

SMALL SCALE QUEEN REARING A SIMPLE METHOD

PRESENTATION BY PAUL MEYER
22 FEBRUARY 2022



RAISE MY OWN QUEENS?

- Google search “queen rearing methods” = 2,270,000 hits
- Categories:
 - Moving ripe queen cells: from one colony to another.
 - No-graft systems: queen given artificial cups to lay eggs then cups moved to colony.
 - Grafting systems: larvae of proper age transferred to queen cups where they develop
 - Artificial insemination: breeder collects sperm, artificially inseminates queen, eggs are laid, then grafted into queen cups similar to other grafting operations.
- The thought can feel daunting, intimidating and complicated.

WHY RAISE A DOZEN OR SO QUEENS EACH SEASON?

- **Availability:** on hand when needed.
- **Cost:** queens are more expensive than ever and they increase in price each season.
- Avoid queen banking or shipping stress, recycled and dead queens.
- **Reduce queen failure rates:** purchased queen failure rates hover around 60% in their first season.
- Protect your apiary from imported pests, disease, or poor genetics.
- Can select starter stock from your very best queens, a purchased queen, or a friend's prized queen.
- Choose from queens that do well in your locale under your management practices.
- Propagation of queens producing desired colony traits or behaviors.
- Control of the quality of work that goes into the rearing of your queens.
- Insurance young queens are in your colonies to give maximum vigor and minimize swarming.
- You may want to raise a few extra queens for friends.

SOME BEE BIOLOGY

- Queens: 1 possibly 2 mating flights, mate with 11+ drones, spend 10 min in DCA.
- Drones successively remove previous mating sign during copulation.
- Drones travel to closest DCA's from hive, Queens to DCA's further away.
- Spermatheca holds 5-7 million sperm; a single drone can provide 5-7 million.
- Approximately 6 to 26.5% of queens do not return from the mating flight(s).
- Spotty brood can be a result of inbreeding, DCA's are lacking drone diversity.
- Large queens weigh 160 mg. or more at emergence.
- Queen quality/longevity = Exceptional 5yrs; Good 1-2yrs; Average 6-8 months.
- Approximately 10% of colonies will have 2 queens (mother/daughter).

THREE TYPES OF NATURAL QUEEN CELLS

Supersedure Cell

(Queen Replacement)



Swarm Cell

(Colony Reproduction)



Emergency Cell

(Queen Restoration)

Created when the queen suddenly goes missing and there are eggs or larvae young enough to raise a new queen.

Worker cells are modified to accommodate queen development.

This misunderstood queen cell is often mischaracterized as the type producing poor or inferior queens.

Truth be told: Prolific queens of good quality, genetics and temperament are produced from Emergency Cells.



EQUIPMENT SETUP

ITEMS NEEDED

- Five frame NUCs
- Medium frame, no foundation
- .095 Nylon Trimming line
- Three Hole queen cages
- Push Cages of varying sizes
- Mini Mating NUCs
- Pollinized queen candy
- Empty brood comb
- Twist ties

5 Frame NUC Setup (DEEP BOX)

Configure two 5 frame NUC's at the appropriate time with honey and resources against an outer wall.

Add frames of capped brood and nurse bees to one NUC used to bank new virgin queens in cages on a medium frame in the center. I call this NUC the:

Virgin Queen Bank.

The other NUC will house frames of capped brood, frames of caged capped queen cells and nurse bees. I call this NUC the:

Queen Cell Incubator.



Medium Frame Setup

Measure from the top of the frame down the outside of the right sidebar 3 inches and drill two small holes close to the outer edges.

Measure down to 5 inches and drill two more small holes close to the outer edges. Repeat drilling 4 matching holes on the left sidebar.

Take a length of .095 in. nylon trimming line and thread it through one of the holes in the right sidebar pulling it across the length of the frame to the matching hole in the left sidebar. Staple the end of the line to the outside of the right sidebar, then stretch the line tight and staple it on the outside of the left sidebar.

Repeat for the remaining sets of 3 holes.

When done you'll have 2 parallel strands at 3 and 5 inches.



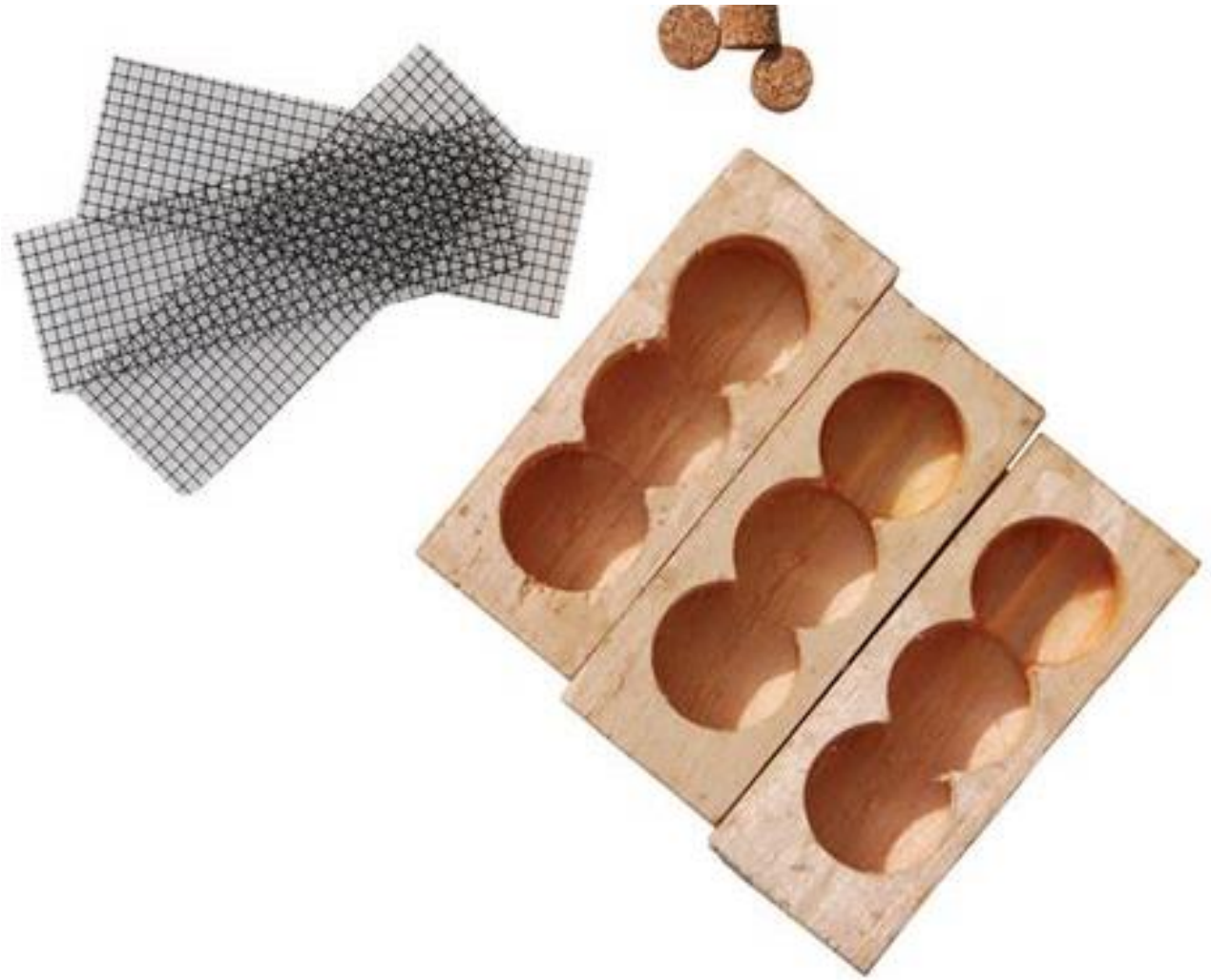
Three Hole Queen Cage Setup

14 queen cages fit along the bottom of a medium frame in between the lengths of nylon trimming line.

Fill one of the outer holes of the cage with queen candy and cover with wax paper before stapling on the screen, then cork the candy end, leaving the other end open for an entrance.

The candy end will sit on top the bottom bar of the frame in between the strands of trimming line.

You will cage virgin queens corking the entrance and placing them on the medium frame in the center of the virgin queen bank.



Medium Frame with Queen Cages

When completed the frame should look similar to the picture on the right.

The empty queen cages can be stored on the medium frame at the end of the season.

Virgin queens and cages are added and removed during the season determined by the number of queens being produced.

Use a mini mating NUC for a mated queen needing to be banked for a short period of time. It allows her to lay up the mating NUC with eggs. Otherwise put her in a 5 frame NUC with bees and resources.



Push Cages

Push cages made from #8 hardware cloth are used to protect emerging virgin queens from each other on frames with capped queen cells in the queen cell incubator.

Varying sizes will allow you to cover single, double or triple cells.

Cage capped queen cells 2 to 3 days before anticipated emergence of the first capped cell.

Check each day starting on day 15 of the first capped cell for new queens. Then move them to the virgin queen bank.

Side note: Using a large push cage over emerging brood is one way to introduce a mated queen to a queen less colony.



Mini Mating NUC Setup

Styrofoam mini mating NUC's are used to introduce mated or virgin queens into.

Other mini mating NUC types can be used.



Mating NUC Feeder Setup

Using a liquid feed is discouraged due to the high risk of drowning lots of bees.

Use a pollinized queen candy instead:

2 lbs. powdered sugar (4 cups sugar put in a blender until powdered)

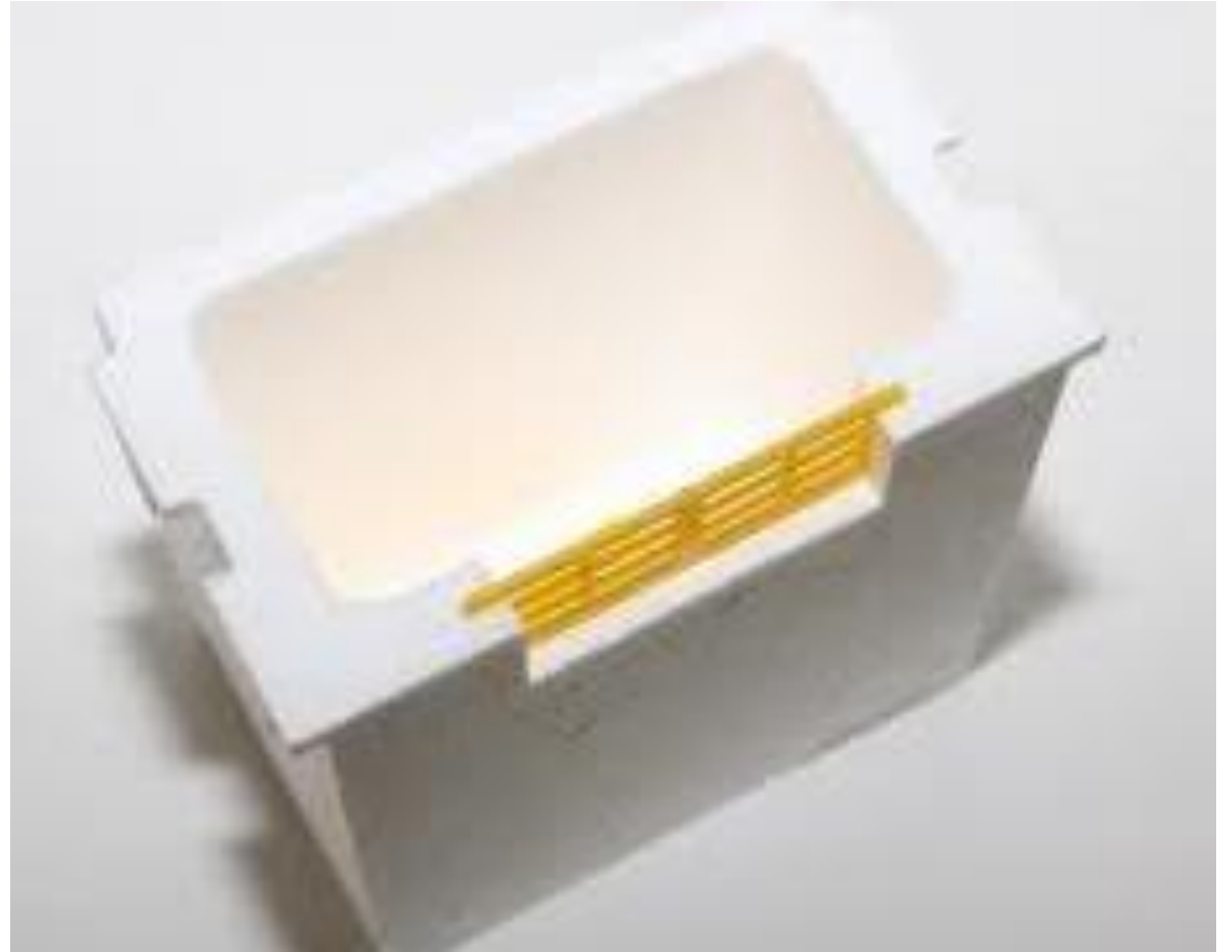
1 cup of honey

1 cup pollen sub or pollen

Mix to the consistency of play dough adding additional powdered sugar as needed.

Add the pollinized queen candy to just below the queen excluder at the top of the feeder.

Refill when a queen is removed or doesn't return. It helps prevent comb build up in the feeder.



Mating NUC Frame Setup

There are three small frames. On two of the frames put a square of brood comb with the cells naturally slanting upward. Use two small twist ties at the top to hold them up until the bees wax them into place. Poke holes at the top of the comb to put the twist ties through.

These two frames provide a place for a mated queen lay and nurse bees to hang out and begin business.

The third frame is left empty to be drawn out. Use a small stater strip or just a bead of wax in the groove just under the top of the frame to get them started. Place this frame as the center frame in the mating NUC.



The Method

Step 1

Add a mated queen to one of your mating NUC's.

- Remove a mated queen from one of your hives along with 3 cups of nurse bees from open brood frames.
- Put them in a mating NUC and close the entrance for 24 hours.
- Place the mating NUC in a permanent location in your Apiary.
- In 24 hours open the entrance.
- Leave the mated queen in the mating NUC for 9 days.

Step 2

Introduce mated queen back to the original hive she was taken from.

- In the absence of the queen the hive colony will have created multiple capped queen cells in 9 days.
- Remove the frames with queen cells and place them in the queen cell incubator prepared in advance.
- Replace with drawn frames or foundation.
- Use a queen cage to reintroduce the original queen back to the original hive.
- **(Side Note:** Short colony brood break)

Step 3

Mini Mating NUC with bees and eggs.

- After removing the mated queen, within 4-5 days the mating NUC colony will create queen cells, typically 1-3 cells.
- A new virgin queen will emerge in about 16 days.
- In about 22-26 days you will have a mated queen.
- Once she has laid up the mini frames with eggs place her in a 5 frame NUC or brood box with bees and resources.
- The cycle repeats and you'll have a new mated queen approximately every 30 days.

Step 4

5 frame queen cell incubator NUC

You will use this NUC for frames of capped queen cells throughout the season.

Write the date of the first capped queen cell on each frame from the same hive.

It's much easier to monitor/manage queen cells in a NUC as opposed to tearing into a hive. Check in the a.m. and p.m. each day.

You may need more than one incubating NUC during the season.

Replace brood frames as needed when new bees have mostly emerged.

- On the 13th or 14th day of the first capped queen cell place push cages over all capped queen cells to protect the virgin queens from each other.
- Monitoring each day will allow you to remove virgin queens as they emerge. This is important when there are more than 1 capped cell under a push cage.
- Once they emerge place them in a queen cage with a drop or two of honey on the screen and put them on the medium frame in the center of the virgin queen bank prepared in advance.

Step 5

5 frame virgin queen bank NUC

Write on the back of the queen cage the date the virgin queen is banked.

Replace brood frames as needed when new bees have mostly emerged.

- Bank virgin queens for no more than 3 to 4 days.
- Introduce to a mating NUC that's been queen less for at least 3 days or more.
- A virgin queen can be introduced to a mating NUC if the previous virgin queen fails to return from her mating flight.

Step 6

Introduction of a virgin queen to a Mini Mating NUC.

- Add 3 cups of nurse bees from open brood frames to a mating NUC and close the entrance for 3 days.
- **After 3 days introduce the virgin queen:** smoke her then smoke the colony, open the queen cage and place it up against the mating NUC entrance allowing her to walk in. Close the entrance for a few hours then open it.
- Once she's mated and laid up the frames with eggs put her in a 5 frame NUC or brood box with bees and resources.
- The mating NUC will create a new mated queen approximately every 30 days.

LESSONS LEARNED

- Smoke introduction most successful. Coating with honey, spraying with sugar syrup, essential oils etc. was less successful.
- Virgin queen acceptance best when mating NUC's were 4 to 7 days queen less.
- Not all capped queen cells produced new queens.
- Did not have any virgin queens killing sisters under the same push cage.
- Not all virgin queens returned from mating flights. About 80% returned.
- Returning queens brought mating swarms back with them.
- Once charged most Mini Mating NUC's produced a new mated queen approximately every 30 days.

MORE LESSONS LEARNED

- Better return rate for virgin queens raised by the mating NUC colony.
- Virgin queens mated with local DCA drones, providing Boise area genetics.
- Did not experience any hot colonies or spotty brood from local DCA mating.
- Did not experience emergency queen cells producing poor quality queens.
- The more Mini Mating NUC's used the more queens produced each month.
- Produced enough queens for new colonies and requeening; ended the season with 5 additional mated queens. Started in May ended in November 2021.
- Treat QC incubator, VQ bank and mating NUC's for mites along with production NUC's and hives.

EVEN MORE LESSONS LEARNED

- Do production colony inspections every two weeks until the end of June (swarm prevention).
- Move queens from mating NUCs to 5 frame NUCs, then brood boxes.
- Use 5 frame NUC's for older queens rather than pinch them (backup).
- Use 5 frame NUC's as brood factories to help strengthen other colonies.
- Purchase mated queens periodically for genetic diversity.
- Prepare for queen rearing in March/April 2022, drone dependent.
- Keep good records (I use a Colony Excel Worksheet and Task Calendar)