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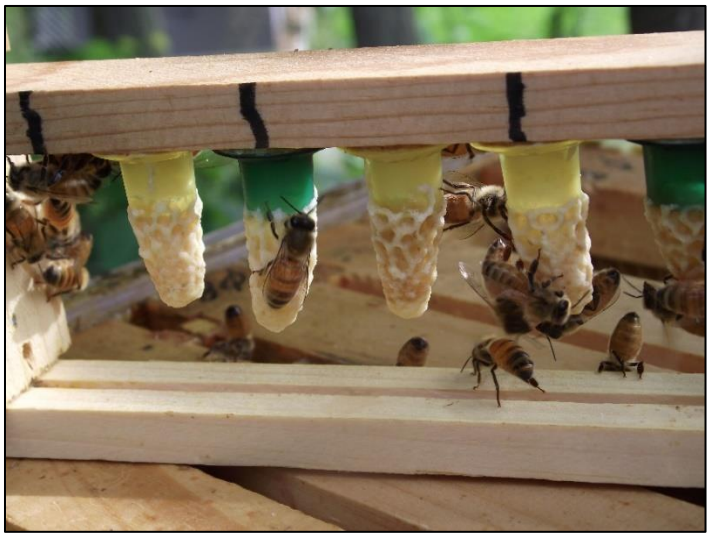
Submitted Bee Culture ???, ????

Grafting Queen Cells

Easy Queen Rearing Using Queen Cells



It's now time to try something different. Your bees are progressing quite nicely, and you are waiting to get all that great honey that your bees have been promising you. Why not try raising queens? It's easier than you think. The bees do most of the work. All you need do is provide the right conditions.

The creation of queen cells and subsequently a queen is driven by the hive needing to survive. They also have another innate tendency to produce queens that we can take advantage of. That is: **whenever a worker cell with young larvae is positioned vertically, they will try to produce a queen** from that larvae.

Grafting

Grafting is the action of removing very young larvae from a normal worker brood cell and placing it in a cup shaped device. This device (a Queen Cell Cup) is then positioned vertically in a hive and the bees will feed the larvae royal jelly and the larvae will develop into a queen. If the hive is queen-less the bees have an extra incentive to raise the cells into queens. Although a queen-less hive is not required, it does seem to improve the outcome of your efforts. Commercial queen producers use this feature to produce hundreds of queens a year.

This method of producing queen cells by grafting is a well known and established method of creating queen cells. It works when either a volume or high volume of cells is required. It also is extremely flexible in that only a few requirements need be met.

First is the need for young larvae – the larvae need to be under three days old to ensure that the future queen is continually fed royal jelly.

Second is the need for a significant number of nurse bees. They are needed to keep the larvae well fed. This also requires that pollen and honey is provided to allow the nurse bees to produce the jelly.

Third is the need to keep a calendar of the capping of the queen cells so that your work is not wasted. **Sororicide** is the name of the game in queen survival.

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With this emphasis in mind most of the functions can be arranged or rearranged or even ignored and your actions should result in queen cells.

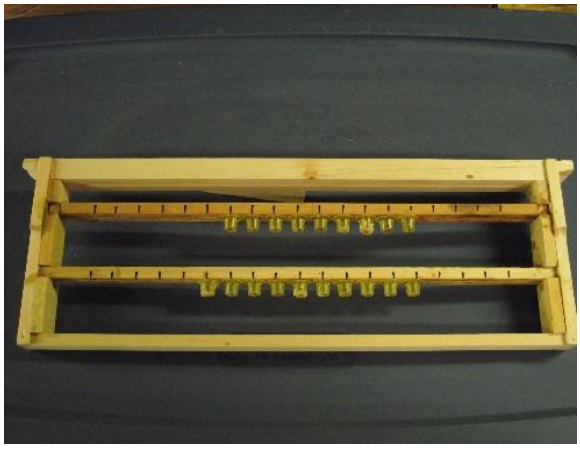
First minimalized scenario will be discussed, and then a longer more detailed discussion will be provided to emphasize the reasons and purpose for each action.

Equipment

The equipment need is minimal, and the grafting frame can be constructed by you with only a little woodworking skill or it can be purchased commercially.

Grafting frame

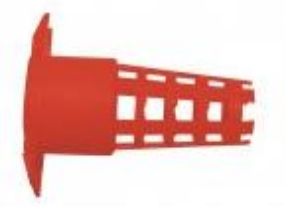
The book *Bee Equipment Essentials* contains detailed drawings, construction hints and how-to-use instructions for the grafting frame.



Grafting tool

Queen cups

Cell protector



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Grafting – The short version

1. Clean and populate the grafting frame
2. Select a frame wiith an over abundance larvae less then three days old
3. Graft the larvae into the queen cell cups.
4. Place the grafted frame into an empty box and surround it with frames of brood, pollen and honey
5. Add a queen excluder and the box to a very, very, very populated hive with many nurse bees
6. Wait (this is the hardest thing to do)
   It takes a minimum of three days to produce a capped cell
7. Move the capped queen cells to a nuc of a hive that needs a queen.
8. Wait
   About 7 days from the capping the queen will emerge.

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Grafting – The expanded version

Preparation – **G**rafting **D**ay -3 or -2
Objective: The preperations for grafting are to ensure that:
1) the grafting goes smoothly and
2) that there are sufficient young larvae available for the grafting process.
This physical actions of this section can be collapsed into the the grafting process. But, the thinking behind this process needs to be considered requardless of when it is performed.

1. Select a frame or frames with eggs and young larvae for possible grafting. The selection of eggs ensures you will have enough young larvae for the grafting. Eggs hatch in three days so the newly hatched larvae will be available within a three-day time frame. It also draws the nurse bees up to cover and feed them.
2. Select frames of pollen and honey to support the cell building
3. Brush all bees from the selected frames back into the hive. This ensures that a queen will not reside in with the grafted cells.
4. Select an overly populated hive to support the cells being built. This can be another hive or the same hive the donor frames were selected from.
5. Add queen excluder and a box above a populated hive
6. Move the selected frames into the box that you added above the queen excluder
    a. Place the pollen and honey on the outside frames
    b. The frames with brood will draw nurse bees into the box

    An abundance of nurse bees allows the young larvae to be well cared for and fed with a lot of royal jelly.
7. Close the hive and wait an hour or two to make sure the nurse bees have moved up to cover the existing eggs and larvae

Grafting Day -2 and -1
1. Clean and populate the grafting frames with the cell cups.
2. Double check setup to ensure the setup is working.
    - Eggs may have hatched, and the older larvae could have been capped.
3. Add the grafting frame with installed cell caps to the setup. This will give the bees time to clean and polish the grafting cups if it is needed.

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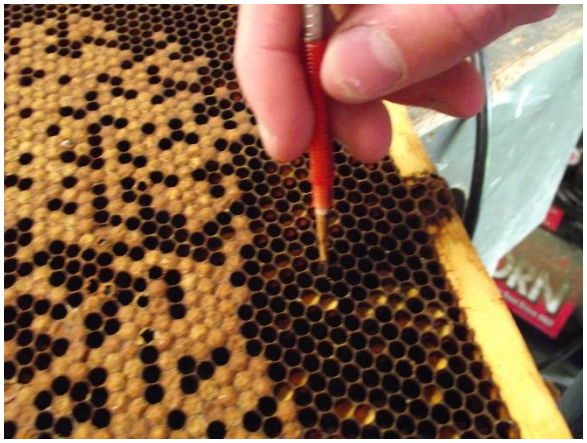
Note: All the setup can be performed in one visit. Allowing the nurse bees to clean and polish the queen cups is additional insurance that the nurse bees will accept the grafted larvae.

Grafting – **G**rafting **D**ay

1. Using the preselected frames of larvae, graft larvae into the queen cups.
2. When using the grafting tool, be sure to:
    a. Take as much royal jelly as possible.
    b. Select the youngest larvae available
    c. Keep the larvae positioned with the same side up.
3. Place the grafting frame back into the top box in the center of the setup.
    a. Pollen/honey frame
    b. Brood frame
    c. Grafting frame
    d. Brood frame
    e. Pollen/honey frame



Hint: Draft or cajole your teen aged relatives into the grafting process. As our eyes age it is increasing difficult to see the young and very small larvae.
Note: My grandson started grafting when he was a freshman in high school and is still helping ten years later.

Note: I have witnessed the proceeding three sections collapsed into a ninety-minute time frame.

- Decide that queens are needed.
- Get a grafting frame and place the cell cups into the frame
- Go to the bee yard
- Select a strong hive
- Graft the larvae while sitting on an old hive body
- Put the grafting frame into a queen-less hive

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Cell Building Grafting **D**ay +1, +2 – Inspect the setup

1. The vertical cell cups with young larvae will entice the bees to build queen cells.
2. Depending on the age of the larvae and you or your grandkid's skill, queen cells should be started within twenty-four to thirty-six hours.

   Note: My first try resulted in only four of ten possible cells being developed. But it was a start.
   Note: My granddaughter and grandson had a success rate of around 90% after they had practice.

Cell Building Grafting **D**ay +++ – Inspect the setup

Allow the cells to be completed.

Caution: Keep a close eye on the cells and once capped they can be moved to nucs. Usually four or 5 days after they are capped. This delay gives you time to set up the receiving nucs.

Caution: Be careful to transfer the cells to a breeding nuc or a hive before the queens begin to emerge or your effort will result in only one surviving queen.

Note: Queens emerge from their cells seven days after being capped.
Note: It is embarrassing when a queen emerges into your hand when you are trying to show a student how to insert a queen cell into a frame.

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Experience: On May 1, 2019, my grandson who has grafted before and his friend who had never worked with bees before started grafting. They finished grafting 15 cells by 2:30 PM. The grafting frame and the donor frames were returned to the hive by 2:35 PM. I checked the hive at 2:45 PM and the bees were already covering the frames. At 3:50 PM I was curious, so I rechecked the grafting frame and the bees had already started adding new wax to the queen cups. This was fantastic. In a little over one hour the bees were already starting to build queen cells. Then next morning I checked the grafting frame and eight queen cells out of fifteen grafts were well on their way.

One day after placing the grafting frame the queen cells had grown to a quarter inch long.

Two days after the graft, the cells were about one-half to three quarters of an inch long.

Three days after the graft, the cells were being capped.

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The NUC – Five-frame

The nuc is an integral part of raising queens.
Here is a general makeup of a common nuc.

- Frame with pollen and honey – keep the bees from starving
- Frame of bees #1
  - Nurse bees
  - Capped brood with inserted queen cell
  - Larvae
  - Eggs
- Frame of bees #2
  The larvae and capped brood are needed to provide the nuc (hive) with enough workers and nurse bees to provide the energy needed to sustain the nuc while the new queen matures, mates and start laying eggs.
- Frame of pollen and honey
- Empty drawn frame – Give the new bees something to do and allow them to expand.

Preparing the nuc

The brood frames for a nuc are easy to prepare by selecting them and shaking all the bees off them. They are then placed in an empty hive body above a queen excluder and nurse bees will migrate to them to take care of the eggs, larvae and capped brood.

Adding the queen cell

The queen cell is added to an existing frame of capped brood and larvae. The easiest position for the cell is near or at the top of the frame with capped brood surrounding it. All you need to do is push it in using the cell base as an anchor.

Queen emergence

The queen emerges from the bottom of the cell. If there is another queen available before the new queen emerges then the older/resident queen will destroy the side of the queen cell and kill the pupae before it has a chance to emerge.

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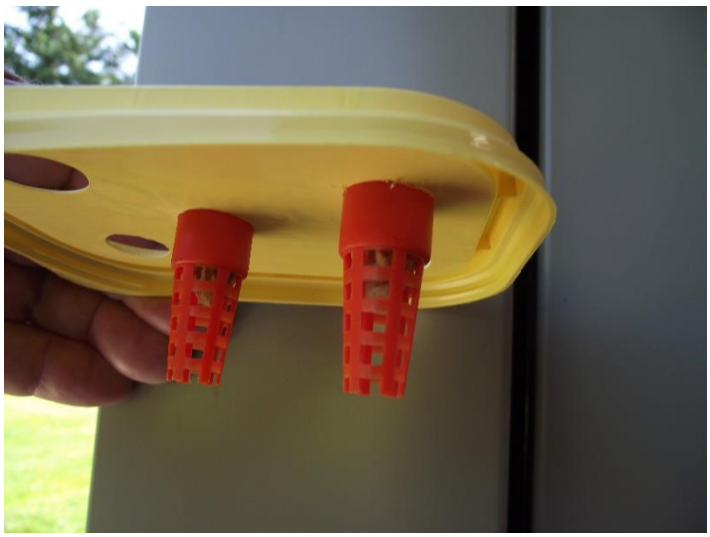
Transporting queen cells



You went through all this work and now have way too many cells for your own use. How do you get them to your friends?
First you need be careful and not crush the cell and preferably keep it vertical with minimal jolting. Second is that you need to keep the temperature reasonable. A hot car will end up toasting the pupae. I've found the easiest way to protect the cell from being damaged is to put the cell in a cell protector and then suspend the cell protector in a plastic container. Used butter tubs fill the need beautifully. All that needs to be done is to drill a hole in the lid of the tub for the correct size of the cell protector you use.

Recap - Terse version

1. Clean the grafting frame
2. Select a frame wiith an over abundance of young larvae.
3. Graft the larvae into the queen cell cups.
4. Place the grafted frame and frames with brood, pollen and honey into an empty box
5. Add a queen excluder and the box to a very, very populated hive
6. Wait (this is the hardest thing to do)
7. Move the capped queen cells to a nuc of a hive that needs a queen.

Conclusion

Easy and fun, producing queen cells is enjoyable and possibly even profitable.

Get a copy of Ed Simon's book *Bee Equipment Essentials* with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from www.wicwas.com. Ed can be contacted through SimonEdwin41@gmail.com.