An Introduction to the Grafting Technique of Queen Rearing

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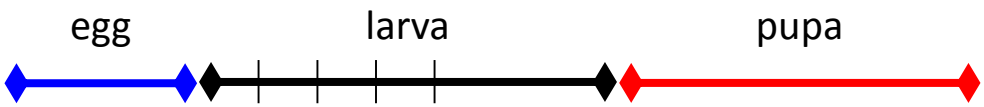
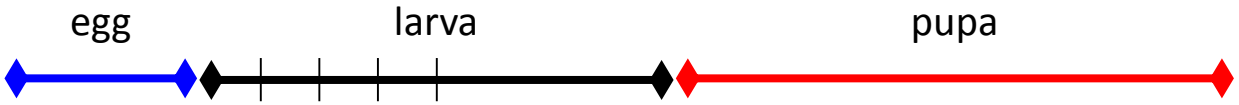
Outline of Queen Rearing

- Larvae of known age from parent colony
- Queen cells initiated in a CELL STARTER during first 24 hours
- Queen cells ripened and matured in a CELL FINISHER
- Cells harvested to mating nucs



Queen

(16 days)



Worker

(21 days)

Drone

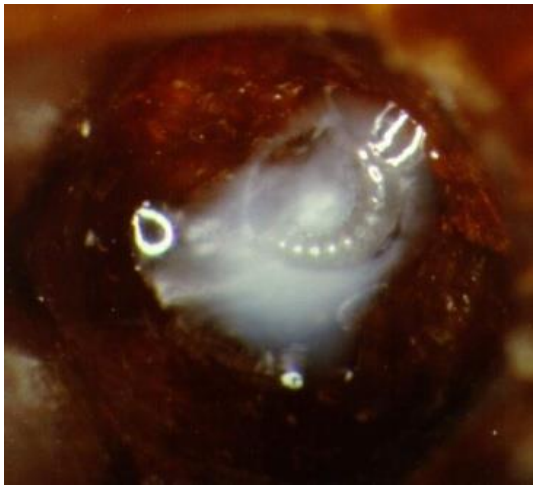
(24 days)

Key Ingredients

Swarming season

Good nectar and pollen flow

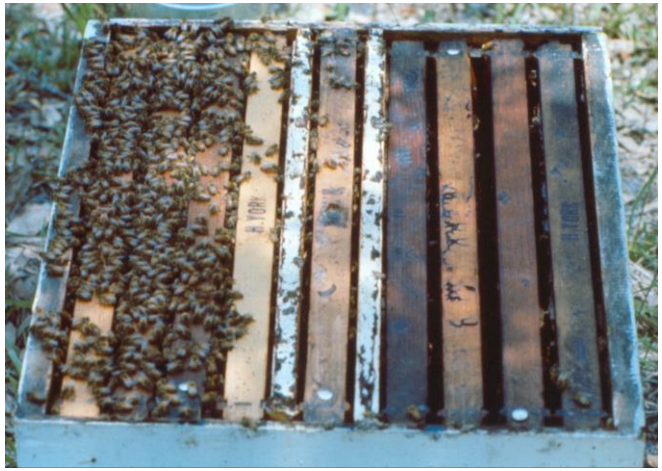
Young bees



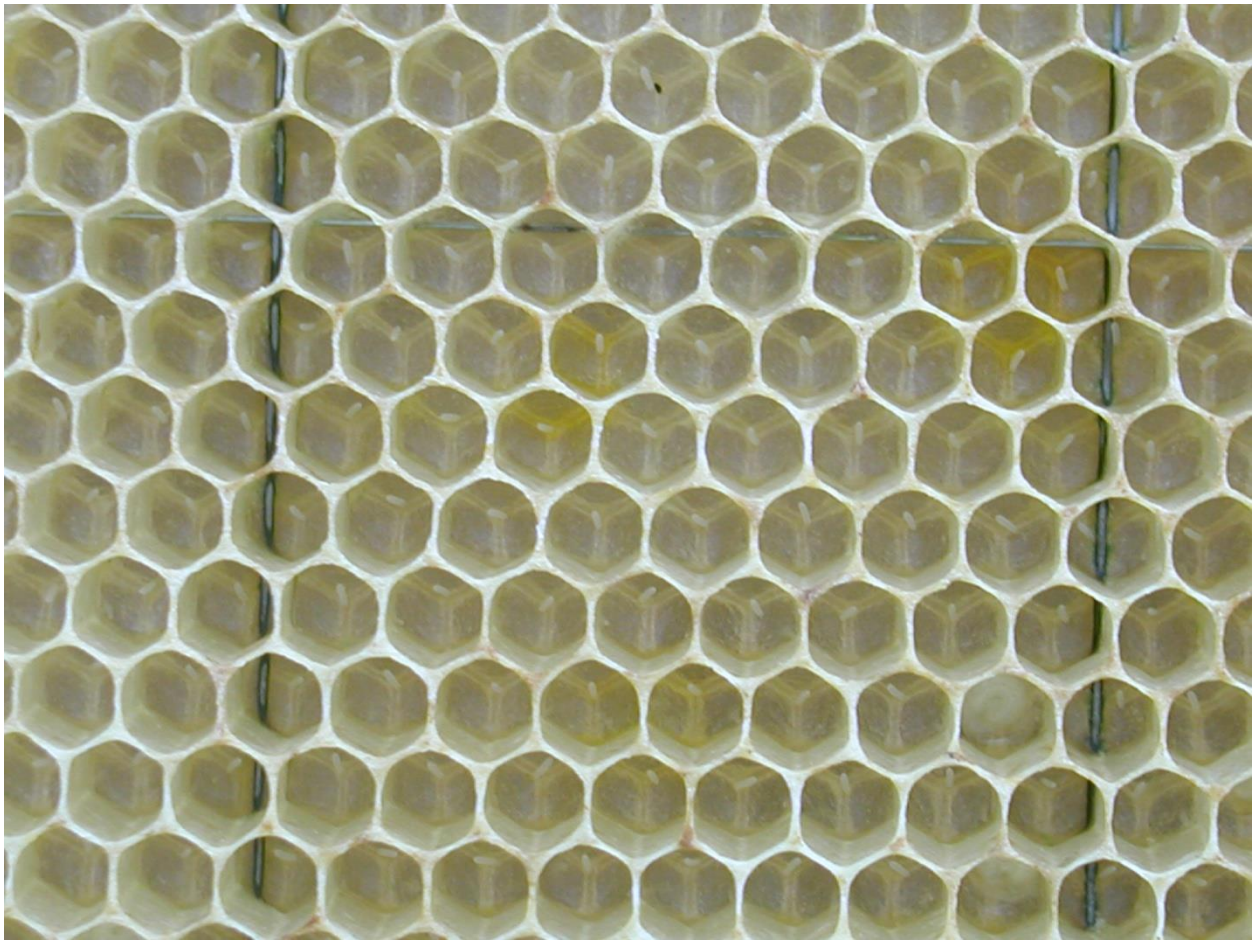
Day old Larvae

How to get the correct aged larva

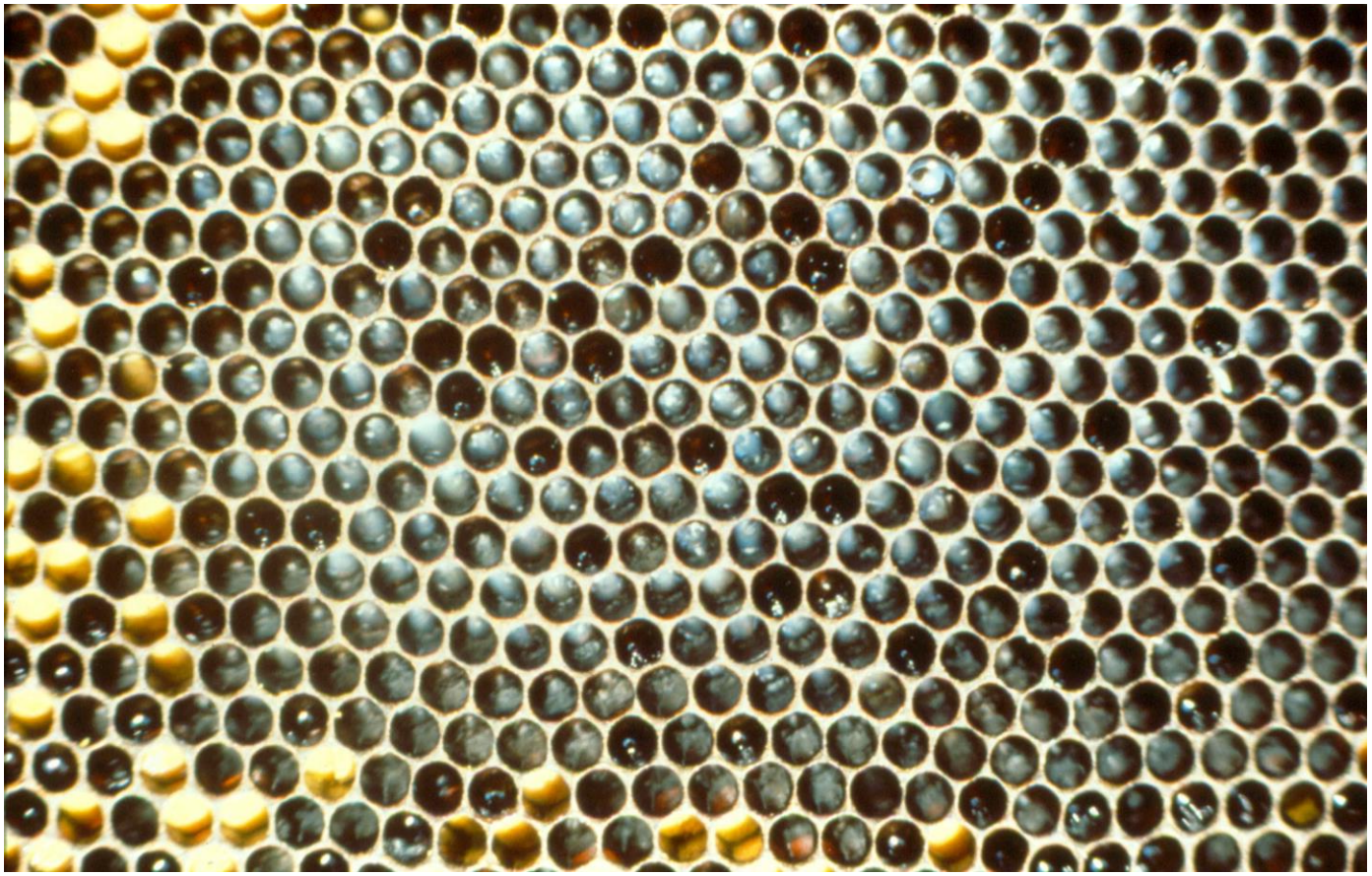
- 1 to 3-frame enclosure
  - Use excluder to “enclose” queen on 3 frames
  - Forces her to lay on a predetermined frame
  - Easy to know the age of larva
  - 1-frame is difficult for safe removal of frame (Queen)



- Push in cage
  - Use # 5 hardware cloth to isolate queen on specific area of frame
  - You can control the maximum number of eggs/day
  - Easy to know the age of larva
  - Must release the queen the next day



Eggs of known age produced by queen on a schedule.

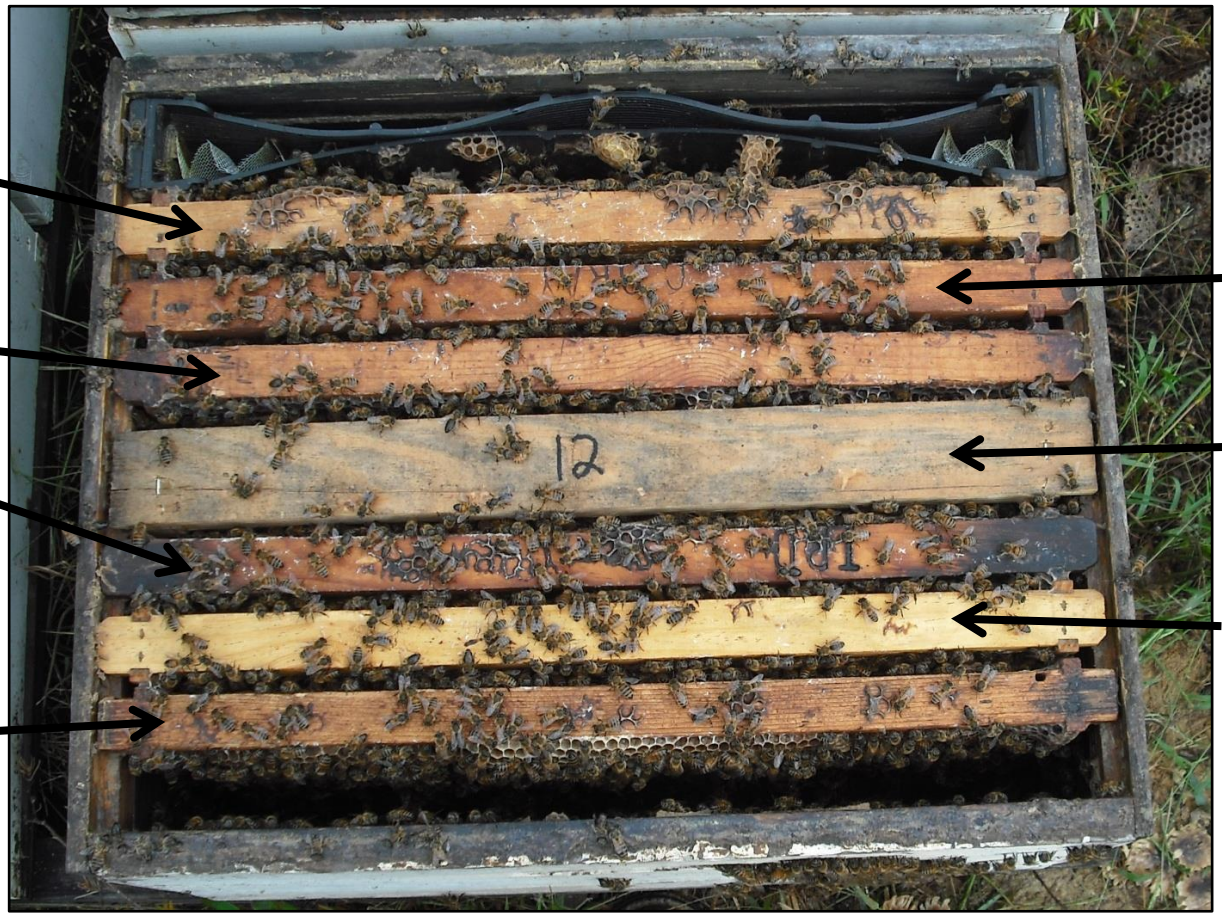


1 to 1 ½ day old larvae needed for grafting

Larvae that have just hatched from eggs are the best.

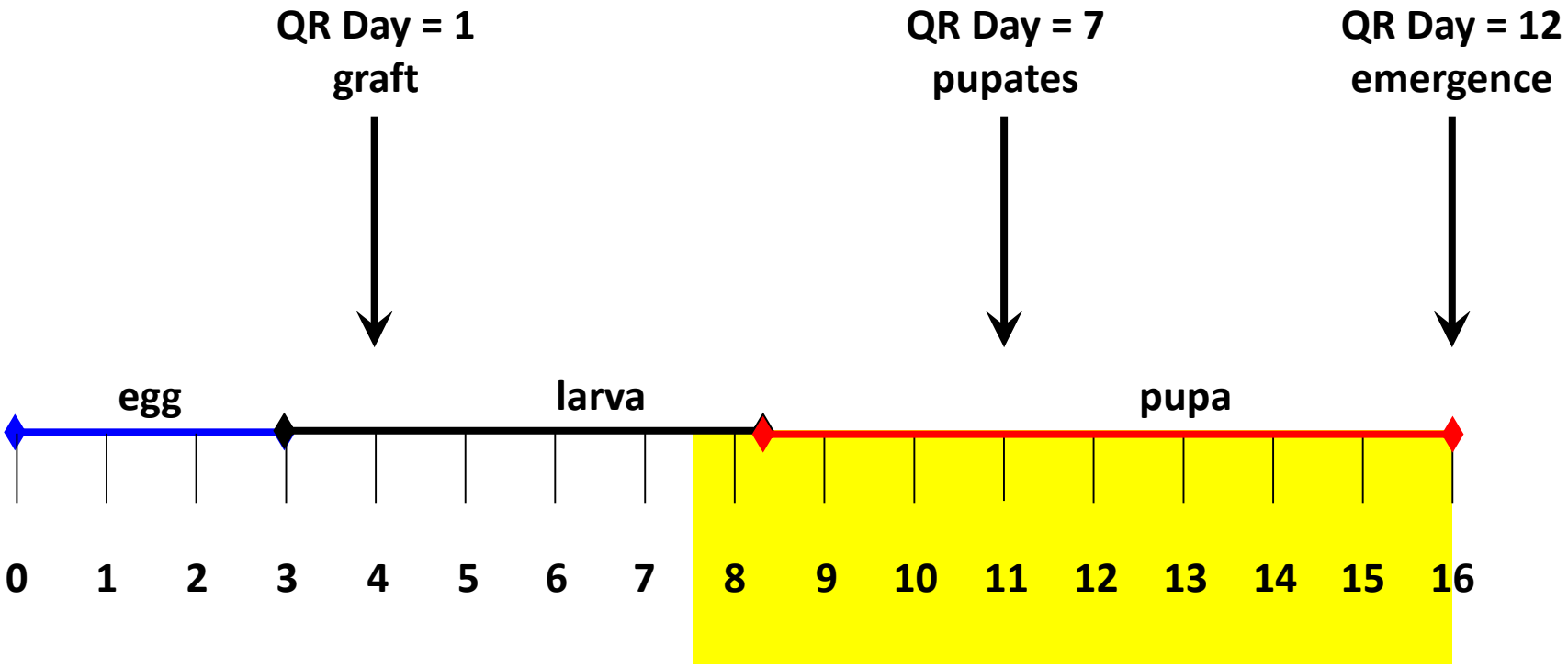
Keep the worker bee density as high as possible.

Cell Builder



Grafting Method

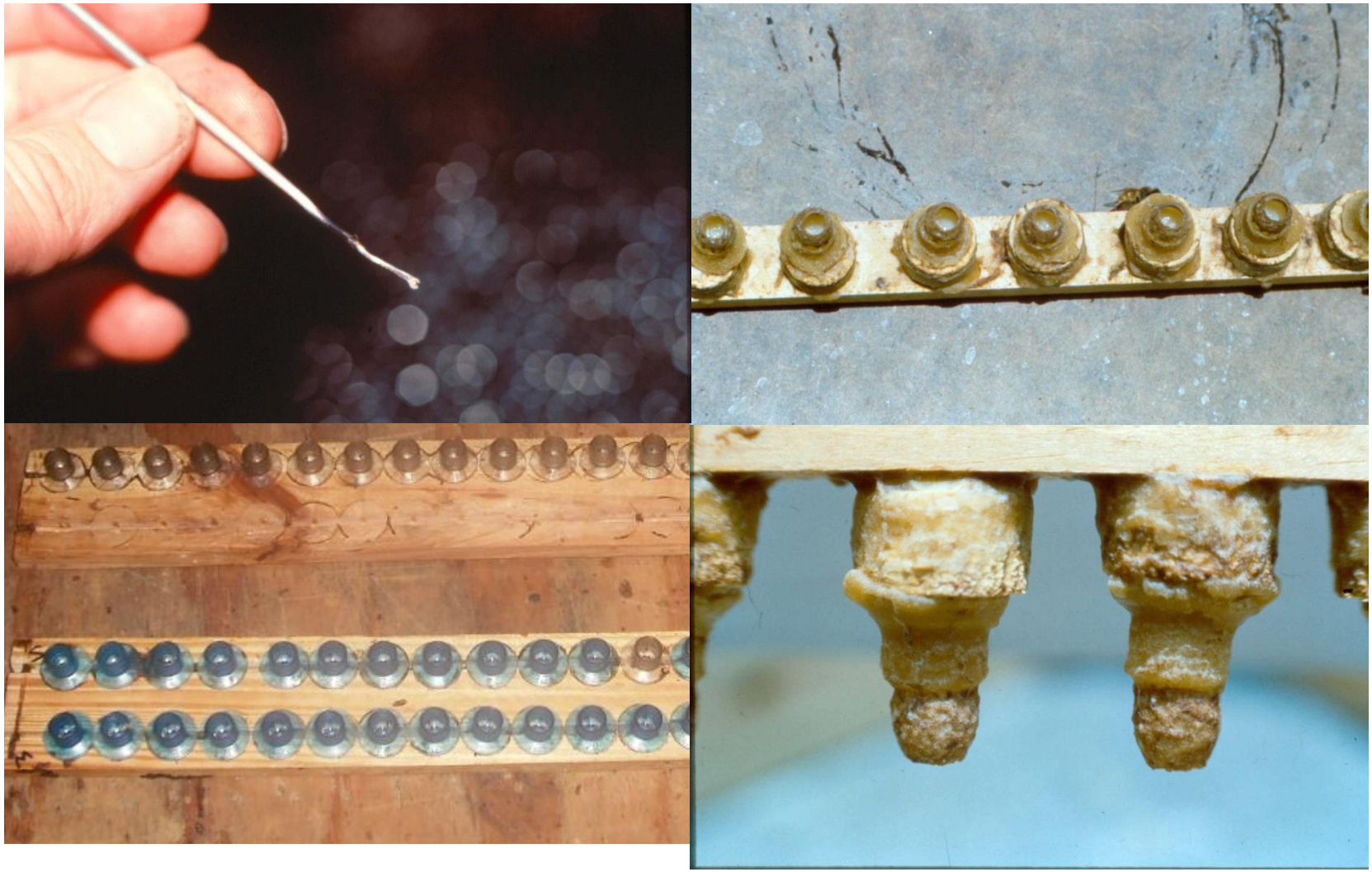
(based on methods of Gilbert M. Doolittle)



20-25th day – orientation and mating flights (QR Days = 18-23)

25-30th day – queen begins egg-laying (QR Days 23-28)

Grafting



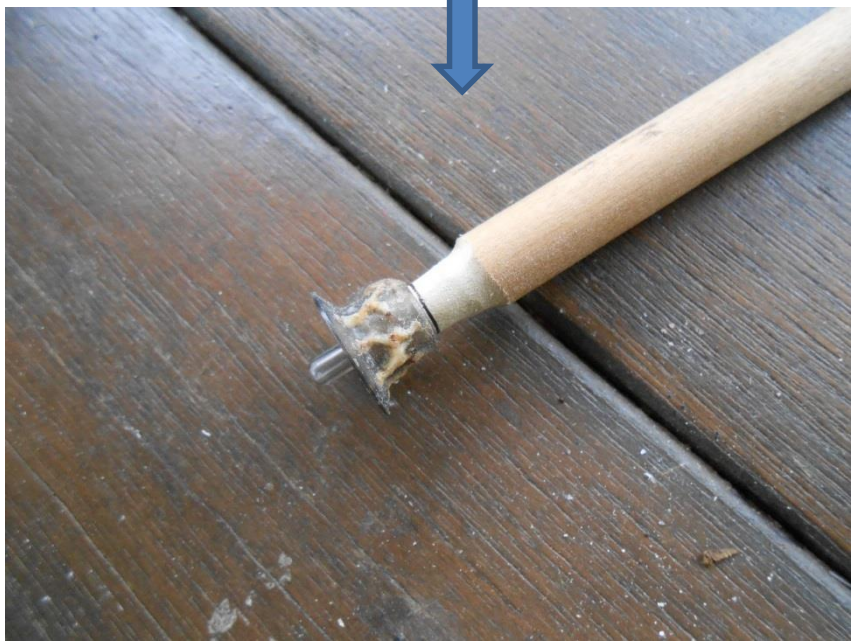
Tools of the Trade—Queen Cups

Nicot System

JZBZ System

Cells can be placed directly on frame

You can make your own cells with a 5/16 “ dowel



Grafting - the transfer of larva into queen cell cups.

- Graft the smallest larva possible 18-24 hr old are best
- Plastic or Wax cell cups
- Many different grafting tools to choose from…
  -Chinese grafter, master grafter, modified bicycle spoke, toothpick

Special Techniques

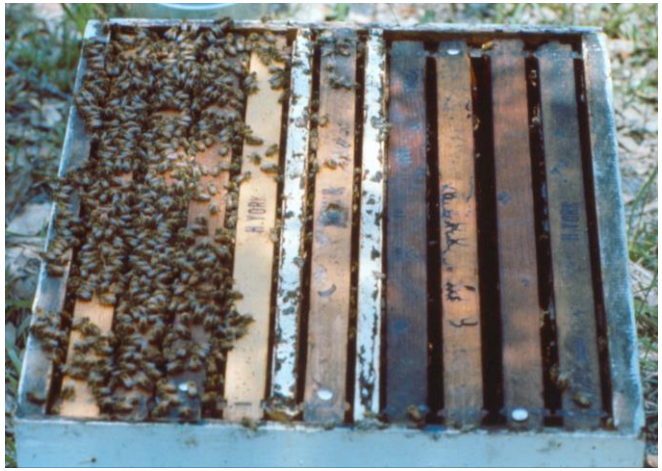
- 'Dummy' graft (to harvest jelly)
- Double graft (use the first graft to prime cells for the 'real' graft)
- Dry graft (no priming of queen cup) ★

Grafting
Step by Step

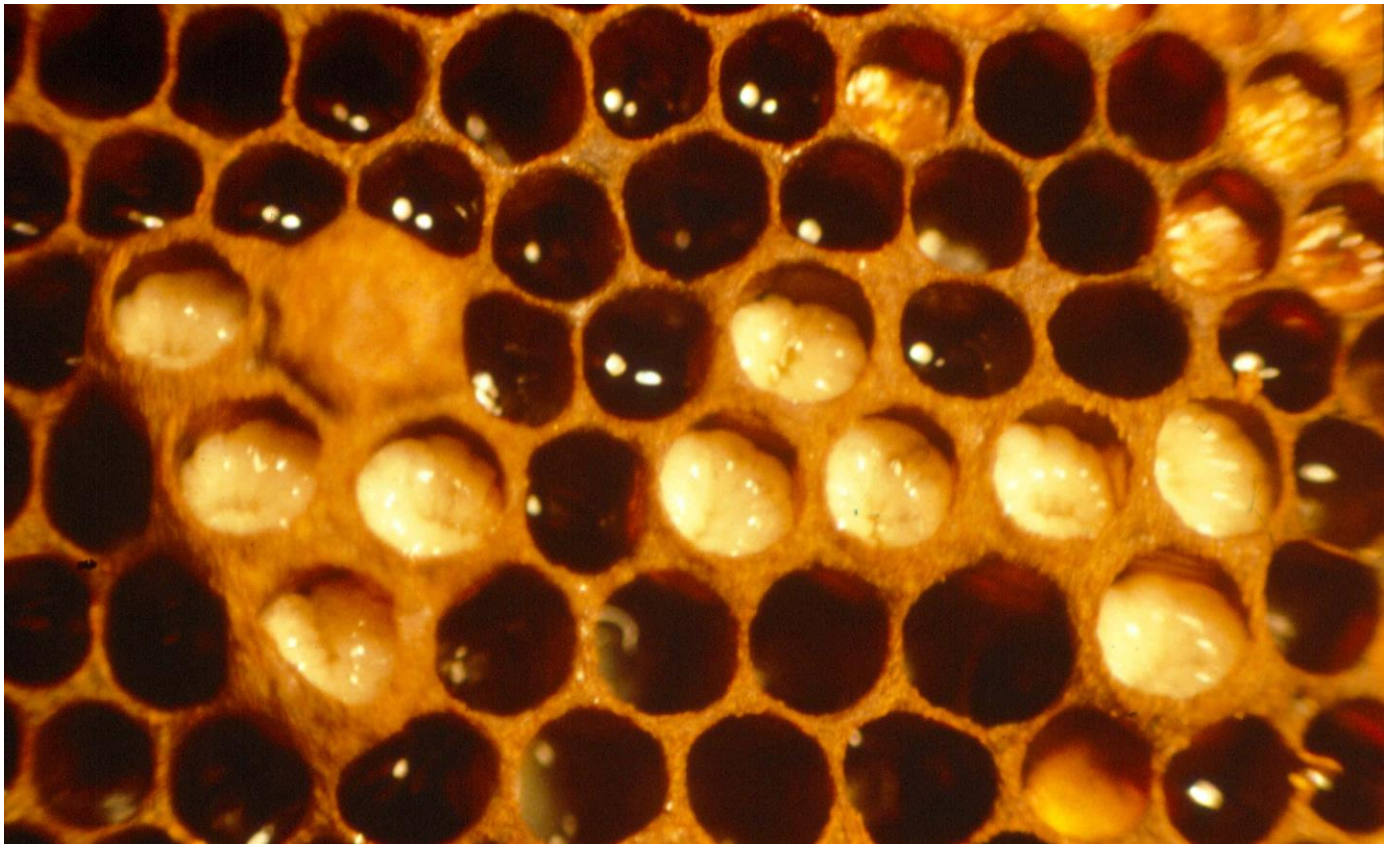
1. Correct age larva from breeder
2. Grafting location
    - Sturdy table with good lighting
3. Climate controlled room
    - Temperature and Humidity
4. Prepare cell builders ahead of time
5. Prepare cell bars ahead of time
6. Graft larva and place into cell builder as quickly as possible

How to get the correct aged larva

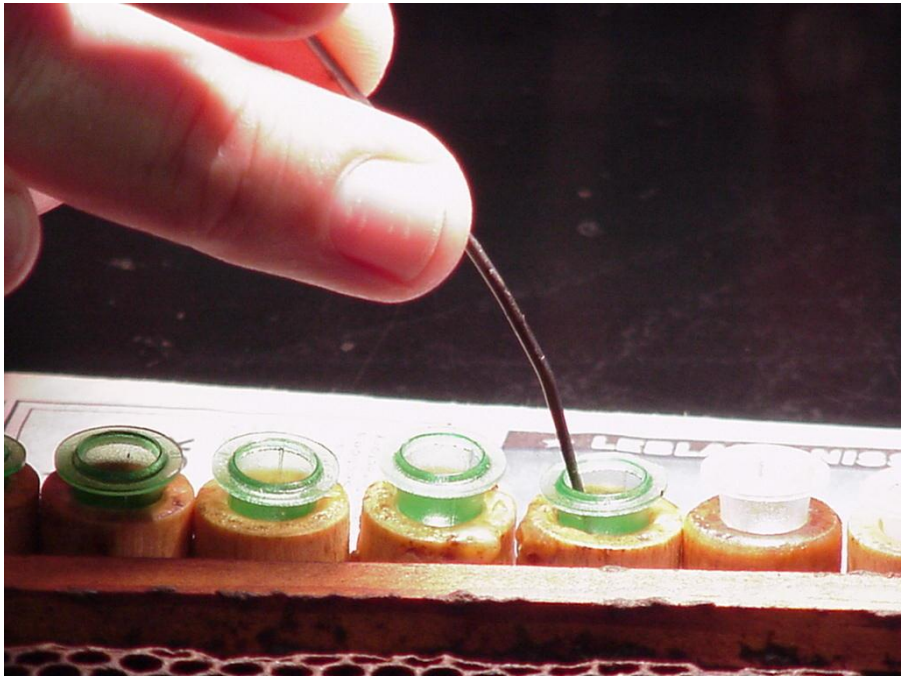
- 1 to 3-frame enclosure
  - Use excluder to “enclose” queen on 3 frames
  - Forces her to lay on a predetermined frame
  - Easy to know the age of larva
  - 1-frame is difficult for safe removal of frame (Queen)



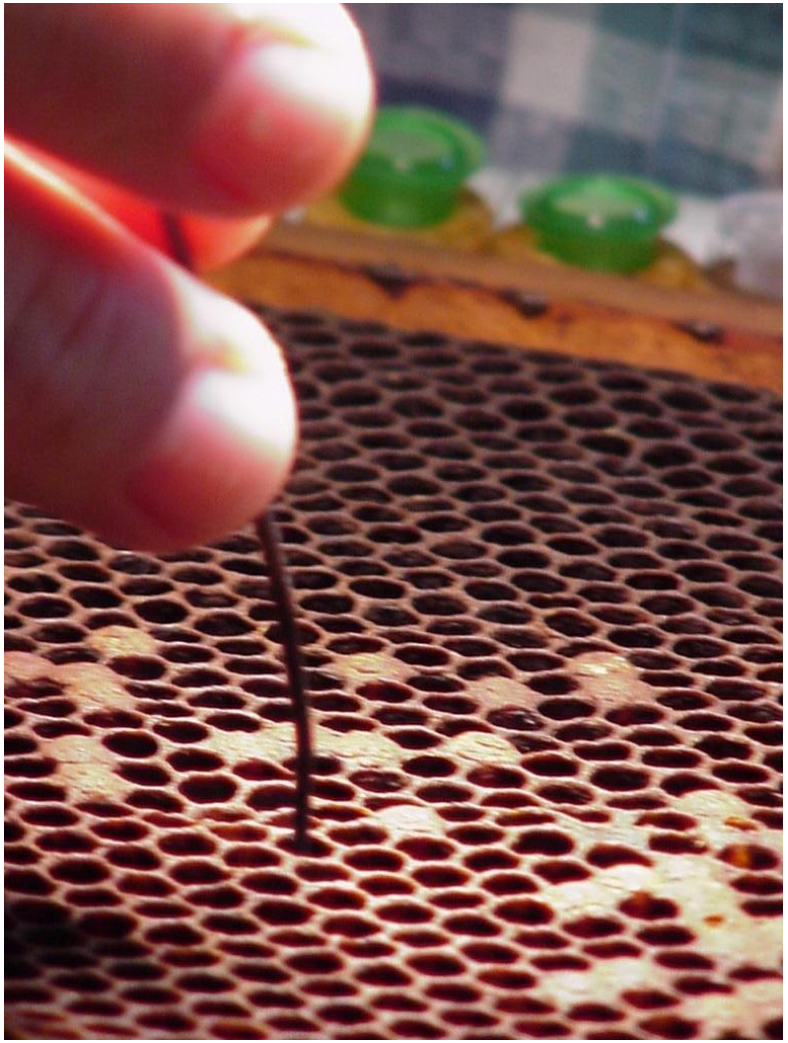
- Push in cage
  - Use # 5 hardware cloth to isolate queen on specific area of frame
  - You can control the maximum number of eggs/day
  - Easy to know the age of larva
  - Must release the queen the next day
  - I killed a fast moving queen this way



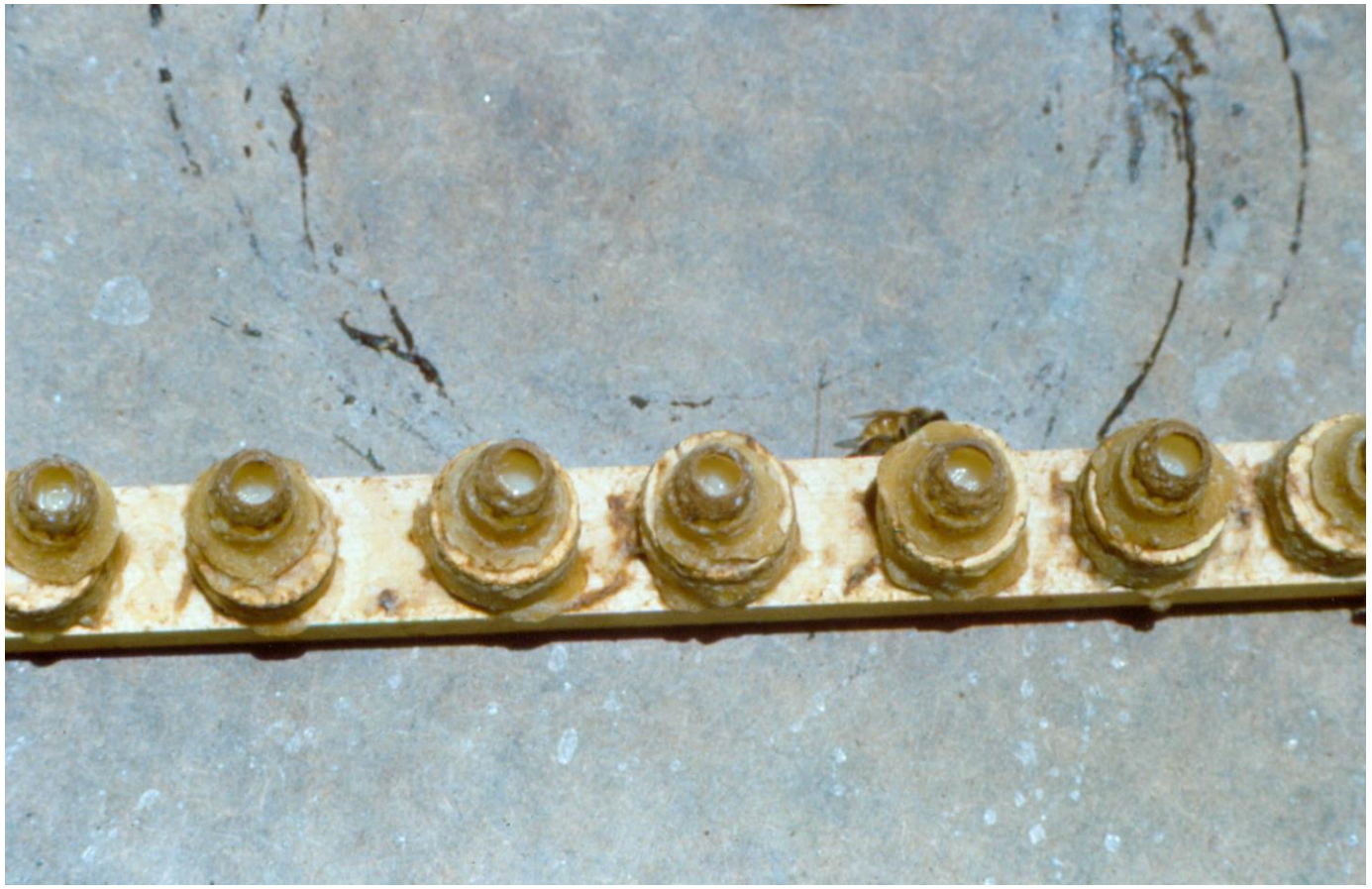
These larvae (5 days old) are way too old for grafting.



A larva of perfect age being transferred into cell cup.



Microscopes or magnifying lenses aid in grafting,
but REAL beekeepers use the naked eye!



Royal jelly can be purchased or harvested.

1. Queen cells aged 3-4 days yield the most jelly

2. Dilute jelly 50:50 with distilled water

3. Freeze mixture until needed for grafting

4. Prime each cell cup with a small drop of mixture before transferring a larva into it

Cell cups can be primed by ladling or pipetting.

When you do it right

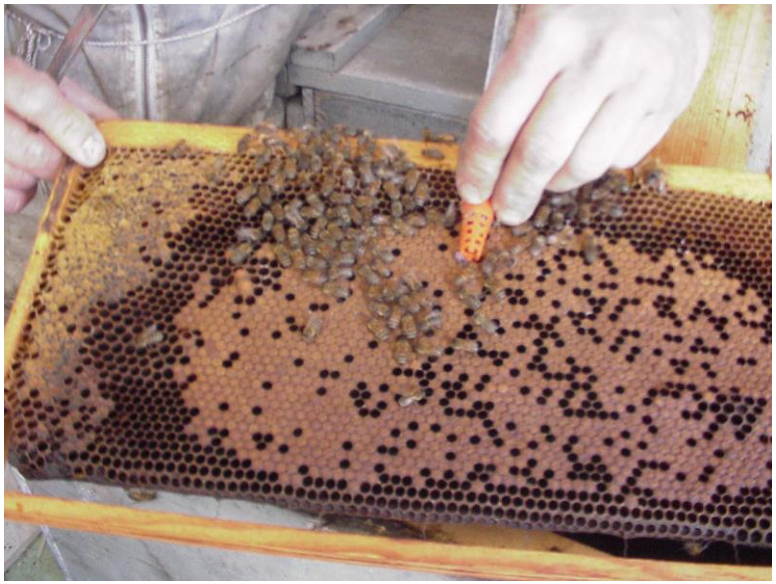
When you don’t

Where do the cells go now?

- **Best place is a mating nuc.**
- In an incubator, isolated cages or vials.
- To a friend who needs cells (transport in a thermos, etc.)

Grade the cells before you use them

How do I place the queen cell?

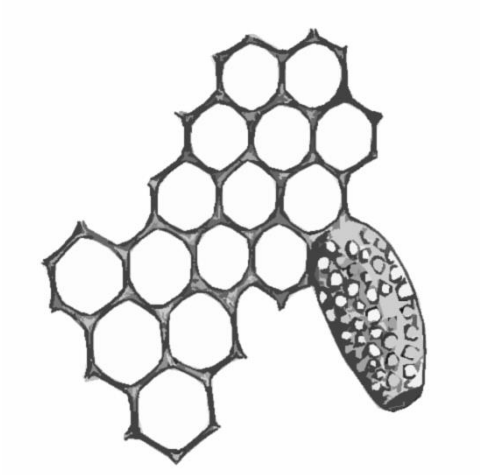


Miksa Honey Farms
Honey Run Apiaries
portable cell incubator

Home Made
cell incubators

Steven Coy's need it now
where's the cordless drill , screws, flat washers, rubber straps and screen wire, carbon neutral **Portable Incubator**

It's bee heated/cooled



Troubleshooting

When things don’t turn out so great

Don't expect to have consistently good take when you first learn grafting…typical is about 10% take on the first go.

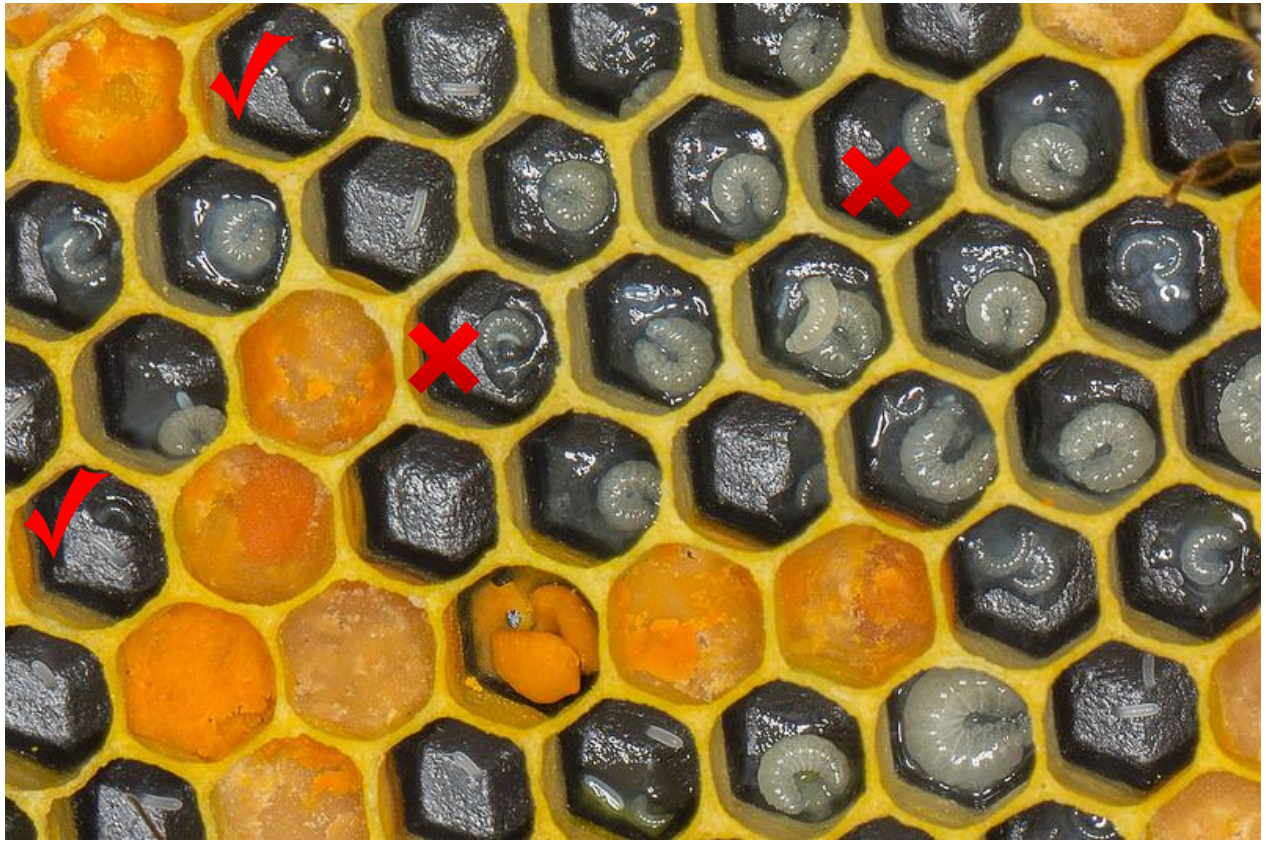
Do make a lot more grafts than you need. A single-story cell builder can support about 60 grafts, but you can double this amount when first starting.

Open Hatch:
A successful emergence

Photo by Kelly Gillette

Problem:

One or two queens emerge, the rest of the cells are torn down

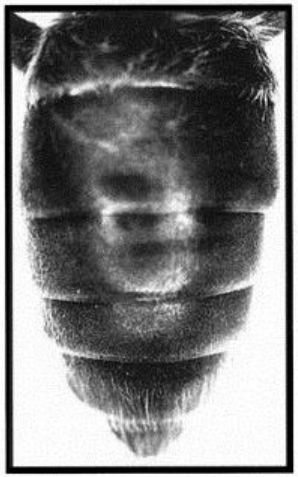


Cause:

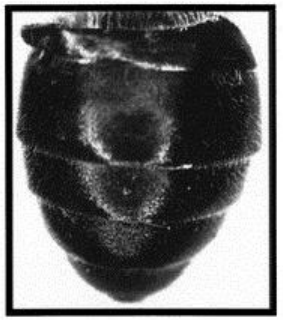
Grafted larvae are not the same age

Problem:

Intercaste Queen



European Queen



Intermediate Morph

European Worker

Robber

Cause:

Larvae too old at time of grafting

Photo by Kelly Gillette

Problem:
Cells torn down

Photo by Kelly Gillette

Cause:
Dead queen or a queen already present

Photo by Kelly Gillette

Hygienic workers will tear down and remove a dead queen.

Photo by Kelly Gillette

Queen death likely due to viral infection, i.e. Deformed Wing Virus

Photo by Kelly Gillette

Problem:

All cells are started, then some are torn down.

Photo by Kelly Gillette

Cause:

Poor nutrition in the cell builder; diseased or dying larvae

Problem:

Burred
Queen
Cells

Cause:

Natural impulse to make comb and store syrup

If you pull your cells early from the cell builder, be sure to incubate them at the proper temperature (93° F) and humidity (50-70%) or queens may not finish developing!

If in doubt…

You can carefully open queen cells that have not emerged on their due date.