



Sampling Pollen for Pesticide Residue

Background

Honey bees gather pollen from many floral sources. Some of these sources may be contaminated from direct pesticide application or from systemic insecticides within treated plants. Pollen taken back to the hive is stored and used as food for developing brood. Damage to an individual bee may vary greatly compared to the eventual damage to the hive. This damage is related to the toxicity of a pesticide and the application method. For example, a pesticide sprayed directly on a honey bee may kill her quickly and thus she will not take any of the chemical back to the hive. However, a low level systemic insecticide prevalent in a local pollen source that does not kill immediately will result in that pollen being stored in the hive and used for feeding the brood. It is unknown at this time whether these consistent, low level pesticides affect brood development, brood mortality, queen reproduction and/or queen mortality. It is known; however, that multiple low level pesticides have a synergistic effect making them more lethal in combination with each other than they are when found separately.

Sampling pollen is included in the 2013 US National Honey Bee Survey and will occur concurrently with the honey bee health survey. Ten of the 24 Apiaries sampled for honey bee pests and disease should include pollen sampling for pesticide residues.

Equipment Provided

In the pollen sampling kit, you have been provided with 10 wooden sampling sticks, 10 plastic pollen sampling tubes in a zip loc bag, a permanent marker for labeling each apiary's pollen sample. You also have been given a paper copy of this protocol, and a smaller US Postal return shipping box with the appropriate postage and shipping address applied to the box.

How to sample

Sampling pollen from active hives can be done in several ways. This sampling routine was developed to demonstrate the easiest method to collect the pollen while you are also sampling for mites, Varroa and pathogens as part of the honey bee health survey. The pollen must be collected from fresh pollen – not entombed pollen (pollen covered by propolis) and not from 'bee bread' (pollen processed by the bees that includes honey and other enzymes). You will be able to distinguish fresh pollen from these other types by the dry, grainy and sometimes colorful cells usually surrounding brood frames (see Figure 1). Bee bread appears moister and has a dull color compared to fresh pollen.



Figure 1: Fresh Pollen

A minimum total of 3 grams of pollen must be collected from the 8 hives sampled within the apiary. To collect 3 grams, it is advised to sample at least 4 cells from each of the 8 hives.

After you have taken the honey bee sample from the brood area for the honey bee health survey, look at the frames you have pulled to see if there are any cells with fresh pollen in them. If so, take one end of a sampling stick and insert it all the way to the bottom of the cell and rotate the stick all the way around the cell scraping the pollen as you go. You may damage adjacent cells as the stick is slightly larger than a cell (Figure 2) but this is normal.



Figure 2: Opening cell wall to remove pollen

As you lift the stick from the cell, move slowly as the dry pollen is crumbly and may fall off the stick (Figure 3). Place the pollen in the plastic container by scraping the stick on the inside mouth of the tube making sure that the pollen falls into the sampling tube. Repeat in at least 4 cells per hive to gather the minimum of 3 grams of pollen.



Figure 3: Sampling Pollen

If the frame you removed for sampling does not have pollen in it, set it aside and try to find another frame with pollen in the hive. If you cannot find any pollen in the hive, move to the next hive for sampling and try to get pollen from it. If you cannot gather pollen from a particular hive, it is necessary for you to take extra samples from the remaining hives to collect the requisite total of 3 grams. Each sampling stick will be used per each hive sampled. The sampling sticks can be disposed of in the trash and should not be used again.

Once all hives have been sampled, close the tube, make sure it is labeled and place it in the refrigerator or freezer for storage until all 10 samples have been collected. Once they have all been collected, place all 10 tubes into the smaller return shipping box for shipping to Beltsville, MD. These samples do not need to be shipped on ice. The correct postage and shipping address label has already been applied to these boxes.