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# Rearing Queen Honey Bees: A Bullet Journal

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# REARING QUEEN HONEY BEES

Marianna Mead 2018

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4/30/18

log 1:

On our first day working together, Peter and I cleaned out his dead hives in preparation for new bees. We took top boxes full of honey into the barn and cleaned bottom supers of any mouse dens. 69 of 70 hives died so we did not complete cleaning every hive today.

In addition to cleaning, we discussed my project deliverables and our schedule for working. We determined, along with Kourtney Collum, that a resource for other beekeepers to start their own queen rearing operation would be most useful to the most beekeepers.

Our queen rearing operation will focus on the doolittle method and we will rear from Saskatraz queens, Bucksport queens, and Bee Whisperer queens (Peter's queens who have overwintered).

I will research queen rearing methods, read relevant articles, and study cases of queen rearing.

→ natural feeder

We put dead hives (boxes) with low honey outside to be robbed. The rest to be extracted.

- in early spring, if brood is present + cluster is in the top box, switch top and bottom box and/or add another super

- a small cluster in early spring can be salvaged by adding a handful of bees every day

5/1/18 - 5/31/18

**Log 2 - 10:**

The month of May was further dedicated to cleaning the dead hives and shifting the entire apiary to another side of Peter's property in preparation for leveling the ground. We also spent time prepping nucs for package installation and for nuc arrival.

We made sure every hive only had one super. We organized the nucs so that each had two frames of drawn comb, one frame of undrawn foundation, and one to two frames of honey w/ an empty nuc at the base as the nucs would come with five full frames.

↳same system for full (10 frame) supers, leaving five frames out in one box rather than an empty bottom.

The undrawn foundation we put into the prepped hives were mainly damaged or undrawn frames that we painted with fresh wax.

On 5/10/18, Peter and I installed 84 nucs. We shook some nurse bees from the nucs into Peter two surviving hives for strength.

The rest of the month we spent releasing queens and managing the hives to prevent swarming.



5/25/18

**Log 11:**

Today a queen rearing expert, David Ellis, came to teach Peter and me his methods and preferences using the Doolittle Method. The Doolittle method uses grafting. You graft 1-4 day old larvae into artificial queen cups, then place those frames in a colony with a queen excluder. It is an efficient & cheap method to produce a high volume of quality queens.

1. place artificial cells into 2 bar frames, about 12 per bar.
2. place drop of honey into each cell and place frame into starter hive (allows 2 bar to be covered in hive scent when being cleaned of honey)
3. prepare grafting station with damp towel, lights, magnifiers, and preferred grafting tools
4. select a frame from preferred stock that has mostly young brood and eggs.
5. graft 4 day old egg from frame into artificial queen cups → 4 day old egg = 1 day old larva
   ↳ artificial queen cups should be prepared with a drop of royal jelly or royal jelly / distilled water mix (helps secure the larvae)

one day old larvae are just starting to make the "C" shape of more mature larvae. They are just past the egg stage

6. cover each bar of grafted larvae with the damp towel to prevent larvae from drying out.
7. place grafting frames into starter hive.

# QUEEN REARING CALENDAR

begin late May/Early June

- day 1 — eggs laid
- day 3 — select starter hive
- day 4 — graft 1 day old larvae into queen cups — place into starter hive; pull cloak board out 6 inches after 24 hrs. then replace w/ excluder
- day 6 — check grafts looking for drawn out cells + royal jelly
- day 9 — queen cells are capped
- days 10-12 — DO NOT MOVE CELLS. move carefully if necessary to open the hive
- day 13 — move capped cells into mating nucs
- day 16 — queens hatch

→ double, or often triple, bar frame for queen rearing with the Doolittle Method. We used plastic cells placed in grooves along the horizontal bars.

day 18 — discard unhatched cells

days 21-22 — mating flights

day 34 — check for eggs (in nucs)

day 39 — check nucs for larvae

day 40 — if larvae present, queen is ready

day 41 — requeen if no eggs or larvae

a pupating queen in the cell

# Starter Hive

- a starter hive is the hive that will accept a frame of grafted larvae & create queen cells.

## To create A Starter Hive →

1. use a cloaking board or something similar to mask the queen pheromone

2. locate the queen, make sure she is in the bottom brood chamber.

3. place cloak board above queen and replace top boxes facing the opposite direction (180°).

4. reduce normal entrance to encourage field bees to find new entrance on opposite side

5. add grafting frames after 1 hr.
   ↳ this forces bees to fly to the top boxes, reducing the chance they'll encounter the queen

6. pull cloak board out about 6 inches after 24 hours
   → we are forcing the colony in the top boxes to believe they are queenless

7. remove cloak board but do not remove queen excluder



## Log 12:

6/15/18

Today Peter updated me on the status of our first round of queens. We got about 36 queens that survived, and that Peter had already moved into nucs. However, some queens had not hatched as they had been killed by queens that hatched earlier. We guessed that some of the larvae we grafted were just a little older, causing them to hatch first. Those queens hatched out of the bottoms of the queen cells they then went & killed queens that had not yet hatched, creating a hole in the side of the killed queens cell.

We did a lot of swarm managing today. Its been getting hotter but there is still a strong nectar flow. Despite our best efforts, we noticed at least one strong hive had likely already swarmed. And, we actually watched a swarm leave another of our hives. Luckily, they were easy to find, I just followed them until they landed!

All in all, a very productive day, we're going to do more grafting in the next couple days. We even did a little grafting today to get in more practice and develop our skills. We'll see how this round goes!

# LOG 13: 6/21/18

Today we did some more grafting. I did most of the actual grafting since I can see the larvae better than Peter can. The one day old larvae are so tiny and are the same color as the royal jelly they are floating in. This round of grafting was both easier and harder than the first. We no longer had David's help but we also had the chance to learn on our own and develop our own system. We didn't really deviate but I anticipate we'll soon come up with our own style that works better for Peter and I. It might be helpful to create a startup checklist for a grafting day.

# LOG 14: 6/26/18

Peter and I learned a queen rearing lesson today. The fragility of 10 day old queens is not to be underestimated. Peter told me how he decided to add honey supers to our starter hive to prevent swarming. He said he was as gentle as possible to prevent jostling, but the larvae must have been extremely precarious. When he checked on the larvae/queen cells he found they had dark spots at the bottom of the cell. Upon investigation, I found the spot was a dead & dried up larvae that had fallen out of the royal jelly and into the bottom of the cell. I do not think it was any disease. Black Queen Cell Virus usually turns the whole cell black. I will have to do more research on BQCV to confirm and keep a close eye for symptoms in the next round of queens we produce.

Today Peter and I made some splits/nucs. We went to several of his hives and made nucs with the southern queens from those hives, replaced her with one of our reared queens & shook many of the bees into our new nuc. Now Peter can sell southern nucs and build up stronger hives with our queens. In other hives, we simply made queenless nucs, getting bees ready to receive a new reared queen. These actions were also swarm preventing.

→ on the right is a queen cell that a queen has hatched out of, the bottom of the cell has been chewed open.

On the left is a queen cell that has been damaged by a queen that hatched first.

↳ this happens when one larvae is older, the queen that hatches first will kill the other queens before they can hatch

# LOG 15: 7/12/18

Peter and I made a final attempt at grafting today. Its getting fairly late in the season to graft because the queens won't hatch until the end of July, which is very late to requeen. The grafting went well, I think. It was quick as Peter and I had sort of a routine by now. We are certainly still learning though, and I'm excited to hear what Peter has planned for next season.

We also did some hive inspections today. There is a hive or two with laying workers that needed to be dealt with and some hives that needed more bees shaken in to improve numbers.

We also put together a last minute NUC but installation is all but over at this point. There's still a good honey flow on right now but its getting a bit late for a hive to establish.

I'm excited to see how this latest batch of queens turns out since almost none of our last batch took. Full cells were only built over about a third, or fewer, of the grafted larvae. We're not sure why that batch didn't do so well, maybe we were too rushed?



# Grafting Day Checklist:

- ☐ breeding colony
- ☐ queen excluder
- ☐ cloak board
- ☐ entrance reducers
- ☐ grafting tool or toothpick
- ☐ distilled water
- ☐ queen cups (plastic or wooden)
- ☐ two bar breeding frame
- ☐ honey
- ☐ royal jelly (optional)
- ☐ towel
- ☐ good lighting
- ☐ starter hive pg. 8

# Potential for Disease

Disrupting and working with the hives so much during the breeding process can create perfect grounds for disease to spread.

↳ using distilled water mixed with royal jelly to prepare the artificial queen cells reduces the chances of harmful elements interfering and using royal jelly collected from a healthy hive is necessary. If the hive could be unhealthy, do not use that royal jelly.

## BLACK QUEEN CELL VIRUS

- kills capped queens
- most common in spring & early summer
- diseased larvae turn yellow & have a sac-like covering
- eventually turn black & walls of cell turns black (queen cells)
- transferred through food particles (by nurse bees)
- most common in commercial breeding operations

↳ not what killed some of ours

| DO | DON'T |
| --- | --- |
| • rear during warmer weather with a honey flow | • rush any part of the process |
| • handle the larvae carefully, such small larvae are extremely delicate | • touch the hive after placing the grafted cells inside |
| • have bright lighting and possibly some sort of magnification | • settle on a technique if it doesn't work, evolve your style to a system that suits your needs |
| • make sure the breeder hive is strong and has the qualities you are looking for | • use old royal jelly, dirty cells, or cold bottled water |
| • make sure you keep the larvae moist and out of direct sunlight | • put more than 10-12 cells per bar on the breeding frame |
| • rotate the top boxes 180° with the queen cloaked below to reduce the number of field bees in the starter hive | • give up → there are always new techniques & different ways to get the job done |

a healthy swarm cell. Worker bees have built the queen cell over an existing larva or egg to either supercede the current queen or prepare to swarm

the same queen cell for scale. this is a healthy, good-looking queen cell.

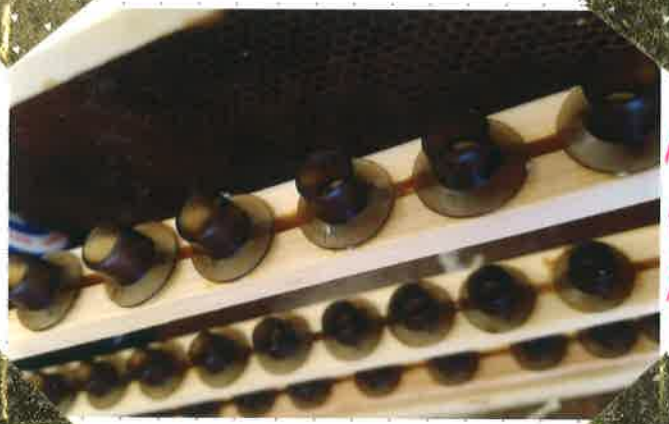
# WHY BREED QUEENS?

- have colonies that suit your apiaries needs
  - such as low swarming rates, high honey, wax, or propolis production, docile nature, low disease rates
- product diversity (royal jelly, queens with desired traits)
  - sell queens to beekeepers looking to requeen
- advancing your beekeeping skills & knowledge → get to know your hives & how to manipulate them while letting them function naturally

this queen has an excellent laying pattern

## final log:

My work with Peter has been more rewarding than I anticipated. Although our last batch of queens did not yield results, I am confident Peter will continue raising during following seasons. I learned a lot about myself as a beekeeper during this project. I'm patient and I like to take my work slowly; one of my favorite things about beekeeping is the community, and queen rearing has engaged me in unexpected ways. I never thought this work would extend so far past the Sustainable Food Systems Research Collaborative, but I leave for three weeks to serve in the Peace Corps. I look forward to sharing my queen rearing skills in the Gambia.



↑ the plastic cells we use for grafting. We place about 12 per bar in the grooves




→ a box of Saskatraz queens Peter ordered to requeen his Southern nucleuses. He intends to rear from the stronger queens next season

there were often more queens than we needed so Peter stored them in a queen bank to keep them healthy. Nurse bees → tended to them without the queens killing each other

Peter and I having our first lesson from David Ellis on queen reining using the Doolittle Method