Queen Rearing Method as used by Steve Rose

July 2015

This is a queenright method developed from a system employed by Jim West of Nottinghamshire. He has successfully used a 2-queen Van der Kerkhof hive for some decades and used it to produce a nucleus based on natural cells every couple of weeks throughout the summer.

After some experimentation the method Steve Rose uses is based on a standard National Brood hive

with two half width brood boxes above a queen excluder and under any supers present. All other equipment, supers etc., are standard although it is convenient to use a queen excluder cut into two halves; one for each half width brood box.

The half-width brood boxes each contain five frames and are put in place, immediately above the queen excluders, when the first super would normally be given. Queen rearing can be started as soon as nectar is found in one of these boxes and mature drones are available. To raise queens a frame of young brood and another of pollen from below the queen excluder are exchanged with two of the frames in one of the top brood boxes (the cell raiser box). To move frames up from the bottom box all the bees are shaken off them to ensure the queen remains below the queen excluder. An empty grafting frame is placed between the pollen and brood frames and two of the remaining honey and nectar-bearing frames left in place. One frame from the cell raiser box is stored away for later use. After a day, when the brood in the cell raiser box is covered in nurse bees, a thin sheet of tough plastic film, cut from, say, an animal feed bag, is slipped beneath the cell raiser box (and over the queen excluder). At the same time the grafting frame is removed, leaving a space where it had been located. The other half box is left undisturbed over its queen excluder so that bees still have normal access from below. The presence of the sheet under the cell raiser box causes the bees in there to be cut off from much of the queen pheromone from below but the bees can still access the box freely by climbing over the top from the adjacent box. After 6 to 24 hours (the longer the better) the grafting

frame is returned, complete with grafted larvae, from a selected donor colony. After another day the plastic film is removed to make the arrangement fully queenright again. At this point the grafts will have been accepted by the colony (probably due to the supersedure impulse rather than emergency) which will continue to nurture the new queen cells until emergence if they are left there long enough. The completed queen cells can be removed and distributed 10 days after the grafts are inserted or they can be caged at that point and left for the virgins to emerge in the hive, usually 2 or even 3 days later. During the whole process the bees continue to use the normal hive entrance so there is no need for special boards fitted with alternative entrances or to follow a timetable of manipulating doors.

If supers are present they can be fitted the wrong way round so that their frames run at 90^{o} to the brood frames. This should aid the bees' passage through the system although care will subsequently need to be taken when lifting the supers as they will be propolised to the brood frames in the half boxes. The presence of pollen and nectar in the cell raiser box is important as the nurses will use this for the royal jelly production. If there is insufficient pollen in the hive a frame can be taken from another colony for the purpose. The colony, being queenright, continues happily and produces honey as normal. If there is no nectar flow and no supers are present the bees should be fed. If they are not fed in these circumstances there will be fewer acceptances

If the queen cells are removed 10 days after grafting the whole process can be repeated every 2 weeks. When repeated it is sometimes found that a frame of sealed brood needs to be moved out of the cell raiser box and into the other half box (or given to another colony) to make room for fresh pollen, nectar, brood and grafting frames. Usually the colony used does not swarm if the process is repeated throughout the season and brood is not returned to the bottom box as there is constant removal of brood from the brood box and the queen in there always has plenty of laying space. They have been known to swarm occasionally though so it is recommended that the bottom box is examined for queen cells every two weeks, when the brood and pollen is moved to the cell raiser box. It is also possible for a natural queen cell to appear in the cell raiser box but this is extremely rare provided the correct timing is observed.

Summary

- Put queen excluder(s) and 2 half-width brood boxes over a standard colony when the first supers would normally be fitted.
- Wait for bees to start putting nectar in the half boxes and mature drones are available.
- Day 1 - Move one frame of open brood and one of pollen up into one of the top half boxes. Slip a queen cell frame (grafting frame) between the brood and pollen frame in the half box and leave two nectar bearing ones in the other two positions (making up the total of five frames).
- Day 2 - Put a plastic film over the queen excluder and under the half box with the brood etc and remove the grafting frame. Between 6 and 24 hours later, graft young larvae into the grafting frame and return it between the brood and pollen. Leave the other half box on its own queen excluder and hence accessible to the bees below.
- Day 3 or 4 - One Day after inserting the grafts remove the plastic film (leaving the queen excluder in place) so that the queen pheromones have normal access to the box again.
- Remove or cage the queen cells 10 days after inserting the grafts.

Notes from Steve Rose 2015:

By late July 2015 I had used variations of this system for a number of years so had gained some experience with it. Only in one season did I find swarm cells during the queen rearing season and this occurred in 3 out of 4 hives. A natural cell has never been spotted in the cell raiser box although on one occasion a virgin was found on top of the queen excluder. She was judged to have come from a natural queen cell that had been produced spontaneously in the cell raiser box or inadvertently introduced on the brood comb from the bottom box. She could have been the result of leaving the plastic sheet in the hive for too long although in previous experiments the timing of the sheet's removal had not proven critical. She was removed and the system continued to be used successfully.

Acceptance rates vary from about 50% to 90% and seem to be related to the season so in a good season I have achieved 18 out of 20 grafts almost every time. The poorer seasons are probably due to lack of foraging opportunities so it might be a good idea to use brood boxes as supers so that feeding could continue whenever the weather breaks. The brood comb thus produced would then be useful for making up nucs.

If half width brood boxes are not available a normal box can be used with a division board fitted. This has been used successfully by another queen rearer but I have never tried it myself although I can't see why it should be less successful than using the 2 half boxes. If half boxes are used they can be removed at the end of the season, complete with bees, brood and stores and put between a floor and roof to make up the last set of nuclei of the season. Another advantage of 2 boxes is the fact that only one needs to be disturbed in order to fit and remove the plastic sheet.

I usually use foundation when charging the half boxes at the start of the season. Drawn comb might, in some circumstances, save time but for me the presence of drones governs the start of queen rearing rather than the condition of the combs in the half brood boxes.

Although I favour grafting larvae into the cell starter frame I cannot see why other methods, such as punched cells cannot be employed. If natural queen cell methods such as Miller are used I suspect the system will be less predictable with fewer queen cells being produced and timings being too haphazard.

On one occasion I put roller cages over the cells soon after they were sealed instead of waiting 10 days after grafting. The result was that the pupae progressed very slowly, emerging as underdeveloped virgins about 3 days later than normal.

All my queens are clipped so I have not tried the system with unclipped queens but I would not anticipate any difference in success with unclipped queens. I have not tried weekly inspections (which might be needed with an unclipped queen) but until 2015 I had found that no swarm cell inspections were necessary in any case. I believe the best way to avoid swarming is to keep the queen laying well so that there is always a large number of open larvae present in the brood box. Hence in a poor season like 2015 feeding might help.