USING QUEEN CELLS

The Future Of Good Colony Management Starts With Rethinking How We Use Queen Cells

Larry **Connor**

The break in the writing thread concerning teaching beekeeper instructors continues this month to cover another topic. Last month I discussed the use of virgin queens. It seems important to step back, biologically at least, and discuss the various aspects of using queen cells in a small or moderate beekeeping operation. With the April release of my newest beekeeping book, *Beesentials: A Field Guide*, I have taken a major position that every new beekeeper should start with or maintain not one but at least two hives during the first year, and then make a nuc (=nucleus) from those bees with the goal of entering Winter with two full and one half hives. My book and journal articles discuss the goal of having a higher success rate for new and formerly single colony beekeepers.

Key to the production of a nucleus is providing one or two frames of emerging worker brood with a queen, or a queen in development. During swarming season, worker bees stimulate the existing queen to deposit fertilized eggs into preconstructed queen cups. These bees are not worker bees at any time in their life, but always queens from the time the old queen places the egg in the cell. These bees receive royal jelly all their lives, and one assumes only the best of care. Compare this to the queens produced under the supersedure instinct. This is when the colony's decides to replace the old queen with a new queen, usually because she is producing a smaller brood area, less pheromone and may (or may not) be running low on sperm stored in her body. In this case the worker bees select a few worker cells and rebuild them, extending the architecture of the cell into the bee space between two combs, or inside breaks in combs. This worker bee is like a stand-in actress in a musical, when the star is unable to go on and the worker bee has a chance at being queen. Only here the differences are nutritional, with the worker larvae receiving royal jelly all her life and thus being chemically (by special diet) converted into a queen.

Generally swarm cells are at the edges of the frames, where the brood extends because of great growth. Supercedure cells are also near the edge of the brood area, but it is a reduced area. They appear usually on the face of the frame, where the proper-aged larvae are found. The position of these two different cell types is more determined by the status of the colony rather than the queen cell production process at work.

Cells from open brood

Some beekeepers make queens for new colonies by removing a frame or two of brood with eggs and larvae (along with sealed brood) so the new colony is able to raise their own queen. I consider this to be the least satisfactory method of queen production, and for two reasons. First, this takes the longest time (from newly emerged larvae to laying queen) for a colony to produce a queen. Second, the new colony may be too weak or nutritionally prepared to produce a top quality queen. Some commercial beekeepers split strong hives, and let the queenless portion produce replacement queens. This is easily done just before swarming, when the colony is in at least two boxes, with brood in both boxes. They do not find the queen, or remove any cells. Instead they spit the hive, and let the bees sort out the queen status with what is left in the new hive. These colonies are often put onto pallets and moved to a new location. When stronger groups of bees are used, this method may be successful but at a big risk of loosing valuable bee assets. Should a split fail to produce a queen, it is stacked back onto another colony. For many commercial beekeepers this method is the only way to keep genetic diversity in their hives, as each colony passes on genes to the daughter hives. No other system does this.

Using cells for new hives

I just conducted a Master Class for the Denver Bee Club, and we made a new hive by using the swarm cells found in a strong, over wintered, natural comb hive. Natural comb, made without foundation, tends to be more random in shape and has lots of places for cell construction. The natural combs were structurally less stable, and require pretty careful handling during the splitting process. We were successful in finding several frames of brood and bees with relatively uniform comb filled

Three swarm cells on a medium frame, extending below the frame. Note the queen cups (empty) and drone brood, also at the bottom of the frame. Swarm cells are associated with full frames of brood such as this one.

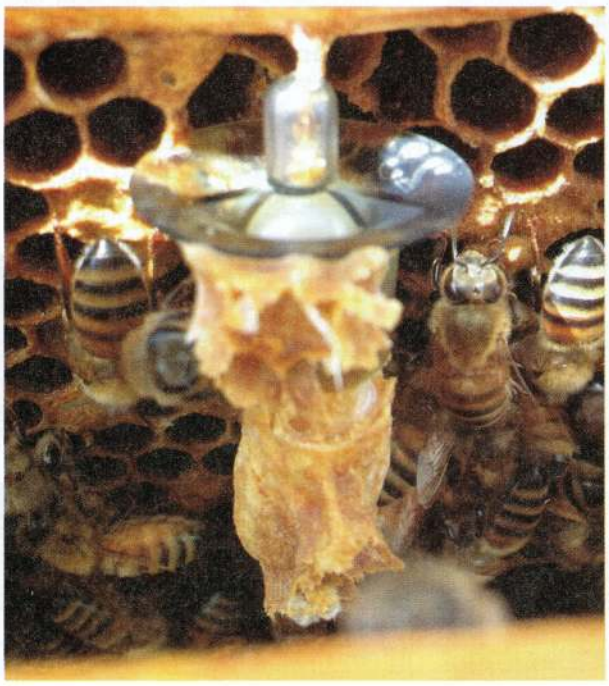
These two supercedure cells were selected from larvae at the edge of the broodnest. Now the brood area has been reduced. Associate supercedure cells with smaller brood coverage and smaller hives. These cells were re-built from worker brood. Beekeepers may make splits from these colonies, keeping the cells, but only when supplemented with extra bees and brood.

with brood, some of it emerging. The stimulus for our decision to make the new hive was the presence of about a dozen swarm cells. There was some discussion if the colony had already swarmed because the colony was so filled with emerging brood. The queen cells were sealed, so it seems possible they might have. We remove three frames of brood, honey and pollen to make up a new hive and made sure that the two brood frames both had more than one sealed queen cell protected during the move to the new bee box. Queen cells on the face and bottom of a frame are easily destroyed by a change in location. Two empty combs were put into the five-frame box to force the bees to confine their burr comb construction into the frames.

Since we did not find the queen (but there were cells with worker eggs), we did not cut any cells, but left them in both the parent and the daughter hive. That way both colonies have the raw materials (eggs and young larvae) if the colony had already swarmed and there was no queen! The parent hive was weakened by the loss of three frames of brood and food, and the colony given more room for development. This may help break the swarming instinct, but there are no guarantees.

This is an efficient and useful way to use queen cells. Rather than letting the colony swarm, by removing frames of brood we have reduced the population, and hopefully the swarming instinct. These queen cells are probably the best produced cells one finds. The parent colony and the daughter colony both need to be monitored every ten days or so until there is proof of a laying queen in both units. In about a month the five-frame nucleus should be strong enough to move to a larger hive size.

For those who seek using natural systems, the use of swarm cell and supercedure cells is quite natural, since the bees have done all the selecting. Even G.M. Doolittle, the 'father' of modern queen rearing, recognized that bee-raised queens are often better than those produced under the transferal system he developed.



A 48-hr cell that was completed by a two frame nuc, but torn apart when I opened the hive and separated the frames. The cell was attached to the adjoining frame.

Using queen cells from a queen rearing method

I started producing queens by grafting in mid April this year, earlier than 2011. While I am watching the nurse bee population grow in the queen rearing hives, I am pleased that the cells that are being started (after mechanically moving the larvae from a worker cell to a plastic cell cup) generally look good. These cells may be used at two points in their development.

Genetic transfer with 48-hr old cells –Two days after grafting (when the larvae are in their fourth day), we are able to remove six-day old queens (three days as an egg and three days after emergence), that are approaching the half-way point on their development path of 15-16 days. The main advantage of this system is for a rapid and inexpensive way to transfer larvae from a special breeder queen, and a marvelous tool for small-scale queen producers to increase the genetic diversity of the bees in their hives. Imagine a local bee club meeting where every queen producer shares 48-hr cells with

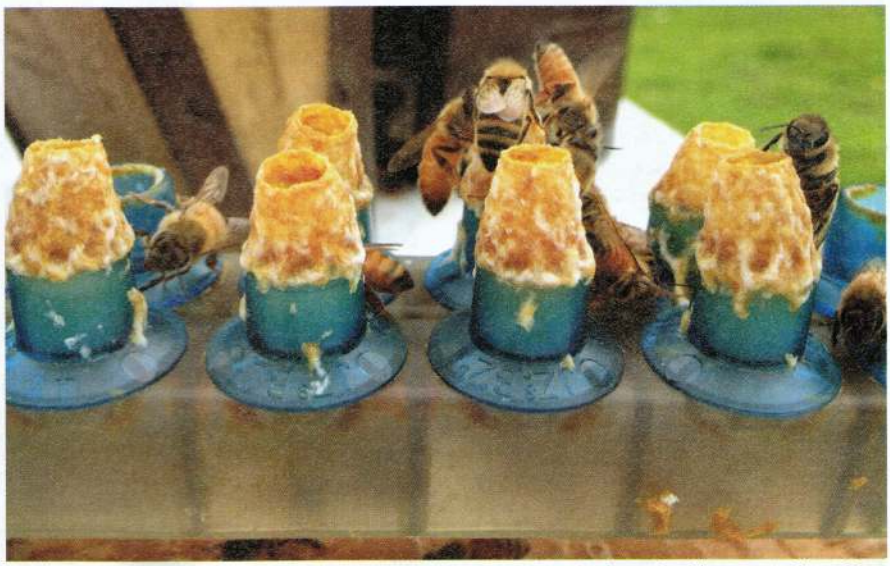
other beekeepers, either for trade, barter or sale. I have instrumentally inseminated queens from Glenn Apiaries, but there are some survivor lines in Michigan that I could trade with area beekeepers for just the cost of fuel to drive to a central location, or meeting, to meet and swap cells. A two or three frame queenless nucleus will rapidly complete the construction of these cells. When made in advance the bees are biologically aware they are queenless and will respond to a started cell by feeding and building the cell. While we only gain two or three days over self-raised queens, we benefit by having queens from the colony we select. Therein lies the benefit of these cells.

The cells are well fed in the 48-hour period from the time of larval transfer, and the larva floats on the top of the jelly. When young larvae are selected it will still be too small to free itself from the surface tension of the jelly, but will be held here tight. This allows the transport of 48-hr cells without need for heating. I push the plug of the base of the cells into a plastic Styrofoam container and then cover the container with another plastic container or thin film to prevent desiccation during transport. It is not a fancy system, but I have successfully carried these 48-hr cells in the car and in an airplane–in my carryon bag, everything sealed in a zip-lock baggy. There are no bees in the container. Be advised that governments regulate the movement of bees from state to state, and **NEVER** move bees from one country to another without permits or face some serious fines and legal charges.

Nearly mature or ripe queen cells – Many beekeepers produce queen cells for themselves and for others that are within a day of emergence. This is a standard method of introducing queens into splits or nucs used by many beekeepers, and the benefit is that you know the queen source of these queens. The emergence of a queen will be within a day, making this a more sure thing.

Both 48-hr and ripe queen cells should use a marking system to identify the queen. The easiest way to do this is to use one color plastic cell base to identify a queen or queen line. If you leave the cell base in the hive you can determine the queen line without too much record keeping. Just make sure you remove the old cells.

Rather than letting the colony swarm, by removing frames of brood we have reduced the population, and hopefully the swarming instinct.



Cells from cell finisher, 48 hours after grafting. Ready to be installed into a nucleus hive for construction completion.

It is pretty important that cells be properly placed when they are put into the hive. I like to push the base of the cell into the top of a frame of brood. With 48-hour old cells it is quite important that they point straight down, not into the brood or into the adjoining frame. With a fully formed cell this is less of an issue. I find I need to leave a bit more space between frames to prevent damage.

Mature cells are easily placed between frames, outside of the brood nest, right on the top bars of adjoining combs. This prevents damage to the cell itself, allows proper emergence of the queen, and eliminates the need to pull frames apart if the colony was made up earlier or is being re-queened after a prior queen was removed. BC

Bee-sentials: A Field Guide *by Dr. Connor is available for immediate shipping. Order from your favorite bee supply dealer or directly from Wicwas Press, 1620 Miller Road, Kalamazoo, MI 49001. The price is $29.95 postpaid in the United States. If you live outside the US, please email* **LJConnor@aol.com** *for a quote payable via PayPal. Or check out the* **www.wicwas.com** *website for PayPal purchase. This full color book is ideal for use in bee classes and training programs, so contact Dr. Connor for quantity discounts to bee clubs. See the full-page ad in this issue for further information.*

Bee population in cell finisher, mid April 2012.