

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

Dewey M. Caron, Elizabeth Burdick & Kristin Danek



# 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
  - 2<sup>nd</sup> 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