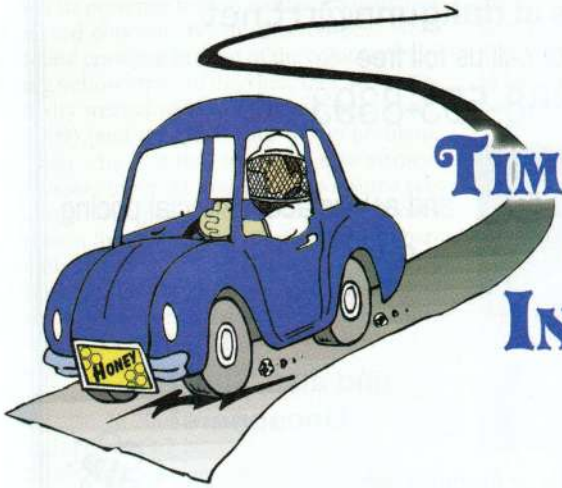
The Traveling Beekeeper



Time for Resistant Bees —A Plan for The Individual Beekeeper

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Every beekeeper must take on the responsibility of intentionally contributing to the level of resistance to mites and diseases in all colonies. They need to start it this year if they have not already done so, since the sooner we all start this process, the sooner we will be finished. This is not a function of operational size, since a single-colony beekeeper can keep resistant bees just as well, if not easier, than a thousand-colony operator. The change that must occur is in the mind of the beekeeper, with each one of us making the decision to keep bees that do not succumb to varroa mites, American foulbrood, chalkbrood, sacbrood, other viral diseases, *Nosema* (both species) and more. Like any trip to a new destination, we first must decide what we want to take with us, and for all of us, we must find queens that already possesses some level of natural resistance, and/or we must set up a selection program to develop such resistance.

Finding resistant queens

Many large-scale queen producers and package bee providers do not select for resistance. Period. They make no effort to work toward a resistant stock. The selection criteria they use are the same as those used in pre-mite selection: productivity, fast buildup, wintering ability (maybe) and low stinging behavior (also maybe). There are many breeder queens selected by large producers who select on just two criteria and two criteria only: brood production and honey yields. Sometimes the system involves the placement of a pushpin on the landing board following colony inspection or honey harvest—at a point where the colony impresses the beekeeper. The colonies that get the most pushpins over the season become the grafting mothers for the next generation. Granted, there may be some non-directed selection for these two characteristics that coincidentally results in lower varroa counts. But the selection method does not discriminate against the colonies with some level of disease, and it certainly does not reflect any selection based on the performance of the queen's daughters in colonies in customer hives. Success or failure of queens in a northern operation does not concern the Sun Belt stock provider since there is little difficulty finding customers for any queens that are produced during the key months of the spring.

So, what does the beekeeper seeking resistant stock do? I have a one-word answer: ASK! *Ask* if the bee stock has been part of any bee-breeding program selecting for mite and disease resistance. *Ask* if previous year customers provided production figures for the colonies and the level of mite population when tested. *Ask* if any of the breeder queens have resistant genetic material in their background. Finally, *ask* if the individual breeder queens are sampled for varroa mite levels, and are one hundred percent clean of American foulbrood, chalkbrood, sacbrood, other viruses and any other pest infestations. It amazes and disgusts me to see queen producers graft from colonies with active chalkbrood infections! How can they be so incompetent! The presence of chalkbrood clearly indicates that the colony is not hygienic, AND it serves as a direct route of infection of the queen and eventually her colony.

Recently, I had a discussion with a large queen bee and package producer and he confirmed that his operation does not have any sort of disease or mite selection program. For large commercial honey-producing operations with a plan to chemically treat the colonies, this works. But for the beekeeper trying to find resistant queens, this is NOT the source! The wide-scale propagation of mite susceptible queens does nothing to help the industry move toward a chemical-free system of raising bees, and as long as these operations continue to produce mite susceptible queens, we will not be able to end the need for chemical treatment.

The smart beekeeper will be at the National meetings this month visiting with queen producers who do have a resistance program in place. They usually advertise this in their journal advertisements, such as the one you are reading this in right now. Look for the key words and phrases: Hygienic stock, tested mite-resistant breeders, Russian bees, VHS breeders, grafted from Minnesota hygienic x VHS breeders; these are examples. If they put it into print, they really should be carrying out the practices they claim. The fact that some of these selection programs began about 20 years ago should provide adequate opportunity for these resistant bees to be made available to the public. Make sure to *ask* for a copy of their data.

Local test survivors

What if you have a regional beekeeper who has colonies that have not been treated for varroa mites with chemicals for the past ten years AND produce good crops of honey and winter well? It is important that you ask for such stocks, since they may already possess the local adaptation factor that large Sun Belt queen producers cannot provide. Seek out and use these queen stocks. Personally, I hope to search Michigan and surrounding state suppliers for chemical-free stocks of queens and nucs. I have a start with the queens I purchased last year from a beekeeper who works with Dr. Greg Hunt at Purdue University and produces queens from stock shown to have some resistance. Using the Purdue stock and new stocks I hope to obtain in 2010, I will start a simple testing program that all beekeepers can duplicate.

Quick stock testing for mite resistance

When we started colonies last year, they all were set up on a screened bottom board, and I recommend that all new beekeepers make this investment for healthy bees. We can leave the insert board in place during the cool spring buildup months and remove it as the colony expands and requires additional ventilation. On a periodic basis we Dust & Count: Each colony will be given a standard powdered sugar treatment of ½ cup of powdered sugar for every deep brood box. This is placed onto a piece of window screen on the top of the hive. A bee brush or large paintbrush is used to spread the powdered sugar over the top of the frames. Then the screen is removed and the sugar on the top bars is brushed between the frames. My objective is to get powdered sugar on the worker bees, but NOT into the brood comb where it may dry out young larvae. (This is why I have not used a bellows or blower system.)

Periodic sugar dusting over the course of the season will provide meaningful comparisons of different stock that are added to your apiaries. (Closely timed dustings—twice a week—also provide excellent varroa control.) An effort must be made to develop some sort of standardization when you do this so you are not comparing new colonies—nuclei or packages—with full sized or over wintered colonies. Colonies can be ranked by their cumulative degree of mite levels. The lowest mite counts are desired, the highest are not. Sampling systems, the wait until you count the mites, should use a standard interval after dusting, from ten minutes to 24 hours. That will provide a useful comparison.

Sort out the colonies with the highest and lowest mite drops based on sugar dusting

The colonies with the lowest overall mite drop are the ones that are supporting the lowest mite population, and theoretically express some sort of resistance or tolerance based on known or unknown mechanisms. Then, evaluate the colonies for other characteristics, such as honey production, late winter population strength (frames of bees) defensiveness (number of stings and/or number of hits on the veil) and other characteristics important to you. This will give you a percentage of your total colony count that can be used to produce new queens either through utilization of swarm cells or from grafting cells.

Colonies that are at the lowest thirty to fifty percent of the ranking—the ones with the highest mite counts—should be systematically taken apart and reassembled to make new colonies with new and hopefully more resistant queens. The new colonies could be made up with three to five frames of brood, one or two frames of stored food, and drawn combs of frames with foundation. With a new queen, virgin queen, queen cell or 48 hr cell from a resistant queen, you can establish new colonies and allow the queens to mate with drones from the local supply. At first this drone population will have low mite resistance, but with periodic stock replacement, some unexpected swarms adding to the environment, and planned drone management, you can build a more resistant supply of drones within your local area.

The goal is simple—reduce the mite count to a minimum and maintain that level by continued testing and selection.

Example

If you have 100 colonies at the first of June (I am using a Northern model, move this to an earlier month if you are in Sun Belt location), select the colonies with the lowest mite drop over the past 12 months. You may use natural queen cells and/or graft from the top ten to twelve colonies. At the same time, take thirty to fifty colonies that have higher mite counts (especially those with the highest counts), and divide each colony into two to four colonies, evenly dividing the brood and honey resources among all new colonies. The old colony will no longer exist. You do not need to find the queen (remove her if you do), but you need to add a queen—mated or virgin—or a queen cell to each new colony. Feed and support the colony with syrup and protein mixtures. Once the colony has expanded to a full depth box, start evaluations with the powdered sugar for the next round of evaluation and selection.

And produce drones

One reason I reprinted G.M. Doolittle's books (*Scientific Queen Rearing* and *A Year in the Out-Apiary*) was the many useful suggestions he made for general colony management. His system used to stimulate drone production from ONLY the best colonies in a location needs to be repeated:

In the group of one hundred colonies (or what is left of them after you make the divisions), select out the very best one-fifth to one-third of the colonies and add drone comb to stimulate drone production. As the brood is sealed, add this to the rest of the remaining colonies. Doolittle showed that the addition of developing drone to these colonies inhibited the development of drones in the colonies. The repeated movement of "desired" drone brood into colonies that you do not want to produce drones will create a good drone population carrying resistant genes.

Goal setting

Over time, in each generation you create, you want to have lower and lower mite drops or counts using the powdered sugar test. New stocks (families of queens) can be added to the study, and separate queen families can be developed as you proceed. The goal is simple—reduce the mite count to a minimum and maintain that level by continued testing and selection. This is not necessarily a complicated process, and the method will result in good colonies with low mite counts.

***Queen Rearing Essentials*, Dr. Connor's newest book, is now available from your local bee supply source or from www.wicwas.com.**