Sampling Colonies for *Varroa destructor*

An extremely important tool for gaining control of Varroa mites!

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WHY SAMPLE in a standard way?

- Be informed: know thy enemy
- Decrease use of miticides
- Reduce chemical residues in hive
- Save time and money
- Develop regional treatment thresholds
- Breed queens from colonies with low mites

1. **Sampling a Colony:** Sample 300 adult bees from one frame containing brood (eggs, larvae or pupae).

2. 300 bees occupy a volume of 0.42 cup or 100 ml. Be careful! Bees are small, so small changes in volume leads to large changes in the number of bees (i.e. 0.33 cup = 200 bees, and 0.5 cup = 400 bees).

3. To make your own cup, add 0.42 cups or 100 ml of water to a cup. Mark a line at the water. 0.42 cups = 1/3 cup + 1 tbsp +1 1/14 tsp .

4. Use one of 3 methods to collect bees: Method 1: Rap a brood frame into a wash-bin bucket. Use your cup to scoop out 300 bees. Rap cup on a hard surface to be sure the bees are at the marked line. Add or subtract bees as needed.

5. Method 2: If your cup is rectangular, run the cup gently down the backs of the bees, causing them to tumble into the cup. Rap the cup on a hard surface to be sure the volume of bees is at the marked line.

6. Method 3: Use the divice called "Gizmo" to sample. It is available from the Walter T Kelly Beekeeping Company or you can build it using the plans online (www.BeeLab.umn.edu).

7. Gizmo has a volume built in to measure 300 bees. Out of the three methods, Gizmo is most accurate, but the other two methods can work as well if the bees are consistantly at the marked line.

8. Once the bees are measured, you can use powdered sugar to dislodge the mites. First, dump the 300 bees into a jar with a size 8 hardware mesh cover.

9. Add about 2 Tbsp (one hive tool scoop) of powdered sugar. Add more sugar if the bees are not coated in white. **Let the bees set for at least one minute in the shade**. Don't hurry this!

10. Shake the jar into a white dish for one minute to dislodge mites from bees. Shake HARD. It is important to remove as many mites as possible. Replace the sugar-coated bees bees in the colony where they will be cleaned.

11. Add enough water to the dish to dissolve the sugar. Count the mites. This is **mites per 300 bees**. The mites will be regular-shaped reddish-brown ovals. You can sometimes see their legs kicking.

12. **Sampling an Apiary**: Sample a total of eight colonies using using one of the methods described above. Sample every fifth colony – loop back if need be.

#Mites per 300 adult bees	Colony infestation	#Mites per 8 300 adult bee samples	Apiary infestation
1	1%	8	1%
3	2%	24	2%
5	3%	40	3%
7	5%	56	5%
9	6%	72	6%
11	7%	88	7%
13	9%	104	9%
15	10%	120	10%
17	11%	136	11%

13. **Calculate:** Convert **mites per 300 bees** to percent infestation of the whole colony (mites on adults plus those hidden in pupae) by using this conversion chart or formula [(**mites per 300 bees** ÷ 3) × 2]. For example, if you find 15 mites in your test sample, then (15 ÷ 3) x 2 = 10% total mite infestation.

If you are a hobby beekeeper, consider treating at a 10-12% mite infestation. If you are a commercial beekeeper, you may want to use a lower threshold.

For more information on how this sampling procedure was derived and treatment thresholds, please read the article in American Bee Journal, December 2010, or in J. Economic Entomology, 2010; vol 103 (4): pp. 1039-1050.