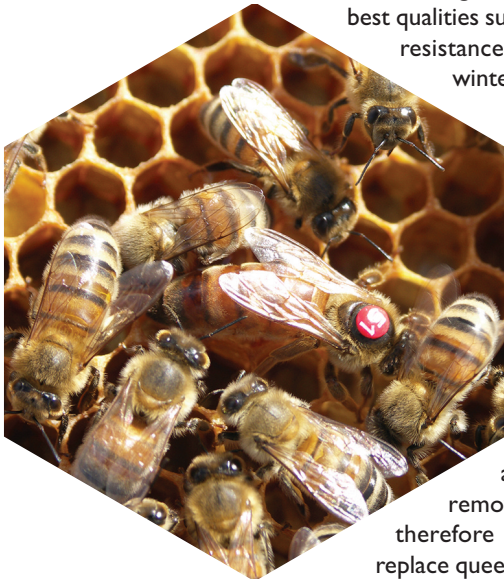


Introducing Queens

Obtaining a new queen

The queen bee defines the characteristics of her colony. Using the sperm she received when she was mated, the ideal queen will maintain a strong, healthy colony with the best qualities such as docility, disease resistance, reliable overwintering and, of course, a high honey yield.



Above: A marked queen in colony. All photos courtesy of The Food and Environment Research Agency (Fera), Crown Copyright; images supplied by the National Bee Unit at Fera.

Although they may go on laying viable eggs for several years, queens are not immortal and there comes a point when any queen will pass her best, fail and die, or she may exhibit undesirable traits and have to be removed. All beekeepers therefore need to be able to replace queens; this is an essential part of good husbandry. By taking control in this way you can prevent many problems and also enable a significant degree of selection for the type of bee desired. Many beekeepers,

however, experience difficulties when introducing queens, so this article gives some basic guidance on procedures that can be used to help your worker bees accept such a new queen as their own.

Queens can be introduced into colonies in three life stages. These are: as mated queens, as virgin queens or as sealed queen cells. Rearing your own queens and managing mating are exacting processes, which take experience, forward planning and considerable preparation. Young larvae are grafted, by hand, into artificial queen cells that are then placed into specially set up breeder colonies where they will be reared as queens as shown in the photo opposite (top of page). When mature, the sealed queen



Grafting (larval transfer).

cells are put individually into mating nuclei. Mating nuclei are small, queenless colonies containing food reserves (see photo below of mating mininuc). The queens emerge from their cells and remain inside the mating nuclei to sexually mature before flying to mate at drone congregation areas. If you would like to read more about queen rearing there is suggested reading at the end of the article.



Cell bar with mature queen cells ready for use.

Most beekeepers will buy mated queens. The BBKA recommends that you buy bees that have been bred locally or within the UK rather than buy imported queens. Bees can, of



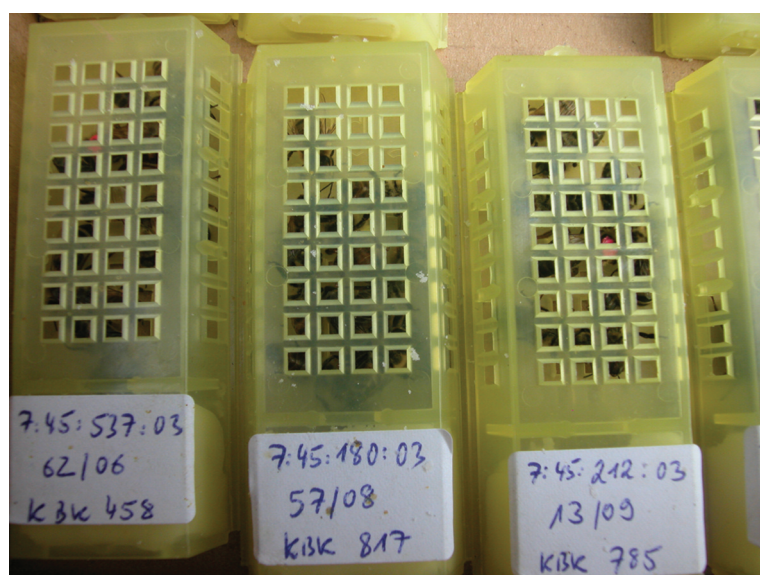
Introducing a queen cell to mating mininuc.

course, be purchased from other countries and many beekeepers do this to get the stocks they want, but whatever the case, you should always obtain them from a reputable breeder. The quality of queens can vary a great deal. Ask local beekeepers for recommendations or see the beekeeping magazines. Otherwise, you may obtain sealed queen cells or hatching virgin queens from a swarmed colony and select these as your new stock.

Whatever the case, it is not usually possible to introduce queens to colonies that already have one. For the introduction to be successful the receiving colony must be queenless with a high proportion of nurse bees. Many expensive bought-in queens have been lost because the beekeeper has attempted to introduce her into a colony where a queen was present even though no brood was seen. A quick and humane method of dispatching an unwanted queen is to crush the head and thorax firmly between finger and thumb. Otherwise, put her into a suitable sealed container and place this in your freezer for at least 24 hours.

Introducing mated queens

- ❑ Introducing a queen to a colony which is not her own is not straightforward, and listed below are a number 'dos and don'ts' that will help you maximise the chances of a successful queen introduction.
- ❑ As a general rule, the larger the colony the more difficult it becomes to introduce a new queen. So, with colonies larger than a full brood box, it is better to introduce the new queen into a small nucleus. When she has been accepted, is laying, and all stages of brood have been present for at least two weeks,

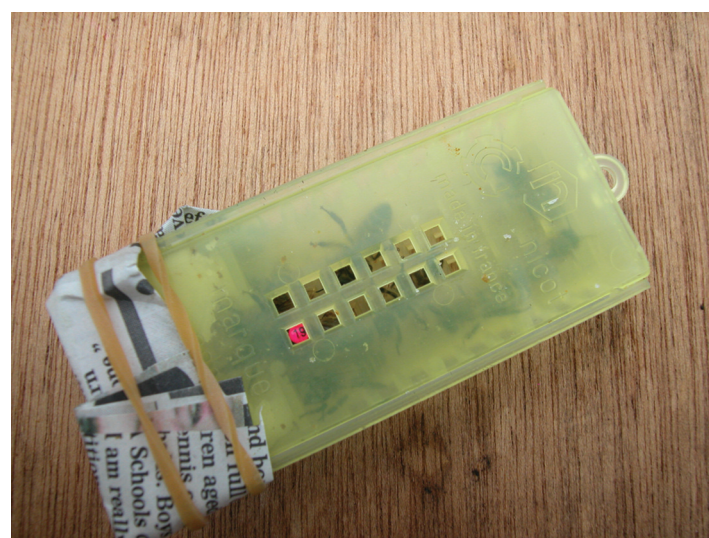


Queens and escort workers in Nicot mailing cages.

then unite the nucleus to the queenless colony, for example using the 'newspaper' method. Place the queenless colony on top of the other hive with two sheets of newspaper in between; leave in situ; the colonies will gradually get used to each others' odours as they slowly chew through the barrier. Do not touch this colony for a week or so.

- ❑ Introductions to full colonies tend to be more successful before mid-April and after the end of August.
- ❑ Introductions to full colonies during the season between mid-April and the end of August tend to be more successful during a good heavy nectar flow. This is because the distribution of the queen's pheromones is increased during a nectar flow. Feeding sugar syrup may also increase acceptance by simulating a flow (see references).
- ❑ It is best not to attempt to introduce a queen to a colony where laying workers are present; she will usually be killed. You can salvage the bees by relocating the hive to another apiary (at least three miles to avoid returns) and then shaking out the bees. They will redistribute themselves among other colonies without any problems. The frames can be recycled and the hive cleaned and disinfected before re-use (see references).

- ❑ Be sure that the colony or nucleus is queenless and check that there are no virgin queens or a second queen present. If you have not removed the queen and are unsure whether she is still present, insert a frame of brood containing eggs. This is known as a test frame. If, after a few days, you find emergency queen cells then the colony is probably queenless.
- ❑ Honey bees can differentiate between their original queen and any new individual for about a day, so introduction methods must allow for this by incorporating a delay mechanism. There are many different types of introduction cage available that provide time for the new queen's pheromones to distribute throughout the colony, thus conditioning the workers to accept her prior to release. Even empty matchboxes have been used.
- ❑ All introduction cages comprise of a container large enough for the queen, made of plastic or metal mesh, with an entrance that is blocked using candy, newspaper, or some other substance that will delay emergence into the colony until the queen's pheromones have taken effect. The workers will get used to the new queen, feed her and pick up her pheromones, and eat through the newspaper and candy, thus ensuring her gradual release into the colony.
- ❑ One of the simplest introduction cages is the 'Butler' cage which is a simple mesh tube blocked at one end and open at the other. The queen is placed in the cage and the open end closed with a newspaper cap (four leaves thick) held in place with a small rubber band. The cage is jammed between two frames of hatching brood, where there will be plenty of nurse bees, with the newspaper cap facing down.



Newspaper cap over the open end of a plastic queen cage.

- ❑ There are many other, often more complex, sorts of introduction cages (also used for mailing bees through the post), such as the Miller or Manley cages. These generally have three holes and lots of beekeepers find them very effective. The largest hole is blocked with a removable plug, or pressed against the comb, and is used to insert the queen. The remaining two holes comprise a short tube-like entrance through which only worker bees can enter and leave, while the queen cannot, and a longer tube through which the queen can move. Before use, candy is used to fill the two tunnels so workers trying to get to the queen will eat through and enter by the shorter tunnel first to feed her, in the process picking up her pheromones and distributing them throughout the colony. Eventually the queen is released when the candy has been eaten through in the longer tunnel, by which time conditioning is complete.
- ❑ NB. Some plastic cages incorporate a cover over the hole at the 'candy' end of the cage. It is important to check that this

barrier is broken off before introducing the cage into a colony. Otherwise the attendant workers and queen will be trapped inside.

- If you do not have a supply of commercially made candy for this purpose it can be made up by mixing a drop of honey with icing sugar to form a thick, firm putty. (Refer to *Best Practice Guidelines 7a: Feeding Bees — Sugar*). Be careful that it is stiff enough to remain in the tunnels and not flow out after an hour or two. It is best to prepare introduction cages a few hours before you intend to use them.
- When a queen has to be caged for any length of time during transit, about eight attendant workers will be confined with her to feed and care for her. It is best that these attendants are removed before introducing the queen to her new colony, otherwise fighting can ensue when the different families of workers meet. The queen is often stung to death in the ensuing mêlée. Some telescopic plastic cages have a facility to enable workers to escape the cage when expanded.
- When queens have been sent long distances through the post, or have been stored for any length of time immediately prior to introduction into full colonies, they can sometimes be superseded due to their poor initial egg-laying performance. Under these circumstances it is better to introduce the queen into a nucleus so that she can recover from the stress of transportation and return to an acceptable egg-laying rate before introduction.
- Queens which have arrived in the post need to be watered immediately. If you intend to store them they will need to be watered daily and kept at room temperature in a dark place. To water the bees you need to run your finger under a warm tap and rub a few droplets of water on the outside of the cage where the bees can access it.

Introducing virgin queens

- Sometimes beekeepers go to swarmed colonies and find queen cells hatching out. If these virgin queens are caught they can be used to re-queen queenless colonies. There is usually good acceptance providing the recipient colony has been queenless for at least 24 hours. This procedure is often used in an emergency, for example when all other re-queening efforts have failed, and when the beekeeper must take immediate steps to save a colony. Two methods are commonly used:
 - Caging the virgin queen and introducing her as described for mated queens.
 - Running her into the entrance of the queenless colony, together with the use of smoke or a sugar spray to mask colony odours. Acceptance by this method is heavily influenced by outside factors such as nectar flow, etc.
- As a general rule virgin queens are less readily accepted than mated laying queens.

Introducing queen cells

- As a rule queen cells are introduced into nuclei as part of queen rearing programmes (as shown in the photo above opposite), but sometimes, especially when beekeepers do not have such a regime, it is necessary to select a queen cell from a swarmed colony to use in a queenless colony. These cells are by nature variable, so for the best chance of success:
 - Select cells that are 25mm to 30mm in length. Longer cells often contain dead, damaged or diseased larvae or pupae.
 - Avoid using emergency queen cells. These look like human noses sticking from the surface of the comb.
 - The best queen cells to harvest are those built at the sides of the brood comb. This is because they are easier to remove without damage.



Introducing a queen cell from a rearing programme. It is important to ensure that the queen cell is not damaged and is hanging downwards as shown above.

- The cell should have a rough rather than a smooth exterior.
- Be careful that the cell has not hatched and the opening flap then resealed in position. This is easy to check this by gently scratching down the lower edge of the cell with a fingernail or hive tool, which will cause the flap to re-open. Cells that are about to hatch usually have a dark ring around the base, and sometimes the queen can be seen cutting her way out.
- Do not use queen cells which are surrounded by drone brood.
- Use a sharp knife to cut the queen cell from the comb, being careful to take a small area of the surrounding comb and not to cut into the queen cell.
- Put the cell adjacent to any brood that may be present, toward the centre or on the upper edge of the nest, by pressing the piece of wax surrounding the top of the cell into the comb. Make sure the queen cell is not damaged and is hanging downwards.

**Gay Marris, Benjamin Jones,
Damian Cierniak, Jack Wilford,
Mike Brown and Richard Ball,
National Bee Unit**

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