



**Beekeeping - Certificate III**  
**Participants Learning Guide**

**RTE3154A Requeen a honey bee colony**



**Australian Government**  
**Department of Agriculture,  
Fisheries and Forestry**



**Australian Honey Bee  
Industry Council**

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Judith Nettleingham and Bruce White assert their moral rights to be identified as the authors of this publication.

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## Resources you will need

For this unit of competency, you should have:

- Participants Learning Guide (this booklet)
- Participants Assessment Worksheets
- active hives and equipment
- replacement queen bee(s)
- if purchased interstate, a health certificate for the queen bee(s)
- personal protective equipment:
  - bee veil
  - gloves
  - overalls
  - safety goggles
  - steel capped boots
  - sunhats and sunscreen lotion.

The Participants Learning Guide is designed to introduce the topics and to provide you with some practical and written activities which will allow you to develop both your knowledge and skills in each area.

The Participant Assessment Worksheets include activities that you will be completing as part of your formal assessment for this unit.

Please record as much detail as you can as your responses to these activities will form part of your assessment.

You will need to send the Participants Assessment Worksheets to your assessor. Check with your assessor to find out if they need you to submit this Participants Learning Guide as well.

## Introduction to this unit

In this unit, you will learn about:

- identifying when and why it is necessary to requeen a colony
- preparing to requeen a colony
- introducing the replacement queen bee
- monitoring progress of replacement queen bee.

If you are interested in rearing your own queens, then you should undertake the unit *RTE3156A Rear queen bees*.

**Before you start this training you should be confident about your skills to:**

- assess suitability of conditions for requeening
- select replacement queen bees
- identify disease status of parent colonies
- install replacement queen bee
- monitor queen bee activity
- work as part of a small team
- follow instructions from a supervisor or more senior beekeeper.

**You should know about:**

- conditions for requeening
- factors other than queen vigour that may affect brood production
- factors to consider when identifying and removing old queen and introducing new queen
- queen bee behaviour and brood pattern
- selection criteria for new queen bee
- storage requirements of queen bees before being introduced into hive.

**Why requeening important**

Each colony must be headed by a fertile and vigorous queen bee to be productive. Queens are best judged by the temperament of her colony and

how well it gathers nectar and pollen. You can identify the egg-laying performance of every queen by looking for a uniform brood pattern of eggs, larvae and sealed brood.

There comes a point when the queen bee is no longer vigorous and the colony as a whole begins to suffer. Then you will need to remove the old queen and introduce new queen into the colony. This process is called 'requeening'.

In the main productive season, worker bees only live six to eight weeks. This means that you can replace and improve the characteristics of your entire colony's workers in a short time by replacing the queen. This is one of the main reasons why requeening is such a useful technique for beekeepers.

Beekeepers usually requeen their colonies each year, typically in spring/summer through to autumn to fit in with seasonal conditions and beekeeping work.

It is worth mentioning that if you find that you are requeening your colonies more frequently than usual, you should very carefully examine all your colonies and review your beekeeping practices. Frequent requeening can both indicate and mask serious underlying problems with your colonies.

## 1. Identify the need to requeen a colony

Apart from observing some physical characteristics of the queen bee, the best way to assess the vigour of a queen is to see how well her colony is performing.

In the main productive season, worker bees only live six to eight weeks. This means that you can replace and improve the characteristics of the whole colony's workers in a short time by replacing the queen.

You should be looking for signs such as:

- damaged queen
- aggressive bees
- poor disease resistance
- drone layer
- poor performance of workers
- poor performing queens
- queens older than 12 to 18 months
- swarming
- remain quiet on the comb
- special circumstances.

### **Damaged queen**

Some times a queen bee can be damaged, such as a broken leg, dented thorax or abdomen. This can occur while you are inspecting or manipulating the hive if you are not careful. A damaged queen bee should be replaced.

### **Aggressive bees**

The most aggressive bees may not be the most productive. If a hive becomes aggressive, it is difficult to work and a lot of valuable time can be wasted as aggressive bees tend to follow the beekeeper.

### **Drone layer**

A queen may become infertile, either by poor mating or through old age. Even though the queen is infertile, she is still laying eggs in worker cells. Like the

queen, these eggs are infertile. Signs to look for are wax cappings of the brood cells raised much more than usual beyond the face of the comb, like a 22 bullet or normal drone cell cap. As this situation continues, more and more of these drone cells are found right across the frame, not just at the edges as is usual.

### **Poor disease resistance**

The genetic make-up of queen bees varies a great deal and some colonies seem to be more susceptible to viral, fungal and bacterial brood diseases than others. Requeening can in some cases help colonies overcome sac brood, chalk brood and European foul brood disease.

### **Poor performance of workers**

Even with a strong population of workers, some colonies don't perform very well and produce very little surplus honey; queens from these colonies should be replaced.

### **Poor performing queens**

Some queens, even young ones, don't have the ability to build up the colony strength. A poor, uneven brood pattern might indicate that this is happening.

### **Queens older than 12 to 18 months**

As a general rule, older queens lay fewer eggs and are less active. This shows in uneven brood patterns. Older queens should be replaced as they don't have the ability to head a strong colony.

Queen bees produce pheromones which are important for the success of the hive. Attendant worker bees lick the pheromones from the queen's body while grooming her and pass them around the colony. This provides all the worker bees with information on the presence of the queen and her condition. As the queen ages, less pheromone is produced.

### **Swarming**

Some strains of bees tend to swarm far more than other strains, irrespective of race. A non-swarming strain is desirable. Colonies that swarm to excess should have the queen replaced.

## Remain quiet on the comb

Some strains of bees run on the comb and are difficult to manage and should be requeened.

### Special circumstances, which may include:

- Producers of comb honey try and select strains that produce white cappings on honey comb.
- Some hobby beekeepers select queens on the colour of the progeny as they are attractive to them.
- Some package bee producers select strains that breed to excess as they want to sell bees.
- Overseas beekeepers select strains that have good grooming ability ('hygienic bees') and are better able to handle the exotic mite Varroa.



*The queen bee is groomed by her attendants.*

*Source: NSW DPI*

## 2. Prepare to requeen a colony

### Occupational health and safety

Check for any occupational health and safety hazards. This needs to become a habit before you start work on any task and while you are doing the task.

The best way to identify common hazards is to observe other people doing the tasks and to ask others, such as fellow workers, your supervisor or advisor.

Some workplaces have detailed written OHS policies or checklists that include:

- information about the common OHS risks for each task
- what actions must be taken to reduce or minimise the likelihood of that hazard happening
- how to report any hazards and who you must report to.

If there is a written OHS policy or checklist that covers the tasks associated with requeening a honeybee colony, obtain a copy and, using a highlighter pen, mark the things that you are responsible for.

#### Activity

What do you think are the likely OHS hazards that might occur while you are requeening a colony?

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How did you identify these hazards?

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## **Tools and equipment**

Always check that the tools and equipment you need are available and in good working order. If any items look worn or damaged, or if any are missing, you need to deal with this before going any further.

## **Check for signs of disease or pests**

When handling or working with honeybees, you must check for any signs of pests or disease. By law, if you do notice something unusual or something that might indicate the presence of a pest or disease, you must report this and take the actions directed by your supervisor and/or apiary inspector. For example, if you notice signs of American foulbrood, the infected hive materials must be burned or sterilised.

**Note:** This unit of competency does not cover the identification and reporting of pests and diseases of honeybees other than to draw your attention to how important this is. You should complete the unit *RTE3407A Identify and report unusual disease or plant pest signs*.

## **Obtaining replacement queens**

You can purchase queen bees from specialist commercial queen breeders or from other commercial beekeepers who have surplus queens. Specialist queen bee breeders rear young queens for sale from about September to March/ Most are located in NSW and Queensland with others in Western Australia, South Australia, Kangaroo Island and Victoria.

You can obtain information about potential suppliers from:

- advertisements in bee magazines and journals such as Australia's Honeybee News, the Australasian Beekeeper and the Australian Bee Journal
- the Australian Queen Bee Breeders Association (AQBBA)
- your local beekeeping association, which will also be able to help with information about local suppliers.

As in every line of business, some queen breeders are very reliable while others are not, so it is important you check out how reliable the queen breeder

is. If possible, ask other beekeepers for their recommendations and why they use or avoid particular suppliers.

You must develop some criteria to compare what is available and provided by different suppliers. You will need to compare suppliers to each other and to what you have set as your standard or your requirements. This is no different to what you would do when making any other important purchasing decision.

For example, when contacting a potential supplier, you could ask the following questions:

- Availability of health certificate from supplier or vendor declaration

If the queens have to cross a state boarder a health certification from the local apiary section of the government maybe required.

- Time queens held in mating nucleus colonies ('nucs') before catching.

The longer the queens are held in nucs the better chance the queen has of being introduced successfully.

- How many drone mother hives per 100 nucs?

The queen breeder should have 10 to 20 drone mother colonies per 100 nucs. This is important so that the queen has the best chance to mate with plenty of drones in the first ten days of her life.

- How are they selected?

Drone mothers should be selected on performance to supply the drones to mate with the virgin queens.

- Price for various quantities of queens.

The more you buy the cheaper the queens should be.

- Race or strain of queen being offered.

- Where the breeders came from and how they were selected.

- Will you get stock from one or more breeders and how many if you order 100 queens?

- Is the queen breeder a member of the Australian Queen Bee Breeders Association?

The Association has a code of practice for members to adhere to.

- Are queen cells available?

You can purchase queen cells to requeen your hives using your own drone mothers

- Does the queen breeder supply breeders and or artificially inseminated stock, in case you wish to purchase a breeder queen at some stage?
- Do you have to order in advance (and how far) or are queens available at short notice?

It is best to place your order early with your supplier. As a way of assessing the quality of the queens supplied by different breeders, consider buying queens from more than one queen breeder at the same time. This way you can compare the performance of their stock by requeening half your colonies with one lot of queen bees and the other half with the other lot.

Never de-queen hives unless you are sure replacement queens will arrive on time!

**Activity**

Contact two breeders that you think might be good suppliers and ask them the questions. You can use the following checklist to record and compare their responses. We have added the suggested criteria we described above, but you can add your own. You must also consider which criteria are more important to you.

<b>Criteria</b>	<b>Priority</b>	<b>Supplier 1</b> ✓ OR X & any notes	<b>Supplier 2</b> ✓ OR X & any notes	<b>My choice</b> (1 or 2 or neither)
Health certificate or vendor declaration				
Time queens held in mating nucs before catching				
How many drone mother hives per 100 nucs				
How are they selected				
Price for various quantities				
Race or strain of queen				
Where the breeders came from and how they were selected				
Will you get stock from one or more breeders				
Member of the AQBBA				
Queen cells available				
Breeders available				
Artificially inseminated stock available				
Time between order and delivery				

**Your conclusion:**


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## Raising your own queen bees

Of course, you may prefer to raise your own replacement queens. This unit of competency does not cover raising queen bees but the majority of the unit is relevant whether you have raised your own queens or have purchased them from a supplier. If you are interested in rearing your own queens, then you should undertake the unit RTE3156A Rear queen bees.



*Queen bee emerging from a queen cell*

*Source: NSW DPI*

## Ordered queens arrive

Generally, queens will be sent by post and it is best to arrange to pick them up at the local post office. The queen will be in a small 'queen cage' with four or five escort bees. One end of the cage will have a small plug of 'queen candy' to supply the workers and queen with food. The outside of this plug is covered by a cap. Queen candy is a mixture of icing sugar and irradiated honey.

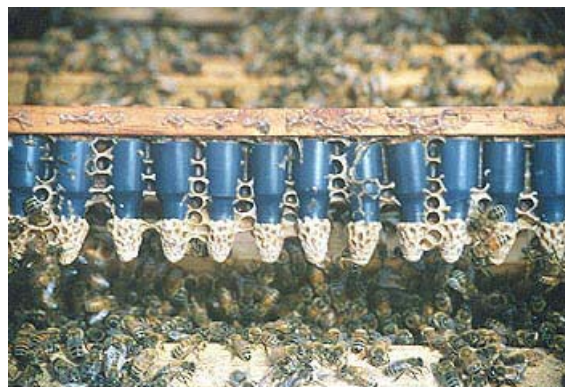
If the queens are to be delivered to your letter box, then you must ensure there are no ants in the letter box. A rag dipped in diesel wrapped around the letter box stand will prevent ants getting to the letter box, and attacking the caged queen bees. The letter box must be cool, and not had moth balls or insecticide placed in it.

If you need to store your queens in cages with escorts, they should be kept cool and out of direct sunlight, in a dark place free of ants and pesticides, including pest strips.

They don't need a lot of air and can be kept this way for at least a week. It is strongly recommended the queen be introduced into a hive as soon as possible to give her the best chance.

### **Using mature queen cells**

Some beekeepers prefer to requeen hives with mature queen cells purchased from queen breeders. These often are sent by overnight bus transport in insulated 'esbies' with the cells packed in sawdust to keep them at the right temperature. Queen cells can also be transported with queenless bees instead of sawdust. The container must be kept upright so as not to damage the cells. These cells must be put out into hives that have been queenless for one day.



*A bar of mature queen cells*

### 3. Introducing the replacement queen bee

#### Introducing queens in queen cages

Queen cages come in various shapes and sizes, either plastic, wood or woven wire. All have a hole so the queen and escorts can be placed into the cage. The cage has a compartment where queen candy is placed to feed the queen and escorts. This also allows the hive bees to slowly release the queen by nibbling through the candy from the outside once you have taken the cork out.

There are many different methods that can be used to re-queen colonies and using a queen cage is the most popular method. Queens are transported in cages so it is best to use these to introduce the new queen. Other methods include:

- Roll the queen in honey. The new queen is covered in honey and dropped into the brood nest between brood combs. The bees will quickly lick the queen free of honey and often accept the new queen as head of the colony. It is best to get the honey from the comb in the hive that the queen is being introduced into. Of course, only use disease-free honey!
- Smoke. Use plenty of smoke to confuse the bees, Then place the queen at the hive entrance and smoke her into the colony through the entrance.
- Paper bag. Catch about ten worker bees from the hive and place them into a paper bag. Place the new queen into the paper bag. The bees will try to get out of the paper bag by chewing it and in the process will release the new queen. This can be a very successful method.
- Uniting. It is possible to join two colonies together if one is made queenless. Place newspaper between both colonies. The bees will chew through the paper so that both colonies are united. The queen is usually accepted. This is considered a safe method of introducing a new queen.

When they arrive, check the queen and escorts for signs of pests and diseases.

Make sure your queens were accompanied by a health certificate or vendor declaration if required, or if you requested one.

### **Conditions for introducing queens**

It is best to ensure bees are on conditions of a light nectar and pollen flow but not swarming conditions.

It's best to requeen in spring or autumn or some of your hives in spring and the others that need requeening in autumn. It's normal to requeen from September to March, never in winter as queens are not available. It is wise to have nucleus hives with queens available so you can re-queen weak or queenless hives during the season.

### **Finding the old queen**

The first step is to find the queen to be replaced. If no queen excluder is fitted, she can be anywhere in the hive, or below the queen excluder in the brood box.

### **Tips for finding the queen**

- If a queen excluder is fitted, smoke the entrance to drive the bees up through the excluder, and then quickly remove the supers.
- From then on, use the minimum of smoke to control the bees so that they don't run to excess.
- Early morning, check the centre of the brood nest first.

Other times remove the second wall frame in the brood nest examine it, then the wall comb and box wall, place the two frames in an empty spare box examining each frame in the brood nest paying attention to the edges of the comb. If you don't find the queen the first time re-examine the combs until she is found including the sides and bottom of the brood box and two frames in the spare box. Once the queen is found she can be killed by squeezing her between your thumb and fingers and removed.

### **Putting the queen cage into the hive**

The new queen in the cage can then be placed into the hive in the mailing (queen) cage after first removing the cork or closure at the candy end only. This allows the hive bees to release the new queen from the cage.

The cage should be placed between two frames of brood in the middle of the brood nest with the candy end slightly upwards so if an escort worker bee dies in the cage the exit won't be blocked.

The hive bees chew through the candy in about two days by that time the hive bees should accept the new queen.

**Place the hive back together**

It's very important to leave the hive undisturbed for at least a week so the bees can release the queen. If you open the hive earlier the bees may kill the new queen.

After 10 days, check for the presence of the queen. If you can't see the queen, then look for eggs in the cells. If you see queen cells, then the introduction of the replacement queen has failed.

### **Introducing valuable queens**

Several methods can be used for introducing valuable queens such as breeders or A.I. queens. Two methods are outlined

Make up from a docile hive a nucleus hive consisting of three frames of brood, a mix of sealed and unsealed brood, covered with bees and a frame of honey, leave the nucleus hive in the apiary where it was made up for about ten minutes. This will result in the older field bees drifting back to the original hive. These are the bees most likely to kill the new queen. The nucleus is moved to a new location and the valuable queen introduced in the cage with or without escorts.

To introduce a valuable queen to a stronger hive, de-queen the hive. Place in the queen in the cage and put a cork over the candy end and leave for one or two days. Open the hive and remove the cork so the hive bees can release the queen. The extra time the cage is in the hive can help successful introduction.

### **Using queen cells**

De-queen the hive a day before placing the queen cell into the centre of the brood nest.

The cell hatches and in the next 10 days the queen will mate and start to lay.

This is a cheaper method but places a bigger check on the colony as the queen has to mate and the hive is brood less for an extra 10 to 12 days compared to re-queening with a mature queen. You must also have in place 10 to 20 drones' mother hives per 100 queens you wish to mate.

### **Re-queening a hive that has a drone-laying queen or has laying workers**

It's difficult to re-queen a hive that has a drone-laying queen or laying workers. It is best to unite these colonies after killing the drone-laying queen with a queen-right colony by placing newspaper between the two units. The bees will chew through the paper and become one colony.

### **Monitor progress of replacement queen bee**

After ten days, check the colony for signs of egg laying and adequate levels of hatching.

#### **Activity**

Ask your supervisor or advisor what they look for in their colonies that tells them that the new queen has been successfully introduced. Make a note below of what they tell you:

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### **Record keeping**

So that you can monitor the effectiveness of your queen replacement activities, you should keep some written records. The following are suggestions only:

- queen bee supplier – contact details, ordering procedure, cost of queens and discount for quantity, method of delivery
- queen – condition at delivery (e.g. healthy, damaged, dead)
- escorts – number and condition
- queen candy – quantity remaining and quality
- how long between despatch and receipt
- how long between receipt and introduction to colony
- reason(s) for requeening

- method of introduction (e.g. queen cage)
- observations after introduction
- observations after opening hive after 10 days.

**Activity**

Are there other things you think would be worth while recording?

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## Final activities and assessment

Now that you have completed all the activities in this Learning Guide, take some time to practice requeening a honey bee colony.

When you are ready, you can complete the assessment tasks that are listed in the Participants Assessment Workbook for this unit of competency.

## Useful references

*Bee Agskills: A Practical Guide to Farm Skills*, NSW Department of Primary Industries 2007

*The Bee Book: Beekeeping in Australia*, Peter Warhurst and Roger Goebel  
2nd edition Queensland Department of Primary Industries and Fisheries

*Commercial Beekeeping in Australia, 2007*, Frederick Benecke, Rural Industries Research and Development Corporation