Agriculture Extensions Services

Newfoundland Labrador

Varroa Mite Monitoring and Sampling Techniques

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The varroa mite (Varroa destructor) is the most serious threat to honey bees (Apis mellifera). It is an external parasite that is visible to the naked eye, flat, reddish-brown in color and oval-shaped (Figure 1). It is 1.6mm wide and 1.1mm long and are found on the bodies of adult bees, where they feed on their haemolymph (bee blood). Varroa cause physical damage to the bees, weaken the bees and transmit a variety of viruses. Their effects are so immobilizing that they can result in the death of an entire honey bee colony.

Varroa has not be detected in Newfoundland and Labrador (NL) to date, and the Province maintains a "free-from" status. However, it is important for beekeepers to be diligent with monitoring and incorporate IPM strategies if this pest arrives in NL.

Detection

Varroa can be found on adult bees and in cells of developing brood. Varroa are detected by examining bees in the brood chamber of the honey bee colony as this is where varroa are most prevalent. When numbers are high they can be observed on the surface of a worker bee (Figure 2). It is unusual to see just one varroa within a colony, as they reproduce rapidly. Where there is one varroa, there are many. This is why monitoring is so important. Monitoring is the first step of Integrated Pest Management (IPM) and chemical treatment should only occur after physical controls methods have been exhausted. Below are physical monitoring techniques to assess the presence or absence of varroa.

Figure 1. Close up of varroa mites.

Figure 2. Honey bee with varroa mite.

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Surveillance & Monitoring Methods

It is important to monitor colonies regularly by examining all or most colonies. Larger beekeepers should sample 10% of their colonies in the each yard, during the spring and the fall.

Varroa is not currently present in NL. Below are four physical monitoring techniques to assess the presence or absence of varroa. These techniques are typically used in other provinces where varroa has been documented, but can be used as monitoring tools in the absence of varroa.

Figure 3. Scooping of bees from a collection pan

Figure 4. Collecting bees directly from a frame.

Two monitoring techniques require honey bees to be collected, and can be collected in one of two ways:

Isolate the queen prior to bee collection!

1. Shake the bees off the frame into a pan, where they will be scooped into a sample container (Figure 3)
2. Collect bees directly off the frame – tilt the frame downwards at a 30o angle, and gently run the container over the frame surface to encourage the bees to fall in (Figure 4).

- Collect bees from the brood chamber, as this is where the highest number of mites will be located.
- Collect bees from at least three different frames, to obtain a representative sample.

Sugar Dusting

Materials required: measuring scoop, tub, tablespoon, mason jar with converted lid to #8 wire screen, powdered sugar (confectioners' sugar)

1. Collect ½ cup of bees from brood chamber and transfer to jar with wire mesh lid
2. Add 1-2 tbsp of powdered sugar through the mesh lid (Figure 5)
3. Swirl to coat the bees
4. Let the jar sit for 3 minutes in the sun
5. Shake the powdered sugar into a white monitoring tub
6. Add water to the white monitoring tub to make potential varroa more visable
7. Place jar of bees back in the sun for 3 more minutes
8. Repeat steps 4 & 5
9. Swirl the monitoring tub to liquefy the sugar
10. Count the number of Varroa (if present) in the monitoring tub

Figure 5. Adding table sugar to bees through a wire mesh.

Sticky Board

Materials required: cardboard paper, sticky material, screened bottom board

1. Mark a piece of heavy paper (40 x 29.5 cm) with a grid. (eg. A letter size folder)
2. Coat the paper evenly with a combination of Crisco and vegetable oil or petroleum jelly
3. Insert the sticky board under the screened bottom board. If there is no screened bottom board, place the hardware cloth or wire mesh directly over the sticky board.
4. Collect the sticky boards after 72 hours.
5. Count the number of varroa mites (if any) and record results

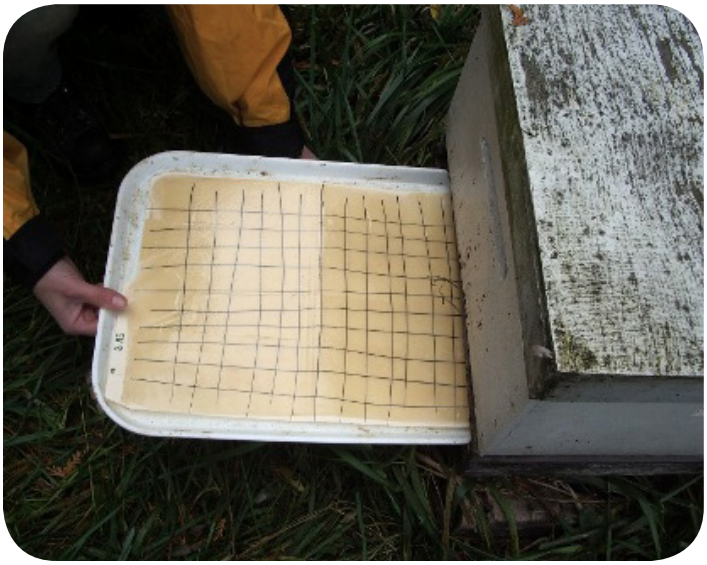

Figure 7. Sticky board

Ether Roll

Materials required: 1 quart glass mason jar, engine starter fluid spray, permanent marker, water

1. Collect ½ cup of bees from the brood chamber and place in mason jar
2. Move at least 10 feet away from colonies. Spray engine starter fluid into the mason jar three times (Figure 8)
3. Shake the jar (up and down and back and forth) for up to one minute. Roll the jar along the side several times (Figure 9)
4. Count the varroa mites (if any) that stick to the side of the jar and record results.
5. Dispose dead bees and rinse the mason jar between samples

Figure 8. Adding engine started fluid to collected bees.

Figure 9. Swirling of bees with engine starter fluid.

Alcohol Wash

Materials required: pan, ½ cup, 1/8 inch hardware cloth or wire mesh, alcohol (70% isopropyl alcohol, windshield washer fluid), water or a mite shaker.

1. Collect ½ cup of bees from the brood chamber
2. Place bees inside well-sealed container and add alcohol so that the alcohol completely covers the bees within the container
3. Vigorously shake the sample in the container for two minutes to dislodge the varroa (if any) from the bees

4. Pour the mixture of dead bees + mites + alcohol onto a 1/8 inch hardware cloth, mesh wire screen over a receiving white-colored pan
5. Rinse bees on top of the screen thoroughly with water
6. Count the number of varroa (if any) in the receiving pan

Commercially manufactured hand-held mite shakers are available at bee supply stores (Figures 10 and 11).

Which technique chosen to use is dependent upon the time and resources available.

Figure 10. Hand-held Mite Shaker

Figure 11. Commercially available Mite Shaker.

Monitoring Method	Advantages	Disadvantages
Sugar Dusting	Does not kill bees Can be completed in situ	Inconsistent results in cold or humid conditions More time consuming than ether roll or alcohol wash
Sticky Board	Does not kill bees Samples entire brood nest Boards can be collected and counted at a later time	Boards must be prepared ahead of time Must return to bee yard to obtain results
Ether Roll	Immediate results	Kills the bees Ether agitates the bees
Alcohol Wash	Immediate results	Kills the bees

What to do if you find varroa

The varroa mite is a reportable pest under the Animal Reportable Diseases Regulations of the Animal Health and Protection Act. If you find varroa in your honey bee colony, contact your Provincial Apiarist!

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