Small Scale Queen Rearing: Part 2

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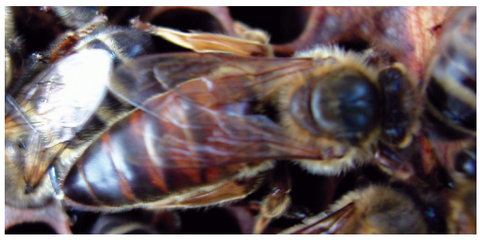

Unmarked queen. Photo courtesy of The Food and Environment Research Agency (Fera), Crown Copyright and supplied by the National Bee Unit at Fera.

It pays to prepare for queen rearing early in the season. You need to ensure that your selected main nursing colony, and, if you wish to have a go at drone rearing, your drone rearing colony plus any supporting colonies, are strong, healthy and well nourished (see Table opposite for a suggested schedule). These colonies should also, preferably, be free from chemical varroa treatments because these are detrimental to the fitness of your queens, drones and their sperm.

Feeding essentials

Our spring often proves elusive, so I feed 1:1 cane sugar syrup and, in addition, a pollen substitute, such as FeedBee, from early April. Do not feed too much syrup at one time as it may spoil with fermentation. If you have not started feeding yet, it is not too late to start feeding your drone breeding colony. There is plenty of pollen coming in on a nice day, but drone breeding and especially drone nursing colonies must have a prodigious supply at all times, in all weather conditions.

Preparing your equipment

Now is a good time to get your 'kit' together. Whatever number of queens you wish to raise, aim at doubling this number. This is because some grafts will not be accepted, some queens may not survive pupation, particularly if the colony has nosema, some virgins will not mate properly, and finally, some may turn out to be not very nice bees, so you must be prepared to cull what is not desirable.

I used to make my cells from wax, easily making hundreds in an afternoon. All that is needed is a piece of 9mm (3/8") wooden dowel, its end rounded with a file and sandpaper, marked with pencil 9mm from the bottom. The dowel is dipped, three times, in cold water followed by molten capping wax up to the pencil mark, and, when set, the wax cell can be twisted off the dowel. These days, I buy plastic cells. They are easier to handle, especially with the pupating queen within. If you wish to buy a complete kit, some of the cell holders come with it, but you may need to buy a few more. Whichever cells you will use for grafting, prepare the modified frame to which you will fix them and buy a couple of Chinese grafting tools.

Photo by Rudy Repka.

A maximum size larva on the tip of a Chinese grafting tool which is suitable for larval transfer.

Colony observation is crucial

Close attention must be paid to proper swarm prevention and control measures because strong, prosperous colonies may well be inclined to 'go for it'. Demareeing is my preferred method. Last month I described how bees will start building queen cells under one of three stimuli: swarming, emergency and supersedure. I like to use the supersedure impulse, using a prosperous and queen-right colony, which by early May will have at least two, but often three brood chambers. Since the colony is fed sugar syrup, I do not use any honey supers.

Setting up a Demareed colony

About three to four days before the grafting day the Demareed nursing colony is set up as follows:

Bottom brood chamber: the queen, one frame of young brood, one frame of food and the remaining frames can be any frames available: empty drawn, with food, or with foundation.
Next goes a queen excluder.
Middle brood chamber: frames of foundation, frames with freshly sealed brood.
Next goes a second queen excluder, which on the grafting day is replaced with a Cloake board. If you do not have this, you can use a travelling screen or Snelgrove board.
Top brood chamber: right in the middle place one frame with pollen and one frame with foundation. Remaining space is filled with frames of sealed and open brood.
Above goes a feeder.

Grafting

Be comfortable, have everything ready. Good light is essential, but direct sunlight is not. Start with moistening and cleaning your grafting tool with saliva, then slide the tool under the larva and transfer her into your artificial queen cell cup, laying her on her same side as that which she was lying on in the original cell she was lifted from. Aim to complete all larva transfers in about fifteen minutes. When done, replace the frame with grafts into the space created by removing the foundation frame in the top chamber. One day after grafting replace your Cloake or other boards with a second queen excluder. There are a few other details worth noting as follows:

- Plastic cups often have a higher acceptance rate. Beeswax cups can be contaminated with varroa treatment residues, which contribute to bees rejecting the grafts.
- It helps the acceptance rate if plastic cups are primed with a little candy. Just a small piece is required perhaps the size of a lentil. The frame with these cup cells is then given to the start-up colony for a few hours, so that bees lick out and clean them, and implant the colony odour onto the equipment before the grafted larvae are placed in the artificial cup cells.
- Do not expose your grafts to full sun for long.
- It is essential to keep the grafting tool spotlessly clean. Cleanse it by licking it with saliva between each graft. Bees will reject a graft if anything is left on the grafting tool from the previous graft.
- When complete novices and improvers use a Chinese grafting tool, since it is so easy, the larvae are transferred 'dry', meaning the cups are not primed with anything. More experienced beekeepers may try a more delicate metal grafting tool or an artist's 00 sable brush. These work better with much younger larvae. I still transfer dry, although others prefer priming the cups with a little droplet of diluted royal jelly. This allows the tiny larva to be 'floated' off the tool onto the surface of the small blob of jelly. The royal jelly, previously aspirated with a syringe from other cells, is diluted 1:1 with clean water.
- Whether picking the young larvae with a grafting tool or letting your queen lay up the artificial cells in the kit cage, the process benefits if the colony enjoys a good income. Ensure you feed the breeder with1:1 sugar syrup for about four or five days before your planned grafting day, or two days before entrapping your breeding queen in the kit cage.

Next month I will explain how to prepare the mating hives.

Action timetable assuming larval transfer date is Saturday 17 May 2014 (= day 0)

Day	Date	Queen nursing colony	Queen breeding colony	Drone nursing colony	Drone breeding colony
-42	5/4/2014	Select suitable colony.	Select suitable colony.	Stimulative feeding.	Stimulative feeding.
-22	26/4/2014	Stimulative feeding.	Make or buy queen cells cups, or if using, buy a complete kit with the cage. Fix cell cups holders to modified brood frame.	Continue stimulative feeding.	Continue feeding. Insert drone foundation.
-17	30/4/2014	Continue feeding.		Continue feeding. If drones eggs laid up and hatched, transfer drones frame now.	Keep here until all eggs hatched. Keep feeding until all eggs hatched.
-7	10/5/2014	Continue feeding.	Stimulative feeding.	Continue feeding.	
-4	13/5/2014	Rearrange the colony in readiness to accept your grafts. Continue feeding.	Eggs laid, from which queens will be reared. Continue feeding. If using, insert the cage from the kit, trapping breeding queen within. Keep feeding.		
-1/4 (few hours only)	17/5/2014	Remove a frame of foundation, place frame with empty graft cells in middle of top brood chamber between frame with pollen and one with very young open brood. This frame will obtain odour of nursing colony.			
0	17/5/2014	After several hours replace the frame with grafts. Continue feeding.	Do the grafting today. If you used it, take the cage out and transfer cell cups with larvae onto cell holders of the modified frame. If doing only one batch, you can stop feeding now.	Continue feeding.	
+2	19/5/2014	Inspect the grafts and see how many cells were accepted.		First drones might emerge today. Continue feeding.	
+5	23/5/2014	Cells sealed.		All drones should emerge now.	
+10	27/5/2014	Distribute 'ripe' queen cells into mating hives.		Continue feeding.	
+12	29/5/2014	Virgin queens emerge.			
+17	3/6/2014	Sexually mature. Possible 1st mating flights.		All drones sexually mature now. Discontinue feeding.	
+20 – +25	6/6/2014 – 11/6/2014	More likely mating flights.			
+28	14/6/2014	Mating window closes.			
+32	18/6/2014	If queen not laying destroy her and dismantle hive.	If queens did not mate properly due to poor weather, start again as on day -4.		