

# QUEEN INTRODUCTION

*A Review Of The Different Life Stages Beekeepers Routinely Use*

Larry Connor

Queens may be introduced in a variety of her life stages, from eggs and larvae on a frame of worker brood as part a queenless and broodless mass of bees, to a fully mated, fully functional laying queen transferred from another colony. Here is a review of the different life stages beekeepers routinely use, and a few they rarely use, but may be wise to consider:

**1. Addition of brood** – Many beekeepers move brood and bees to set up a new hive, allowing the bees to generate their own queen cells using the emergency instinct. This allows the bees to select the larvae they want and produce their queen. If the frames selected have a limited number of the optimum aged larvae for cell production the bees may be forced to develop queens from older worker larvae, and that is not always a good thing. The quality of the royal jelly feeding of the queen will depend upon the strength of the group of bees provided with the brood, and the age distribution of those bees. Optimal royal jelly feeding and queen cell provisioning requires a healthy component of nurse bees. Finally the development time from set up to egg laying by the queen, and the first emergence of worker bees is the longest of these options. Some beekeepers have a long tradition of setting out boxes of bees and brood and letting them grow, mate and foster their own queens, but it may be the least efficient method of meeting this goal. There are better methods available for queen starting than this.

**2. Use of open queen cells** – During swarming and supercedure beekeepers will find started queen cells on frames, cells the bees have not yet finished building, and move them into otherwise queenless colonies. These often increase colonies, and come from larger hives divided into smaller nucleus colonies. This offers the beekeeper some level of selection



*Queen cell on the side of a brood comb may be used to establish a new colony.*

of the started cells, and selection of the genetic stock of the queen. I have used this when a valuable or favorite queen has gone missing, and only her daughter cells remain. It is a way to perpetuate a particular queen, hopefully in a daughter with some of Mom's redeeming characteristics!

**3. 48-hr queen cells** – A small but growing number of beekeepers are moving grafted queen cells two days after grafting. The reasons for use of these cells are these: a) The queens are from a particular stock, and this offers a low-cost option for introducing a particular stock into an apiary; b) At the 48-hr stage the larvae is still quite small, and still unable to move from the mass of royal jelly in the started cell; c) If produced in a quality queen rearing operation, the cells will be well filled with royal jelly, with often 80 to 90% of all the jelly the larva will receive from the nurse bees before sealing; and d) Last and perhaps most important, these cells may be transported a number of hours outside the hive with no apparent harm to the developing larva.

This allows for beekeepers to travel a distance from the source, or to ship the cells by overnight delivery. A cell may be carefully placed into a brood frame so the tip of the cell hangs downward and the bees are able to complete the cell building process. My favorite aspect of this system is the rapid feedback I get from looking at the cell two or three days after introducing the cells into a new group of bees – if the queen cell has been accepted it will be sealed and well cared for by the bees. But if they decided that the larva was not perfect, if the larva was overheated during transport, or for any other reason defective, you know it right away. No need to wait another week or two to take action, such as add another cell, search for the overlooked and very stealthy queen in the box, combine the brood with a hive that has got it right and has a fully sealed queen cell. The system still requires most of the queen development time (about nine to 10 more days before the queen emerges), and the time for mating and egg laying to start.





*When you are a little late getting to the queen cells, one of the queens will emerge and destroy her sisters in their cells. The damage is from the side, not the tip of the cell.*

**4. Ripe queen cells** – About a day before a queen is ready to emerge from a cell, we call the cell ‘ripe.’ These are often characterized by having the tip of the cell removed to expose the brown silk of the cocoon under the wax layer the workers build around the larva. The workers do this to detect the queen pheromone being produced by the developing virgin inside. Ripe cells are the stock and trade of commercial beekeepers, and a few cell producers like David Miksa and family in Groveland Florida have made it their business to produce high quality queen cells from a number of different queen stocks. As I have traveled in the United States and Canada I have learned that there are many local sources for ripe queen cells, but rarely is this fact advertised. This is often due to the huge demand for queen cells from the late Winter through early Summer, depending on where the operation is located. So check around if you want a dozen or so queen cells – it is not worth the bother to sell ones and twos because of the low cost of the cells themselves. The cost will vary from source to source, and at different times of the season.

A number of producers sell small lots of locally adapted queen cells from \$7 to \$10, much higher than the prices charged by commercial operations in Sunbelt states.

Queen cells are used to increase colonies, often called splits or divides. They are positioned against the brood frame so the sides and tip of the

queen cell are hanging down in the frame as they would in nature. It may be necessary to find an indented area of brood comb or actually cut away the comb. Other beekeepers use the plastic arms of the cells to place them carefully on the top bars of frames. As long as no cold weather is expected, it works fine. Some beekeepers use a different color plastic cell base and will leave the cell in the colony as their record of which grafting stock the queen represents.

Some beekeepers introduce queen cells into the honey supers during the nectar flow as a means of replacing any queens that are ‘on the edge’ of replacement. Since colonies often use the nectar flow as a time to supersede queens, this timing is right. The ripe cells are placed in the nectar-filled supers, allowed to emerge and mate. Since she is a young queen and the other queen is old, fighting is less likely and usually youth replaces age as a dimension of the superseding queen replacement mechanism. If your old queen was marked, the appearance of a vigorous unmarked queen will document queen replacement when you do your post nectar flow hive inspection.

**5. Virgin queens** – I have long been instructed that virgin queens cannot be used for introduction, but my personal experience is that you are able to use them the same you would a mated queen. Unmated queens do not produce as much

pheromone as a mated queen, but they are queens and do generate a chemical signature the bees recognize and monitor. When queen cells approach emergence, place them in cages so the queen will be confined (and kept from performing harm on her sisters). She should have room to move, and emergence in the JZsBZs plastic queen protectors resulted in 50 percent mortality as the queens could not fully move about in the cage. But this is not the intended use of this cage! A larger plastic cage or wood cage/container allows for movement and the queen may enter her old cell to feed on the remaining royal jelly found there. I like to add a small ball of queen candy to the bottom of each cage and the queen will feed herself. This is very important to keeping a large number of caged queens alive in a queen bank or cell finisher (they are basically the same colony).

Keep virgin queens in a queen bank for 10 days. After that I expect there is increasing difficulty getting the queen to mate and lay normally. However, I have had older virgins weeks past emerge mate and return to the hive and head excellent hives, indicating this area of bee biology needs a bit more research.

The key to using virgin queens is to treat them just like mated queens during introduction. Do not direct release virgins, even though many beekeepers will tell you to do just that. I leave the virgin queen in a



*Some of the cells we were able to produce in April in Galesburg, Michigan. In this area, the drone population will be mature at the time these queens are ready to mate. (The farm has produced Christmas trees since 1959 but the bees are the growing part nowadays.)*



wood cage with tape or a staple over the cork, and a plastic queen cage with the cap over the candy end. Leave the queen between frames of brood for three to five days, and then remove the staple, tape or cap. Then return the queen to the frame so the bees will chew out the queen candy. Do not direct release virgin queens, as they are able to fly – and will! Just recently I had a virgin fly away from the hive, but since she was marked I knew it was she when I returned to the hive to check the queen cell that I put between to frames of brood as an insurance policy. The queen cell was torn down, but my marked queen was laying eggs on the brood frame. Obviously she had oriented to the site when she flew away and was able to return. Just how long does it take for a queen to learn her hive's coordinates?

Virgins offer a lower cost alternative to get a certain genetic stock. If you have a pool of desirable drones in your hives, this offers a means of bringing in new stock to test against that drone supply. Virgins are lower priced than mated queens, and their use is vastly underutilized by the beekeeping industry.

### 6. Mated and laying queens –

Most beekeepers start with mated and laying queens when they start beekeeping. These are queens that have completed the development cycle, emerged as virgins, been placed into a mating colony, mated, and then harvested for sale. Commercial queens are often very young, having laid eggs for a few days at best. Others may be found that have been kept in larger mating nucs for several weeks to several months and have developed fully. Queens in packaged bees are not the bee's mother, in fact, they may not even be genetically related. Queens in nuclei are almost always the queen that produced the brood that is in the hive, but maybe not the bee's mother, since they are from the colony that was divided to generate the nucleus.

The ideal queen introduction uses a queen that is removed from one colony in an apiary, such as a holding nucleus, and placed into a push-in introduction cage and allowed to start laying in that colony without a serious decline in her function as a queen. When queens are ordered from some distance, the



48 hr queen cells produced in a queen rearing class in Langsburg in June. After the class several of us took these home and installed them in increase colonies. Some had the cells drawn out by the nucleus bees, and I had one mate and is laying nicely. It did not save much time in the development of the queen, but it made it possible to 'sample' genetics from another Michigan beekeeper. The cell bar is a new prototype we have looked at this year, provided by Jim Payson of JZsBZs. The cups insert and twist to lock in. It speeds prep time before grafting!

queen is removed from either a mating nucleus or a queen bank, caged, shipped and delivered to you for introduction. She will be shipped with workers in the cage with her or in a battery of queens with nurse bees around the cages to provide feed, heat control, and support.

The longer a queen has been outside a hive, the larger the hive you are introducing a queen into, and the more genetically UN-related the queen is from the worker bees, the more important it is to delay the release of a queen into a group of bees. When smart beekeepers purchase an expensive queen for breeding they often used a delayed release system in a small nucleus of bees. They keep the queen confined in an escape-proof cage for five to seven days, return to

the hive and remove the staple, tape or cap. I like to walk the queen out at this time, releasing her so I can observe the behavior of the queen, and more importantly the workers, on the comb. The queen should be quiet on the comb (not taking to the air like a virgin), and some bees may offer her food. The newly released queen will often go to a cell of honey and take a long, deep drink. If there is any evidence of aggressive behavior toward the queen, as shown by bees crawling on her body and curving their abdomen as if to sting, gently remove the queen and place her back into the cage for release later. If you have not been feeding the colony, feed with a thin syrup to encourage food exchange from bee to bee.

Next month we will continue with issues of finding the queen, replacing and introducing queens (especially in the Summer months), and a discussion of managing queens in packages, nuclei hives and a wide range of queen problems. **BC**

August will find Dr. Connor on the West Coast for the Western Apicultural Society meeting in Salem, OR. Hope to see you there! Later this Fall there is a possible drive out West to the Denver area, so check in with Dr. C. to see if he could schedule a meeting in your area to or from the area! And always get updates at [www.wicwas.com](http://www.wicwas.com).

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