

Powdered Sugar Sampling to monitor *Varroa* mite populations in Honey Bee colonies

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Monitoring

- Varroa mite levels fluctuate within bee colonies during the season and between seasons. Knowing how many mites are present and how quickly their population is increasing [via monitoring] enables the beekeeper to determine what action, if any, should be taken to control Varroa mite levels.
- Growth rate depends on
 - IPM tactics used
 - Host colony genetics
 - Environment
 - Infestation from neighboring hives

3 Basic ways to Monitor Mites

1. On Brood

Impale capped drone pupae with capping scratcher and count number of cells infested
= % brood infested



Count # brood infested
not total mite count

3 Basic ways to Monitor Mites

2. Natural mite drop

Sticky Board

Mites dropped over three days captured on sticky/vaseline-coated board

= average mite drop/day



3 Basic ways to Monitor Mites

3. Mites on adult bees

Sugar roll

Shake mites off nurse bees using powdered sugar

= # mites/bee or
mites/sample (~300 bees)



Sugar shake method

- Collecting a sample of adult bees (1/2 cup or approximately 300) from the brood area and then vigorously shaking the sample with powdered sugar (for 1 minute) causes the majority of mites (>90%) to dislodge from their hosts. We can then shake out the mites onto a light colored collecting dish and count the mites – if we know the number of bees in our sample we then know **# Mites/Bee**

Sampling

Equipment



Powdered sugar

tablespoon

White [mite] counting dish

Colony to sample

Measuring cup
(marked at 1/2 cup)

Wide mouth
quart Mason jar
w/ modified lid
(8 mesh screen)

for powdered sugar sampling

Obtaining Bee Sample



Step 1: Open colony to brood cluster – Select 1 or more frames w/ open brood & nurse bees
- look to be certain queen is not on frame

Obtaining Bee Sample 2

Step 2: Shake bees from 1-3 brood frames into 5 gallon bucket or plastic wash basin – we prefer if bees are collected from 3 different frames but risk of queen injury is greater



Obtaining Bee Sample 3



*1/2 cup scoop from
cardboard box*



Step 3: Scoop up a 1/2 cup sample of bees (~300 adults) from bucket – if you shake bucket, bees will clump together for ease of obtaining bee sample

Obtaining Bee Sample 4



Modified lid (screen mesh replaces solid top)

Step 4: Transfer $\frac{1}{2}$ cup bees to wide mouth mason jar and screw on lid with modified 8 mesh screening

Add powdered sugar



Push powdered sugar
through lid mesh



Step 5: Add 1-2 heaping tablespoons powdered sugar to bees in the sample jar through modified screened lid

Powder sugaring the bee sample

Step 6: Shake the sample vigorously for 1-2 minutes to distribute the powdered sugar over the bees – if bees not covered add more sugar. Keep jar vertical when shaking.



Shaking out the mites

Mites (dark spots) in sugar

Step 7: Invert jar over a white dish and vigorously shake mites and sugar from jar – shake until no mites or powder sugar comes out



Optional reshake with additional sugar

Add another ½ tablespoon of powdered sugar and reshake for one minute. Shake out sugar w/ mites until no more drop -- count total number of mites



Calculate Number of mites/bee

Step 8: You can estimate ~300 in 1/2 cup and release sugar coated back into their hive.

OR

To get a more accurate count (and see if more mites are present) kill the bees w/ alcohol or soap to wash then Strain sample to count number of bees -- divide number of mites by # bees
= # mites/bees



NOTE: Shaking in powdered sugar does not harm the bees. They will clean off the powdered sugar and return to normal duties after release.

Increasing count accuracy - optional

- Add alcohol or soapy water into mason jar and shake well
- Pour through double strainer
 - 1 larger mesh to catch bees
 - 2nd of fine mesh (white) to catch mites
- Count mites and count # of bees r
 - $\# \text{ mite washed} + \# \text{ mites shaken}$
divided by total # bees =
 $\# \text{ mites/bee}$



Cloth below strainer

Mites/Bee

- The sugar shake # of shaken mites or your calculated estimate of # Mites/Bee is a “guesstimate” of the level of mites in the bee colony. It can be used to make a decision on further treatment needs &/or to assess past treatment effectiveness. It will enable you to monitor the development of mites over the season and one season to the next.

Deciding on what action needs to be taken

- **Step 9: When was sample taken?**
 - Before supering – April/May
 - Treat when levels are 2-3 mites/sample (0.006 – 0.01 mites/bee)
 - Mid flow (optional) –June/July
 - Remove crop and treat when 10 or more mites/sample (0.05 mites/bee)
 - Post honey flow before final fall brood rearing – Aug/Sept
 - Treat when levels are 10-12 mites/sample (>0.05 mites/bee)

These thresholds assume normal size colonies with brood

Application of Results Summary

It is recommended that a minimum of 2 samples be taken each year. Spring sampling (April to mid-June) will help establish the colony condition before/during the active season. If 2-3 or mites are in sample colony/apiary you should perform a non-chemical IPM treatment to reduce mite buildup.

At a minimum, a fall [no later than mid-August] assessment should be made of each colony/apiary.

If more than 10-12 mites are shaken. further (usually chemical) treatment is needed to help insure over winter survival.

For Additional Information

- See website <http://MAAREC.cas.psu.edu>



Courtesy Univ of GA