

Mite Measuring

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Mite Measuring Methodology

BC Bee Breeders' Project Update by Brenda Jager

The BC Bee Breeders' stock evaluation project in the Kettle Valley continues to move ahead with ninety-nine into winter. The research team's emphasis this year has been to establish large healthy hives that will over-winter. After having the packages the team worked to build them up, equalize their populations and then introduce selected stocks and mites.

The summer also provided an opportunity for experimenting with evaluation methods. The team measured mite levels in natural drops as well as honey and pollen production. Working to standardize our measurements was very important to compare the various bee stocks.

Testing for mite infestation levels is essential for this project. The team has been experimenting with three methods:

- natural drop (ND)
- sugar shake (SS)
- alcohol wash



Krystal Thorpe checking mite levels using alcohol wash method.
Photo by B. Jager

What seems simple in fact is not easy to standardize. Natural drop can be influenced by the population size of a hive, grooming behavior of the bees and whether there is brood present. In order to compare mite infestation levels between hives and stock lines we must use consistent ways to measure the population levels and know the season of the bees. For instance, some of the lines stop brooding early in the fall or start later in the spring than other lines. The team will be documenting all of these traits to help us understand how different stock lines differ.

The alcohol wash and sugar shake give us an indication of the mite infestation of the brood nest. Samples are taken from the hive where young larvae are being fed by nurse bees. The number of mites found is related to the number of bees in the sample. The percentage of bees infested tells us the percentage of bees infested. However, obtaining a standard sample size based on a specific measurement (such as a half-cup) always produce a constant sample size.

Why do we need a standard sample size? To save time and effort we do not need to count every single sample we take. The

consistency of the bees and the ability of the sampler to fill the sample container equally each time affect variation in sample size. Getting a consistent sample jar to the same measurement each time can be challenging when more than one person is taking samples. If one person has a slightly different technique for settling the bees.

The size of the bees is affected by many variables including the availability of larval food, size of the brood colony, whether there are drones present. The samples have shown that a half-cup of bees in the spring can have almost

bees than in the fall. Also, a higher mite infestation can also reduce the size of the bees. Once we stabilize our techniques for taking samples, and ensure all samples are very close in size, we will be comparing the percentage of the samples from each collection period to ensure we are adjusting our number of bees per sample time period it was taken. All samples will be adjusted to give a 1° mites per 250 bees ± infestation level. This will compare infestations between hives and between times of the year.

Practice sampling has improved our techniques for knocking mites off the bees. In order to test our sugar shake efficiency, we shake bees from the comb into a box. We then tumble the bees to mix them and take two samples for a wash, and another for a sugar shake that is washed afterwards. After the wash, the bees in both samples are counted. We also look for more mites. SS samples are expected to not be as accurate as washes; however, we find that the SS method is giving results very close to the washes. Only the odd mite is coming out in SS's after-washes. Here is how we do it. The sample is placed into a mason jar and then tapped down firmly to get the bees tangled to the bottom of the jar. We then check the amount of bees against a line marked on the jar. Once the measure is correct, a metal screen is placed on top of the jar and the mason ring is screwed down to secure the screen. Powdered sugar is pushed through the mesh. This helps to prevent clumps in the sugar. A quick shake of the jar evenly distributes the sugar over the bees.

Rather than immediately shaking the jar over a white board, we lay the jar on its side. Leaving the bees to ramble about seems to help dislodge the mites. Having the jar on its side prevents all the mites from going to the bottom of the jar (the opposite end you need them to fall out). After a minute or two, the jar is turned mesh down and shaken for two minutes. Sugar and mites fall to the board. We've found that to get the most mites, it's best to stop shaking every once in a while, turn the jar on its side and knock the bees clinging to the mesh off. Roll the jar in your hand, allowing the bees to separate, and then start to shake again. Our wash technique is as follows. Place the bees into the sample jar. Tap the jar to get the bees down to the bottom. When you have the correct measure, pour windshield-washing fluid over the bees, being sure to put extra in, but do not fill the jar. There needs to be some ability to move within the jar. We place the sample jars into a box all together. The whole box is then shaken vigorously for ten minutes. This helps to dislodge the mites. We've convinced our local paint store to do this for us.

To separate the mites from the bees we use a piece of white fabric placed into a bucket, which is half filled with washer fluid. A screen basket is



BCBBA President Liz Huxter scraping board debris.



then submerged into the same bucket (above the fabric). The samples are individually placed in the basket, stirred to separate the bees and the mites and allowed to settle to the bottom. The basket is then raised out of the fluid. At this point we use a garden sprayer (the kind used for trees, etc.), filled with more fluid to wash the bees. The fabric is then lifted from the bucket. This year we have practiced our measurements for the wash and sugar shakes on non-project hives. We did not want to take samples from the project hives until we had established our measurement system and also to allow the hives time to build up. The natural drops were taken monthly or bi-monthly. The results of the drops are not fully attributable to the project stock yet, however, they provide a very good starting point – a baseline from which we can measure changes. Our fall assessment is a frame by frame counting of honey, pollen and brood. We are using a 32 square system of 32 squares per frame to measure stores and brood in the hive. We also weigh

of honey and note the number of frames of bees in both boxes. The measurements allow us to know approximately of the hives going into winter. Differences in aptitude, pollen distribution and brooding patterns are already shown. We can see differences, but we do not know, for instance, if the smaller or larger populations will make the winter succeed in spring build-up. That is to be seen only with time and a new season. We will repeat this hive assessment in spring and fall.

Now that we have worked out our methodologies and techniques and have done some initial measurements, we are crunching our numbers, making charts and graphs. We're looking forward to providing a first year report at the General Meeting and convention of the BC Honey Producers and BC Bee Breeders' in January. Please come to the team and hear first hand about our exciting project.