

Bee Improvement

Background

This note provides guidance on improving the standard of managed honey bees. General advice on buying bees is covered in the advice note 'Advice for Obtaining Honey Bees'.

Think of honey bees as a collective stock

All beekeepers would prefer to keep docile, easily managed, disease tolerant and highly productive stock. If this is to be achieved they must work together as a collective. In comparison with other stockmen beekeepers have less influence on genetic balance because they have little control over which drones mate with their virgin queens. Beekeepers therefore need to work together in order to achieve significant levels of stock improvement.

Why not just buy in good quality queens?

Buying in quality queens from other counties or countries can be advantageous; a quick fix or a long term solution. However it can become an ongoing commitment. Importing for desirable traits to improve your own stock is a better way forward. There could be significant risks, such as pest introduction, spread of disease, effects of local cross breeding, etc., that need to be taken into proper account. Only import consignments of bees that have been properly certified and are accompanied by a health certificate as these represent low risk.

Start rearing your own queens

Successful queen rearing gives a feeling of great achievement, so within the context of a collective stock all beekeepers should be encouraged to do so. It is often the case that queens are reared from colonies making queen cells early in the season. This should be avoided as it will select for a propensity to swarm; not a helpful trait for colony management. Colonies should be carefully selected for beneficial traits, such as docility, good overwintering, low tendency to swarm, disease tolerance, productivity, etc., before the removal of material used in any queen rearing project.



Two stocks are required for queen rearing

Generally, for most queen rearing systems, two stocks are required; the 'breeder' where the young larvae are to come from and the 'rearer' to develop them into queen cells. The rearer must be strong, have plenty of young brood food-secreting bees and is usually made queen-less. Any strong colony making swarm preparations is suitable. Very young larvae are harvested from the breeder by grafting, using a punch technique, Jenter or Miller methods and then developed in the queen-less rearer. There are techniques to enable the rearer colony to be queen right, which enables the queen cells to be reared under a supersedure impulse, one of which is described within BeeBase www.nationalbeeunit.com. Full details of these and other methods can be found in suitable text books or online.

Key points for successful queen rearing

- Small-scale beekeepers can form breeding groups, which also helps ensure an adequate supply of queens and stock for bee-keeping associations. They can also exchange suitable material to maintain genetic diversity over a larger geographical area.
- Select a system of rearing that suits your needs. Gaining confidence in any method is important, so joining a group to learn and even making mistakes together is a good way forward.
- Bear in mind that there are three impulses that cause bees to build queen cells

Swarming: Swarm cells tend to be built of new beeswax in the swarming period, generally April to August. There may be between 4 and 20, or even more.

Supersedure: These cells are well formed and generally larger than swarm cells. They can occur at any time of the time year but are more noticeable in Spring or Autumn. Usually between 1 and 4 are formed.

Emergency: These are built if the queen is removed from a colony when brood is present. The colony uses eggs or young larvae from worker cells, feeding them the same diet as a prospective queen and building out the cell into a distinctive hooked shape like a human nose.

- Maintain records to effectively select stock. Records should be maintained for day to day management, and must be kept for the use of varroacides and other bee medicaments. Records kept can be expanded to include stock assessments.
- Rear queens from selected colonies with high yields, good temperament, disease tolerance, etc. I.e. your best colonies and not the colonies selected for drone rearing.
- Rear drones in colonies that are strong and have a good temperament. Inserting a frame with drone foundation will boost drone numbers. Better still use drawn drone comb. In smaller hives, such as the National, these combs can easily be obtained by using a brood box as a super in the previous season, extracting the honey and storing for later use. Do not use colonies from which you intend to take genetic material for queens.
- Start drone production at least three weeks before queen production to ensure an adequate supply of suitable mature drones for mating.
- Maintain genetic diversity. It may be necessary to introduce new queens or stock to do this, particularly if you are a small-scale beekeeper in a remote location.

Beekeepers who do not wish to graft

Or those who use Jenter, Miller and other similar systems and who only want a few queen cells can manage colonies to produce queen cells which can be harvested and put in to queen-less nuclei. This can be done by:

Inducing swarm cells: A selected stock is built up onto a double brood box. When inducement is required the brood is 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 is placed between the two brood boxes. Swarm cells will be built. It helps if super storage space is limited. Remember that if you do not remove or cull the existing queen before the queen cells are sealed the colony will want to swarm.

Inducing supersedure cells: True supersedure generally takes place when mating conditions are not at their best, so harvesting cells from stocks that naturally do this carries some risks. However we can induce this impulse by management. A selected stock is built up onto a double brood box with a queen excluder and supers added as required. When the colony is strong and the conditions right the colony is re-assembled with the queen confined to the lower brood chamber by means of the queen excluder, then the supers are added and the other brood box on top.

The stock is not queen-less and worker bees have access to all parts of the hive, so all the brood is properly cared for. Because the top box is far away from the queen a reduction of the queen's pheromones occurs. This induces a supersedure impulse and though the cells built have the appearance of emergency cells they will have been built because of supersedure impulses.

These cells can be cut out and used as required.

Buying in new genetic material

- When buying in queens or a stock for genetic material remember that it is a case of 'buyer beware'. If you have no experience of the source, consider recommendations, obtain references, or make checks on the stock before you buy to help avoid disappointment.

If importing bees for genetic material

- Only import to obtain beneficial genetic traits. Remember that your imports will influence neighbouring honey bees.
- Comply with the current import regulations found on BeeBase www.nationalbeeunit.com Different rules apply for the EU and Third Countries, which are those outside the EU.
- Ensure the bees will meet your requirements.
- Use a reputable supplier. Recommendation or references may help you choose.
- You may need to check what is supplied before purchase.
- Bear in mind that importing colonies, nuclei and packages carries a higher risk of disease introduction in comparison to importing queens and attendant workers.
- Remember that health certificates only relate to freedom of visible signs of American Foul Brood, Tropilaelaps mites and Small Hive Beetles.



If you collect swarms

- Swarms can influence your stock. Swarms of unknown origin should be hived in a separate or isolation apiary to enable disease checks to be made. They can also be re-queened with surplus queens from a queen rearing programme before introduction to established apiaries. There is a separate advice note 'Taking and Hiving Swarms' offering good practice guidance.

Surplus queens and stock

- If you are selling or supplying surplus queens and bees describe them accurately and ensure that they conform to the standards set. Be prepared to let buyers examine stocks to satisfy themselves that they are disease free and suitable.
- Maintain a record of all movements to ensure traceability. A printed record is included in the advice note 'Advice for Obtaining Honey Bees' or if you are registered on Beebase records can be kept within your personal record.



Defensive colonies

- If colonies are defensive or show undesirable traits re-queen with a different strain of honey bee. If you do not wish to rear or buy in queens just culling the queens in the worst 25% of colonies and letting them re-queen themselves will result in improvement over time.

Don't put your bees at risk Are you registered on BeeBase?



BeeBase is a FREE online service provided by the National Bee Unit (NBU) to help protect you and your fellow beekeepers from colony threatening pests and diseases.

If there is a disease outbreak in your area, the NBU team uses BeeBase to contact local beekeepers and arrange for precautionary inspections to check for any signs of infection, and to advise on what to do.

Register today through one of these easy methods:
w. www.nationalbeeunit.com
t. 01904 462510

This leaflet was produced as part of the Healthy Bees Plan. The Healthy Bees Plan aims to address the challenges facing beekeepers in sustaining the health of honey bees and beekeeping in England and Wales. It has been jointly developed by Governments, beekeepers, their associations and other stakeholders.

For more information on the Healthy Bees Plan visit:

<http://www.fera.defra.gov.uk/healthybeesplan>