Integrated Pest Management in Beekeeping,

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As more and more problems seem to besiege the honeybees, it becomes incumbent on the bee's guardians to become better beekeepers. While chemical controls of these problems have their place, and, in many ways have served us well, they are not the only solutions. In fact, as we see more and more problems with the chemicals we've employed we learn that they are only stop-gap solutions that need to employed very prodigiously and, at best, only on an emergency basis.

Continued use of chemicals has caused uncounted problems in the hive. Queen and drone fertility has been documented from chemical residues and bee viability is suspect. We have watched as the diseases and pests have gained tolerance and/or resistance to the chemicals we've employed for their control. We have chosen to tolerate levels of contamination in a food product that sells largely because of the concept that it is "pure and natural." If used carelessly, use of chemicals can put at risk the very product that is the end product of our endeavors; honey.

The concept of Integrated Pest Management (IPM) in beekeeping serves purposes on a few levels. It strives for the long solution, it minimizes the use of chemicals that can damage the "pure and natural" image of honey, it minimizes the negative effects of chemicals in the hive, and it safeguards the usefulness of the chemicals for when they are most needed. These advantages have a price; they can be more labor intensive. At the same time, they can save.

There are four steps to IPM in Beekeeping:

- Genetics
- Mechanics
- Measuring
- Chemicals

For proper employment of IPM in Beekeeping, these should be used in the order they are listed above:

1. Genetics, while it is not a quick fix, it is the real, long-term solution. We are blessed with those who have scientifically worked to come up with bees that demonstrate resistance to various problems. We should take advantageous of these traits. We can also be doing our own selection of traits in the areas of hygienic behavior and disease resistance. At any rate, we should be working toward the goal of having bees that take care of the problems themselves without the aid of systematic drug therapy.

2. While working on the genetics, mechanical controls of bee diseases and pests should be employed. Some of these are clearly labor intensive but will not only save money, they will add to the general well being of the bees and purity of the honey. In fact, some of these methods are not so labor intensive, but all of these methods should be considered as a method of using fewer chemicals while working on the long-term solutions of genetic controls.

   The concept of using mechanical controls and genetic traits to minimize the detrimental effects of diseases and pests has given us tools for long term solutions and, in the meantime, given us the ability to stretch out the time between chemical treatments.

3. In order to know when you can skip a chemical treatment or when it is necessary to employ such controls, the beekeeper needs to monitor levels of infestation. Inspecting the brood for diseases is considered normal in most operations. It should also be normal practice to measure mite load levels. Once the mite levels are determined, they can then be compared with levels that are considered to be "economic threshold" levels to determine if chemical treatments can be skipped or are necessary at the time. Measuring also tells when we can use alternative or mechanical methods and should be used to measure the efficacy of the various treatments employed.

   Measuring levels of Varroa mite infestations is critical for knowing if a chemical treatment can be skipped or if it is, in fact, necessary to treat as soon as possible. For all of these methods, timing is critical and factors, which must be taken into consideration include: climate of the area of concern,

time of year, colony strength and amount of brood. Methods used to check levels of infestations include, in order of accuracy:

a. Drone scans
   - A quick method for detection of infestation but of little value in measuring levels.

b. Sugar shakes
   - Best if a consistent level of approximately 300 bees are used in sample
   - Bees must come from brood area
   - Depending on time of year, 12 – 25 mites found in 300 bees is a conservative threshold level.

c. Sticky bottom board with 3 day, natural fall,
   - Assuming brood is available, 150 mites would be considered a conservative threshold. (50 mites per day)
   - Time of year should be taken into consideration.

4. Chemicals or drugs that are labeled for specific use in beehives for the control of specific infections or infestations should be employed by closely following label instructions when threshold levels are reached and when it's felt that other methods will not be effective enough. It has been demonstrated that the frequency of use is being minimized through genetic advances and mechanical techniques. Using the chemicals as little as possible and correctly, when necessary, will maximize their benefits and make for advances in both the beekeepers operation and in beekeeping in general. When chemicals are needed, beekeepers should consider not using the same one over and over. Alternating each time or every third time will extend the efficacy of the chemicals.

   There are new chemicals being developed all the time. For many years we only had one chemical to control Varroa mites. As efficacy diminishes due to resistance, others are developed. Today there are several. Some of these can be called "hard" chemicals while others could be considered as "soft" chemicals. No matter which chemicals you choose to use to control the specific problem you're targeting, it is required by law to follow the label directions. Likewise, it is not legal to use products or formulations that are not labeled to control the specific pest being targeted

For a chart of "Chemical and Non-Chemical Controls for Bee Ailments", see "fact sheet" of that name.