

Easy Queen rearing by Amanda Millar

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These notes are intended for those with little or no experience of queen rearing, covering the basics and theory and then some simple methods which should be straight forward for anyone with a small number of colonies to provide some good queens. Timings are suitable for southern counties of UK. Providing the basic theories are applied many of these methods can be improvised to suit the situation of the beekeeper. A huge number of methods can be found in various books and leaflets, many just variations on a theme. I have attempted to bring as many simple methods together as possible for the reader to select from. I have tried some of them, others sound interesting and I hope to try one day.

BASIC THEORY

Why rear our own queens?

To improve the qualities of bees such as disease resistance, productivity, swarminess and temper

To replace old queens

Replace poor queens and drone laying queens, (don't delay or poor queens will produce poor drones, continuing the problem)

Remedy queenless colonies

Part of treatment for chalkbrood

Increase stocks

Satisfaction of mastering a new technique

Cheaper and better than buying foreign or unknown queen

Their history is known

Increasing queen problems and early supersedure, disappearance and mating problems means you are able to resolve own problems more easily than relying on others to help out

Local bee strains have been demonstrated to have better survival than strains from elsewhere

Techniques to master first

Finding queen

Knowing queen developmental stages

Keeping good records

Marking and clipping queens (clipping may not be essential but makes things easier)

Making up nuclei (see Ted Hooper, Bees and Honey)

and possibly mini mating nuclei (see Appendix 1)

Introducing mated queens, virgins and queen cells. See BBKA leaflet Introducing queens in members section or Ted Hooper's Bees and Honey (Queen Introduction)

Assessment of colony quality, queen quality

Perseverance necessary; may be 50% success rate.

Number of colonies required for queen rearing

If only one colony - simple division, artificial swarm or taking nucleus are only options and no genetic improvement possible.

Minimum of 2 if 'improvement' is the aim, but ideally more colonies should be available to choose from, and so you can have one good colony for drone rearing and another for queen rearing

Considerations

Selection of best, healthiest stock

Drone availability

Abundance of pollen and honey stores

Availability of pollen and nectar/syrup coming in

Abundance of young bees

Main principles for any method

Select colonies for drone and for queen rearing – separate colonies to avoid potential inbreeding – selected using records and criteria eg health, productivity, low swarming etc.

Need strong well fed colonies for drone production, started 3 weeks before queen production

Strong well fed colonies for queen rearing, these may or need not be the same as those providing the eggs/larvae

Abundance of pollen, nectar/honey/syrup as income and stores

Abundance of young bees of brood food, and wax production age (400-500 nurse bees per queen cell)
Get varroa down to low levels first

Tips

When handling frames with queen cells, do not shake but handle gently and brush bees off if necessary
Do not mark or clip a queen until she has mated and established in a colony
Do not use Thymol treatment when queen cells present as brood may be adversely affected, nor when virgin is waiting to mate as colony behaviour and pheromone communication may be disrupted.
Icing sugar can be used when you have capped queen cells or a virgin, just avoid times of day when she is out on mating flight or may be confused on return. It is a good time to use icing sugar as there will be little brood and mites are on the bees are more vulnerable. For details of Icing sugar application see Brighton and Lewes website Information sheets page http://www.brightonlewesbeekeepers.co.uk/?page_id=54

Colony Selection Criteria

No disease at all (Chalkbrood, Sacbrood, paralysis viruses, Deformed Wing virus etc)
Good honey production
Low swarminess, regular supersedure
Hygienic behaviour
Good temperament
Rapid spring buildup
Good winter survival
Low following tendency
Economical use of stores (Native rather than Italian etc)
Low propolis production (but propolis may help against disease)
Good brood quality (diploid drones and inbreeding avoided)

Queen development stages

Egg for 3 days
Open larvae for next 5 days
Cell sealed on 8th day
Larva pupates approx day 10
Wings develop day 14
Final moult to adult day 15
Emerges from cell, day 15 or 16
Critical times are first 3 days of larval feeding which determines the queen quality;
at 8-10 days the larva must not be dislodged from food or will die;
days 14-16 if chilled or shaken wings may be damaged. So if moving queen cell, best between days 11 and 13 inclusive.

When to rear queens

The best time is when the weather is warm, the colonies have had time to build up to a good size, when the colonies are in a suitable condition to rear queens, possible early nectar flow on and good pollen availability, when drones are on the wing, best before the main nectar flow as many supers increase the lifting and complicate some of the procedures. Also starting early gives nucs time to build up before autumn. April, May and June are the best months. Make a note of the weather conditions when the virgins might be out mating; if few decent flying days they may not become good queens.

Emergency, supersedure and swarm cells

Queen cells can be built in response to any of these 3 impulses

Supersedure. It is desirable to select a colony for rearing which tends to routinely supersede rather than swarm. However supersedure can be induced by reasons other than genetic tendency; it is a response to a perceived failure of the queen, either due to her great age, damage (inexperienced handling by beekeeper), exposure to pesticides and chemicals at any time; exposure to heat or chilling in the rearing and introducing stage. Newly introduced queens may be quickly superseded if the bees are a different strain to the queen and there is a mismatch with pheromones and behaviour. Queens which have swarmed with their bees are very often superseded later that year and adverse weather conditions resulting in poor mating condition (not enough drones or sperm) can lead to rapid supersedure. Some of us will have noticed an increase in supersedure in the summer of 2012. Disease can either affect the queen directly leading to supersedure or indirectly if the bees perceive the reduced brood, colony size etc as a failing queen.

Supersedure cells can be good as they have been fed and reared as queens from the start, but should not be relied upon if they are a result of a diseased or poorly mated or inbred queen or from a weak colony. Adequate records should clarify the conditions.

Supersedure cells tend to be fewer in number (1-5) than swarm cells (3-20). Supersedure cells are usually of the same age whereas swarm cells can be of varying age. Swarm cells are often found on the edges of the frames, supersedure cells are also found round the edges but may also be seen on the face of the comb. Swarm cells are usually produced only after drone cells have been started in the spring through until late summer. Supersedure cells may be found early spring, late in the summer and there may or may not be drones around. If a colony is planning a supersedure they may hang on to their drones until after other colonies have thrown them out. Close observation of signs will help distinguish between swarming and supersedure, and if in doubt cells can be thinned and left intact if the queen is clipped.

Swarm cells usually produce excellent queens as they too are intended as queens from the moment the egg is laid. Swarm cells are often of different ages and colonies with a tendency to produce lots of swarm cells may be a bit short on royal jelly by the time they rear the last ones which are often smaller. If swarm cells are to be used, the later small ones can be removed so bees can devote their attention to the better ones.

If swarm cells are all destroyed before being capped, the bees will still be in swarming mode and start to produce more cells, these later cells will be of emergency type and may be started on older larvae and the resulting queens may be smaller. It is not recommended to use such cells for queen production.

Emergency cells are produced in response to the loss of a queen. Their quality depends on the Main Principles mentioned above, ie strength of colony with abundance of food and young nurse bees, but primarily on the age of the larvae selected for rearing and this can be controlled by the beekeeper. They are built out from cells started as horizontal worker cells on the face of the brood comb and then built downwards, therefore having an upsidedown 'L' section.

Whether swarm, supersedure or emergency cells are exploited in the method of queen rearing chosen, it is advisable to thin the numbers to match the size and resources of the colony. Also once the queen cells have been chosen by the beekeeper, mark the top bar of the frame above the cells (eg with a drawing pin) and be sure to check about 4 days later as any change in the colony situation and queen pheromone availability (eg queen removed, or queen cells thinned) can trigger another bout of emergency cell rearing, these later ones will need to be removed and discarded. I have found on several occasions that they can continue to produce emergency cells on older larvae after this 4 day check so I recommend a further one 4 days later to prevent any unwanted casts and loss of bees.

What to do with the capped cells

Once you have your capped queen cells you can install the cells into nuclei or mini-nucs to hatch and mate there. You may like to put a small strip of aluminium foil around the sides of the cell just leaving the tip exposed, to prevent workers biting it.

Mini-nucs require fewer bees, but the success rate may not be as high as with nucs, and more skill and practice is required to start and maintain mini-nucs satisfactorily, but once the technique is mastered it means you can mate your queens without depleting potential honey producing colonies through taking off nucs. It is difficult if not impossible to treat them for varroa and increased stress may result in increased nosema but they are only required for a couple of months and can be merged or grown on to nuclei if strong.

Capped queen cells can be put into incubators to hatch and the subsequent virgins introduced to nucs or mini-nucs for mating. The advantage of this is that you can be sure you have a good looking queen. Not all cells will hatch due to chilling or Black Queen Cell virus and if they have been badly handled or shaken they may hatch with damaged wings. Queen cells need to be handled very gently, avoiding chilling and kept at a steady 34-35 degrees centigrade, preferably suspended in an upright state although I have had some success with cells laid horizontally too, and kept separate from other cells as the hatching virgins will have a desire to sting to death the occupants of other cells or fight with any other virgin she finds. The humidity needs to be between 60-80%. Cells should be inspected several times a day and as soon as a virgin is seen, she should be offered a drop of 50:50 sugar syrup (or dilute honey if from your own healthy bees) which she will drink avidly, removed to a cooler location at about 25 degrees (eg an airing cupboard) and fed daily and kept out of bright light in a queen cage, inside a larger plastic box within which is a small pot of wet tissue to provide humidity. She can be kept for up to 3 days like this before introduction to a nuc or colony and can feed herself if fondant is available or is offered syrup by the beekeeper. It is important to only leave a tiny bit of fondant as it becomes moist in the humidity and queens can get sticky. If so drip warm water over her and dab dry quickly with a tissue. If her wings get sticky she will not be able to fly to mate. When first hatched a virgin has little queen pheromone but this develops in the first 2 days, making her more attractive to the bees. She can be kept alive like this for up to 3 days until a suitable hive available.

METHODS

You need to refer to the previous year's records to determine the best colonies for health, productivity etc. Colonies with signs of virus or chalkbrood or other health problems should not be used for propagation.

Select colonies which will be Drone producers, Egg producers (breeder colony) and Queen rearers (which may be the same as the egg producers). Select your method of mating eg nuclei, mini nucs and prepare equipment well in advance. The colonies should have been treated for varroa the previous autumn and monitored so they have the best chance of coming out of winter large and healthy. They may well require further varroa treatment in early spring, eg icing sugar.

Start feeding selected colonies 1:1 syrup as soon as warm enough, probably sometime in March including pollen supplement if little is available naturally; small quantities but regularly, not so much that they fill up all the frames with syrup. Once feeding is started it needs to continue until queen cells are capped unless there is a nectar flow on. Nucs will need feeding. Feeding syrup stimulates brood rearing and pollen collection. Depending on size of the colony, consider insulation if the weather turns cold in April to avoid chilled brood. Give a frame of drone foundation to the drone producing colonies. Drones need to be underway 3-4 weeks before queen rearing starts, and keep them being produced. Drones take 24 days from egg to hatching and then a further 12-14 days to mature before being able to mate. Queens only take 16 days to hatch and 2 days to mature. If there is a shortage of food then drone eggs are eaten. Drones only survive for a month after hatching. Research suggests 50% die before reaching maturity. If a drone is parasitized by even one varroa mite, fertility is reduced by 10% so it is important to monitor and treat varroa infestation of colonies the previous autumn, and beware late invasion of varroa after Apiguard treatment. Queens need to mate with up to 45 drones, average about 14.

By the time you want to start queen rearing the colonies should have a full box of brood or at least 8 frames of brood. Many rearers recommend bees fill a double brood box in order to be sure you have sufficient young bees to produce the best queens. I routinely use a brood and a half on my established colonies.

Summary of Preparations

Previous year select best colonies

Winter; finalise selection based on autumn health check, monitor varroa and treat if necessary

Spring; confirm they have survived in good condition, knock down mites with icing sugar treatments

Start feeding syrup (and pollen substitute if necessary)

Give drone foundation or super frames in brood

3 weeks after drone eggs laid, start queen preparations

Equipment

Good Records, Drone frame, incubator, crown board plus porter escapes for crowding. Divider/Cloake board, Nuclei, Miller frame, queen cages and haircurler, queen cages for apidea, virgin holding box, apidea to nuc merging board, nuc to full size merging board.

I will outline several possible methods with advantages and disadvantages, some of which I have tried, starting with the simplest and increasing in complexity. You can then choose which method(s) you wish to try according to your circumstances.

1. Taking advantage of natural swarming impulse

I expect we have all made use of some unexpected queen cells when we have unintentionally let a colony swarm or found a colony preparing to swarm. When you see larvae in queen cells, remove the queen to a nucleus made up from another colony so as not to deplete nurse bees in the queen rearing colony, mark selected large, well fed cells by putting a drawing pin on the top bar above the cell, remove the rest and 4 days later check no more queen cells made (and a further check 4 days after this may be advisable or before queen returned). When cells are capped, remove to nucs, incubator etc. and reunite old queen back with colony or allow one cell to hatch. Alternatively the colony could be split into 3 nucs, each with a cell, however this would forfeit the honey crop completely.

Advantages

- Should be good quality queens provided colony large and prepared as above, and queen cells thinned to appropriate number
- Very easy, no difficult manipulations of eggs or larvae.

Disadvantages

- Beekeeper has no control over timing, not all colonies swarm every year. If the queen is removed to nuc for a fortnight or a queen cell left to hatch and mate in early/mid May, when the colony should be producing the brood which will be foragers in July, then the honey crop may be reduced.
- May lose part of colony to swarm unless queen is clipped or she is removed to nucleus or queen cell checks at 4 and 8 days are missed.
- May perpetuate genetically swarmy strain of bees

1a. A refinement of this method is when you find a colony beginning queen cells (it usually will not do this unless in the right condition and with drones available) remove the queen to a nuc, the same day start a Miller frame in the colony you wish the eggs to come from (See Miller frame below). Remove every queen cell found in the swarming colony and check every two days that no more have been made. After 6 or 7 days that colony will be unable to make any more queen cells and the Miller frame with eggs from chosen colony will be ready to insert in the middle or use a frame with only eggs on. With no more open brood of their own to rear, there will be a surplus of nurse bees with lots of royal jelly available to feed the developing larvae on the frame they have been given. The colony will be in swarming condition but the cells built on the frame of eggs is with the emergency impulse as they are queenless.

1b As part of artificial swarm

When queen cells are seen carry out standard artificial swarm (eg Modified Pagden method

http://www.brightonlewesbeekeepers.co.uk/?page_id=54

Use the resulting queen cells as required. This is a similar method to 1a only using a full brood instead of nucleus for the queen, a Miller frame can be used to avoid promoting a potentially swarmy strain.

2. Induce swarm cells by congestion

According to the National Bee Unite, Bee improvement Best practice guideline 10

<http://www.nationalbeeunit.com/index.cfm?pageid=167>

swarm cells can be induced by building up a selected stock into a double brood box, when ready the brood frames are divided so that the sealed brood is in one of the brood boxes and the unsealed in the other. The queen is left with the unsealed brood and a queen excluder placed between the two brood boxes. It helps if super storage space is limited. Swarm cells will be built. The colony will want to swarm as soon as the cells are capped so remove the queen before this happens and deal with the cells before they hatch.

Advantages

- Fairly straightforward
- Beekeeper has more control on timing
- Should not affect honey crop (providing they do not swarm! and you merge the colonies by end of June)
- No extra equipment required (apart from a brood box)

Disadvantages

- A certain amount of reorganization and disruption to brood nest required (find queen and keep her safe in a cage while this is done)
- Need to remove queen before cells capped or colony will swarm, attention to timing
- Need to monitor for queen cells when reinstated and more space given, as colony may still be in swarm mode and depart shortly even though queen cells have been removed. A clipped queen would be an advantage here.

2a Congestion simplified

It might be easier just to put a crown board fitted with Porter escapes, under the supers for a few days, and then monitor the queen cell development and remove the queen to a nuc just before they are capped, replacing her once the queen cells have been harvested. I have not tried this method.

3. Inducing emergency cells

The queen is removed from a large colony, or a double brood colony can be split into two and the queenless half is left to make emergency queen cells. These must be thinned and selected carefully. Don't be tempted to allow a nuc to rear emergency cells, they will not have the number of nurse bees available to feed the queen larvae sufficiently.

Advantages

- Easy, not even necessary to find the queen if a double brood is split.
- Timing under the control of beekeeper

- Can manipulate so they have to rear queen cells on the larvae you provide from chosen genetic source (breeder colony) see below for details of producing frame with suitable aged larvae). Need to remove all their own produced queen cells 4 days after removing queen and then introduce frame of eggs just about to hatch.

Disadvantages

- May get poor queens unless care is taken to select queens which are reared from larvae no more than 24 hours old, by inspecting 3 days after queen removal and destroying any capped cells as these would have been made using larvae over two days old, keeping only those cells where larvae are seen swimming in copious quantities of royal jelly.
- If a double brood is split and the queenless half happens to be the one moved away, the subsequent loss of foragers which return to the original site will mean a cessation of pollen being brought in (required for royal jelly production) and reduction in bee numbers may make keeping the brood warm more difficult and poor queens produced.

4. H G Daws method (emergency impulse)

I found this in July 1989 BeeCraft magazine and like the sound of it.

Build up a strong colony of Brood and a Half (ie deep and shallow boxes) with minimum 8 frames of brood in the main brood chamber, with queen excluder above the top one. Day 1: Put the queen in the half brood chamber and confine her there with queen excluder above and below. Day 2-3, start Miller frame in breeder stock.

Day 8-9, remove the shallow brood (with queen) to one side 6ft away so the flying bees in the main brood do not find their queen and provide them with a floor, crown and roof, leave honey supers with brood or split between the two. In the main brood chamber there will be mainly capped brood with none suitable to make queen cells with but masses of young bees recently hatched and hatching in the next few days with no eggs or larvae to feed.

The main brood box is given a frame of eggs into the middle of the brood area, from the breeder colony (or from the shallow super if suitable stock) or a Miller frame (see below) which had been inserted into the breeder colony 7 days before. Since there are surplus nurse bees the selected larvae will be amply fed. Make sure there is an adequate pollen supply and honey supers or feed. Meanwhile the Shallow super will have lost most of its flying bees and may need feeding; reduce its entrance size.

Day 17 or 18, Remove all the sealed queen cells before they hatch (ie 5 days after sealed), move the shallow back to main brood in 2 stages, then unite the shallow box with the brood.

Advantages

- Timing to suit beekeeper
- Little disturbance to main colony, honey crop not affected provided started before mid June
- Very well fed queen cells
- No extra equipment required apart from floor and roof
- Easy method
- The main brood bees will be delighted to have their queen back and there will be lots of space for her to lay in.

Disadvantages

- Cannot think of any, except temporary (~ 10 days) imbalance in population of shallow brood with queen, which will lose its foragers and may need feeding.

5. Inducing supersedure cells

Build up colony to double brood box. When the colony is strong, confine the queen in lower brood with most of open brood, then queen excluder and super and 2nd brood box on top with one frame with eggs or very young larvae either from that stock or from breeder colony but otherwise late stage brood. Bees in the top box are further from the queen and begin to receive less queen pheromone and begin supersedure cells. They will look like emergency cells but will be under supersedure impulse. When the queen cells in the top box are capped, the top box can either be removed to make a new colony or the queen cells cut out and the colony reinstated as a large honey producing stock. (With a little more work this method can be carried out using a nucleus, see Nucleus On Top method, below). A brood and a half could also be used but sorting of frames with open brood with the queen will not be possible, so less ideal, but confining the queen in the lower box by a queen excluder for 5 days before doing the move would mean the shallow box would be mostly capped.

Advantages

- Timing to suit beekeeper
- Large colony, brood not interrupted so later honey storage not affected
- Population balance maintained (ratio of nurse, forager, brood etc)

Disadvantages

- Stock which rarely swarm are sometimes reluctant to start queen cells and may need period of isolation from queen (see next method)
- If nectar flow starts, the insert of extra supers between broods may cause reduction of bees in upper cell rearing box. This problem applies to the following few methods also.
- Becomes complicated if the lower box begins swarm preparations too.
- There is a risk that the presence of capped queen cells at the top may trigger swarming in the lower box, although technically supersedure, they could flip to swarm if they get congested etc.
- Lifting of heavy brood box to top of hive (several times).

6. Inducing queen cells by temporary isolation (emergency impulse)

This sounds similar to the inducing supersedure method (5) but by isolating the bees from the queen, the cells are started under emergency impulse even if they revert to a supersedure impulse to finish them. Set up a brood box over a super as the above method, allow nurse bees to distribute themselves according to need for a day or two, then slip a solid crownboard with upper entrance slot if desired, under the top brood for 24 hours, during which time they will be cut off completely from the queen and initiate emergency cells. Remove board and restore connection so the cells can be nourished by all the colony's food sources. As mentioned earlier after 3 days destroy any capped cells which would have been started on older larvae.

Advantages

- Timing to suit beekeeper
- Potential to use eggs from different colony to produce queen cells
- Control of larval age the queen cells are made from and therefore reliably better queens (providing sufficient nurse bees)
- Useful if bees are reluctant to make supersedure cells.
- Natural proportions of workers/foragers/nurse bees so bees less stressed

Disadvantages

- Require slightly more equipment; solid crownboard with upper entrance, or a special separation board
- Extra manipulation required although not difficult
- Becomes complicated if the lower box decides to start swarm cells
- In poor weather or too many supers the top box may become short of bees.
- Lifting of heavy brood box to top of hive

6a. Inducing queen cells using Cloake Board

Use the above method but place a Cloake Board under the top brood. This board is a frame into which a slide can be inserted which can cut off connection or restore connection with rest of the colony, it also has an optional upper entrance. A queen excluder can be incorporated in the frame, or placed under it.

Advantages

- Less disturbance to colony and less lifting

7. Nucleus over colony method

I have used this several times, including using a Cloake board modified to fit a nucleus on top. The nucleus is made up with 2 frames of stores including pollen, 2 frames of mainly capped brood, (not necessarily from that colony) insulation boards on top and outside if weather cool. With the Cloake board open allowing interaction, the nucleus is put on top of the brood and super with a queen excluder above bottom brood box. It will restock itself with nurse bees from below overnight. Next day add the frame of eggs from the chosen colony, slide in the isolation board for 24 hours so bees start to make queen cells, then reconnect by removing slide so queen cells are fed by nurse bees supplemented from those below. Thin the queen cells to about 6 which you know have been made from the eggs you provided. When cells are capped, remove nucleus and separate queen cells.

Advantages

- Less disturbance to main colony and does not affect honey crop
- No heavy lifting of brood boxes.
- Nucleus can be removed as a unit for mating elsewhere

Disadvantages

- May find insufficient bees stay in nucleus, especially if weather deteriorates. It did not work well in the wet summer of 2012, make sure colony below has minimum of 7 frames of brood.

- Too many supers between them seems to reduce effectiveness
- Watch that the lower brood does not start swarm preparations, especially as cells near capping, and monitor after nuc has been removed. A clipped queen will reduce the risk of swarm getting away.

7a. A variation on this would be to put the queen in the nuc on top, then isolate for 24 hours, queen cells will be started in the brood below well stocked with nurse bees, three days later thin queen cells, destroying any already capped (which had been made from old larvae), and put the frames with queen cells on into the nuc and return the queen to the brood below the queen excluder, making up any gaps with foundation. When capped remove nuc and cells. Will still need careful monitoring for swarm preparation after capped cells removed.

Advantages

- Easier to check for swarm preparations as only the top box with the queen in needs inspection while the nuc is on.
- Queen cells will be better looked after in the larger brood

8. Nick Withers' simple Queen rearing

<http://honeybee.bz/queenraising.pdf>

Here are three methods, with minimum intervention, in one the cells are started and reared in a queenless colony, the second started in a queenless and reared/finished in a queenright colony (I am still not sure how this happens without a risk of the colony deciding to swarm when the cells are capped) and a third method using a well stocked nuc but limiting it to 1 queen cell so as not to over stretch the nurse bees.

Miller frame

This can be used to provide eggs/larvae of the correct age to be inserted into the queen rearing colony.

Cut a sheet of unwired wax foundation across the middle using deep zigzag cuts, you can get enough for 2 frames if cut carefully. Fix it into a frame and insert into the middle of the breeder brood nest. In 5-7 days the bees will have drawn it out and the queen laid eggs, make sure they have drawn worker rather than drone comb which can happen. When eggs are laid, remove the frame, brush all the bees off, cut back the edge to cells containing larvae which have just hatched (less than 24 hours old) and insert the frame into the queen rearing colony (prepared and de-queened and checked for no queen cells) avoiding chilling or drying in the process. The edges are preferred by bees for drawing out long queen cells and they are easier to remove when capped, the zigzag edge leaves a longer length for them to develop cells on but limit it to 5-6 cells so nurse bees are not over stretched looking after them. Be careful to keep the frame upright at all times as there is less support for the comb. Four days later there should be capped cells which will hatch on the 12th day from inserting the frame into the queen rearer colony.

More complex queen rearing methods

Most of these methods require several colonies, specialized equipment, are more time consuming and require skill and experience best gained after trying simpler methods. These include grafting, Punch cell method, Jenter method, Vince Cook method, Doolittle, Horizontal comb, swarm box, Alley etc.



Miller Frame ready to go into breeder colony



Modified Cloake board with isolation slide, to fit nucleus



Nucleus and Cloake board in use in method 7

Tips for queen introduction to standard colony

Feed recipient colony for a day or two to put them in a good mood. Mated queens one month old are accepted better than recently mated queens, it allows pheromone to develop.

Avoid introducing a new queen to a different strain of bee, often fails.

A virgin over 24 hours begins to develop 'queenly' scent and looked after better.

Ensure plenty of young bees to look after queen, or add frame of hatching brood to boost numbers.

Don't introduce when the colony is under stress, robbing or nutritionally stressed or they may reject her.

Colony should be healthy with low varroa.

Recipient colony should have queen removed just before. If some time before then checked and any emergency queen cells removed.

Further reading

Bee Sex Essentials by L J Connor. Paperback covering the biology of queens and drones, mating requirements and techniques for queen rearing.

Ted Hooper, Guide to Bees and Honey, sections on queen rearing, making up nucs, introducing queens etc.

Appendix 1

Starting an Apidea

by Amanda Millar

Make up the mini frames, cut some 1 inch strips of foundation and stick them into the tops of the frames using melted wax (eg using a thin rod of wax foundation and a long match will enable controlled drops to be precisely located).

Half fill the food compartment with fondant, some people mix in a bit of disease free honey too; I don't usually add honey but sometimes give them a bit of Neopol pollen substitute.

Make sure you have the hole in the perspex cover aligned with two adjacent half cutouts in the frames so you will be able to suspend a queen cell or cage there.

You need a mug of young house bees, they will have to make wax and feed the queen and subsequent brood. I get them from the supers of a big colony (you need to be sure you don't accidentally shake your queen in.) I use a large plastic cat litter tray, lift out a well covered super frame; that way I cause minimal disturbance to the donor colony, do not need to smoke it and am least likely to accidentally take the queen, a very light shake over the top bars of the hive will remove the older foragers, give a sharp shake in to the tray to dislodge the younger bees, You may need to shake in several frames, the foragers will tend to fly off and the house bees will crawl around, give it a gentle shake to keep the crawlers in the tray, spray with a little water or dust with a bit of icing sugar. If fresh nectar drops from the super have shaken out they will probably be sticky enough without adding anything else, then pour about a mug full into the apidea which you have turned upside-down, with the floor slide open and the entrance closed. Quickly slide the floor back into place without squashing any. Turn right way up and put in dark quiet place for 48 hours. They will roar a bit.

After 24 to 48 hours you can take off the polystyrene lid, leaving the clear cover in place, have a capped queen cell suspended on a toothpick through the top without damaging the cell, or cotton thread tied to toothpick, open the little 'Apidea' flap and suspend the cell. I made tiny cylindrical cages of plastic mesh, with fondant blocking the base when introducing virgins, close flap and replace lid, be sure they do not fall to the base or they will be neglected and die.

After another 24 hours in the dark you can take them out to your chosen place and open them up at dusk. It is better they are not too close to other hives to reduce disturbance and robbing risk.

Leave time for hatching plus 10 days for mating before checking for eggs, but do check and top up fondant or invert syrup if required (add straw or pieces of wood to avoid drowning if using syrup) and remove the cage after a couple of days making sure she was released and the fondant has not gone hard. If pollen is going in it is promising, I have sometimes heard queen piping and several times spotted a virgin going out or coming back from her mating flight, usually between 11am and 2pm, if you see several bees at the entrance Nasanov fanning, the virgin may be out mating, so best to do inspections early or late in the day to avoid disturbing a returning queen.