

The Traveling Beekeeper



Raising and Managing Your Own Queens and Drones

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A MODEL BREEDING PLAN PART 2

"G have 60 colonies. How can I raise quality queens?"

Many sideline beekeepers have asked me if it is realistic that they produce queens for the local beekeeper market. My answer is yes, but you must be serious about the effort and be willing to rearrange your spring and summer schedule so you do the job correctly. If a beekeeper is not committed to doing a good job, he should stick with honey production and pollination, where the level of precision is far less demanding. Beekeepers interested in producing queens must know how to count and keep records; they must be available to perform critical tasks during the queen-rearing season, and must be willing to allocate resources that involve both time and money.

Here is a plan that uses 60 colonies for breeding work. These may be all the colonies in an operation, or represent the part of a sideline operation that is going to be dedicated to queen and drone production. I selected 60 after discussing this with Dr. David Tarpy of North Carolina State University, who has conducted work on drone diversity and the production of well-mated queens.

YEAR ONE

If you are a sideline beekeeper with another job, you probably want to ease into the queen-rearing project. For that reason I have suggested a two-year plan for your efforts. Of course, these two years' activities could be collapsed into one season, but you are on your own if you want to do it.

You have two objectives during your

first year: (a) to requeen your colonies with at least six different drone sources, and (b) to develop and refine your skills as a queen propagator by using the Doolittle (larval transfer or grafting) method of queen rearing, or a non-grafting plan as outlined in Laidlaw and Page's *Queen Rearing and Bee Breeding*, Wicwas Press, 1997. Or, you can use one of the kits sold by bee supply firms that allow you to produce queen cells without grafting by getting the queen to lay into the plastic cell base.

(a) Install six different genetic lines for drone production; that's 10 queens each from a combination of unrelated genetic materials. Look at stock like the Minnesota Hygienic, VSH, New World Carniolan (Sue Cobey), Russian (USDA), Ohio Queen Project (Joe Latschaw), and other producers. Also, seek out local survivor stock, and strains bred up by other local beekeepers. Keep in mind your latitude and altitude when selecting stocks, and try to find those that do well in your local conditions and that will benefit from your local floral source. Without evaluation, I would not expect a stock selected for the tropics to do well in a temperate area, or vice versa.

Why six lines? Well, this is a minimum, but it attempts to incorporate Dave Tarpy's finding that the average queen mates with 12 or more drones to produce the most successful colony. This is pretty new information and not found in many books. You want to sample from the queen-producing drones in these colonies. Since the queen is heterozygous and the drones she produces are homozygous, the use of six unrelated strains of bees will provide the *minimum* genetic diversity you seek in your colonies. If you have 100 colonies to use in your plan, you could increase the number of unrelated stocks to 10 (with 10 queens

each), providing a total of 20 unrelated drones in the mating area. *Always keep your drone diversity at a maximum during the mating season.*

We have evidence that colonies from queens mated with larger, more diverse, drone types are better able to resist diseases (AFB, chalkbrood, sacbrood and EFB). The colonies are better able to maintain the temperature within the broodnest, a behavior essential for survival in both cold and hot climates. And recently we have learned that queens mated with more drones are more attractive to nurse bees, are better accepted and cared for. My guess is that we will add many other behaviors about the advantage of multiple matings as more researchers work on the subject.

But these are not all local strains! For now, we do not have the flexibility to use locally produced strains of bees that combine the wintering, production, and hygienic behavior we seek. Work with hygienic bees shows that a hygienic queen must mate with at least 50 percent hygienic drones in order to pass on the hygienic trait to the colony. Hygienic bees uncapped and remove larvae diseased with American foulbrood and chalkbrood. The strains have also been shown to remove a higher percentage of larvae infected with varroa mites. By using the hygienic strains of bees in your operation, you will achieve better disease management, as well as reduce the frequency of use of mite control chemicals. When applied in a management plan that uses screened bottom boards and powdered sugar, you will have the closest thing we have as far as pesticide-free colonies.

By the end of the first season you want to have vigorous queens from these different stocks inside your colonies. You may have purchased all of these queens and installed them or you may have obtained a

breeder queen and produced daughters from her. All of the final queens are there for one purpose: to produce large numbers of viable and target drones for the second year, when you will really get down to business.

(b) During your first season take a class on queen rearing (I'm teaching several this season)—check to see what is being taught in your local area. I hear excellent reports about classes taught by Sue Cobey and Marla Spivak/Gary Reuter in different locations. OR, take a few weeks off and help a commercial queen producer to raise queens.

Use your own queens in your own nuclei colonies and let them build over the summer. Are you happy with what you see? Or, do you need to start over? Keep at it. Don't be afraid to discard a batch of queens that are too small.

YEAR TWO

My suggested interval for queen production is 10 to 12 weeks, focusing on the natural spring buildup, swarming instinct and peak honey production season for your area. This will provide you with queens for sale to other beekeepers, queens for use in your own operation, and queens to keep in nucleus colonies that will be over-wintered for sale or personal use the next season. For a review of that portion of the process, check out my book *Increase Essentials*, published in 2005 by Wicwas Press.

1. Take out a calendar—physical or on the computer—and mark out 10 or 12 weeks from the end of the fruit bloom in your area. For me near the 43rd parallel, this will be some time in mid May after apples are finished blooming. This is important, for this is when the swarming instinct in colonies is at its maximum level, and you will use that natural event to produce new colonies and new queens mated to healthy, vigorous, competitive drones from a number of target drone sources. As a handy rule never graft (or use some other cell-starting method) until drones are in the purple eye stage (about 5 days after sealing) and are VERY abundant—a minimum of 100 sealed drone cells per queen you plan to mate.

If you want to rush the season, you may count backwards and start grafting and queen production before or during the fruit bloom. If you are new at this, I advise you wait until weather conditions stabilize and there is a small risk of low night time temperatures that might force bees into cluster—I do not like the idea of newly made queen cells and/or mating nuclei being subjected to cold temperatures and clustering.

2. When the first queen cells are a day or two before emerging, plan to make up your first batch of nuclei colonies. This nicely coincides with the swarming instinct, so you should reduce the swarming pressure by doing this. Your goal is to make up a total of 120 mating units over the next three weeks. These colonies may be made with a single frame of sealed brood, the adhering

bees and a food frame. Or, you may decide to make these units stronger and use two frames with sealed brood on them. Use sealed brood because the newly emerging bees will boost the strength of the mating unit when the queen is busy maturing and mating. By the time she starts to lay the mating unit should have good bee strength as well as good food reserves collected by the colony (in addition to what you have given them). I suggest you feed the mating nuclei with sugar syrup medicated against *Nosema*. This is critical for the production of healthy queens. It may seem unnecessary, but it can be very beneficial if the colonies are subjected to any weather or chemical stress.

3. Use standard box and standard deep or medium frames for the mating unit. This eliminates the expense and bother of another sized box and frame in your operation. It makes it easier to use frames of brood and food from colonies that may end up swarming, and it makes it easy to combine equipment at the end of the season. Double nuclei colonies are desirable for several reasons: First, they can be used as honey supers when not producing queens; second, they are stronger than mini or specialty nuclei boxes that may be too weak to withstand small hive beetles. They will also give the queen a larger surface area of brood comb to lay into and hopefully allow her egg laying/pheromone machinery to develop more fully.

Sometime before grafting season, make arrangements to obtain one to three instrumentally inseminated grafting mothers from hygienically tested stock. Talk to Tom Glenn at Glenn Apiaries of Fallbrook, California about the possible combinations of instrumentally inseminated queens he supplies. Or, obtain an instrumentally inseminated breeder queen from another source, but only if she has the genetics for hygienic behavior! Alternate these queens for grafting, keeping good records of what you supply customers.

Plan to graft from queens so you are able to produce mating nuclei and supply them with a ripe queen cell on the following schedule:

Week 1: 40 nucs + cells

Week 2: 40 nucs + cells

Week 3: 40 nucs + cells

Week 4: Harvest queen. Add new cell

Week 5: Harvest queen. Add new cell

Weeks 6-10 or 12: repeat

Why three weeks? If you are familiar with most mating nuclei queen harvest schedules, you can see that this is a longer time in the mating nucleus than traditionally taught by beekeepers. In the past queens were pulled on a 14-day schedule. This plan pulls the queen on a 21-day schedule. This allows for the queen to have better expansion of brood area of the nucleus and increased production of the queen's pheromones. The bottom line is that the queen is more mature and better able to withstand the process of removal and reintroduction into another group of bees.

The three-week interval also provides you with a chance to cull queens producing poor patterns as seen in sealed brood. If you elect to keep the queens in the mating nucleus for 4 weeks or longer, you are able to evaluate the queen for bee-related behaviors.

4. Plan to leave the last cycle of queens in the mating nucleus to over winter and sell next spring. This is another advantage of using standard bee boxes and frames. You will be able to grow the nucleus at the end of your production cycle and have queens ready to use in the late summer and fall. Or, you may want to overwinter some or all of these queens. Such a program is perfect if you are in an area where beekeepers need quality nucleus colonies in the spring.

Four or five frame nucleus colonies must be managed carefully, so they are not too strong or too weak entering the winter. Any inferior queens can be culled and the equipment incorporated with other colonies. As winter starts, put the nucleus colonies into groups and insulate and wrap them for winter protection. If you have a good queen, good stores and adequate pollen and honey (fed syrup), the units have an excellent chance of surviving the winter. I suggest you feed with a syrup medicated with Fumagilin-B in the fall to protect against *Nosema ceranae* and *N. apis*.

ECONOMICS

Queen production: Harvest 30 queens for ten weeks, or 300 queens @ \$25 each.

Nucleus sales (next spring): Sell 90 spring nucs and reuse the boxes to restock from the 60 colonies you started with. Sell for \$100 each. Use new frames only and reduce comb contamination problems. You have a strong selling point if you have young-comb, locally produced, hygienic bees!

Queen cells: Produce 500 hundred queen cells for sideline/commercial beekeepers @ \$4 to 6 per cell. Plan to deliver queen cells at regional and local bee club meetings. Make extra for on-the-spot sales.

Expenses will include: the cost of 60 double 10-frame mating hives; 720-900 new frames each year (to replace those sold in over-wintered nucs); sugar syrup and medication for *Nosema* control in sugar syrup; other medications and varroa treatments (use screened bottom boards and sugar dusting in 60 colonies); cost of purchased queens and one to three instrumentally inseminated breeder queens tested for hygienic behavior.

Once you have perfected your production skills, *only then* should you schedule sales. Remember, YOU are a potential queen producer. It will take time to develop your skills and confidence. Start slowly and grow as your experience builds your confidence in the product you produce.

If you are interested in more about the reproduction and mating of queens and drones, email Dr. Connor at ebbooks@aol.com for details on how to purchase a copy of his brand new book *Bee Sex*

Essentials. Or, contact your local bee supply dealer and ask for a copy.

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