSU AgCenter how to build a *Varroa* mite washer" in the search engine of your choice.
- An alternative method for monitoring *Varroa* mite populations is the powdered sugar shake. While this method is less accurate and more time consuming, it does not kill the bees used in the sample. For information on how to perform a powdered sugar shake, enter "LSU AgCenter powdered sugar shake for *Varroa*" in your search engine of choice.
- Consult with experienced beekeepers in your area as to the methods that work best in your climate. A good source for this discussion is your local beekeeping organization.

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