The Kieler Mating Hive

Introduction

The Kieler mating hive is a low cost mini-nuc designed for queen rearing using fewer bees than would be used with a full sized nucleus hive. This has the advantage that for the same number of colonies the beekeeper can potentially either raise more queens or can leave more colonies in honey production and disrupt only a few hives for queen rearing. These instructions cover only the use of the Kieler and are not a detailed description of the process of queen rearing. There are a number of books covering the subject and we recommend the beekeeper looks at several before finding a method which suits them. Advice should also be sought from experienced beekeepers. Queen rearing is not difficult but there is a wide range of techniques and to avoid disappointing results the beekeeper should carry out as much research as possible before trying it themselves. The Kieler is robust but any damage can be filled with outdoor flexible filler – but test the filler first as some have solvents in them.

Initial Preparation of the Mating Hive

Although not absolutely essential (unless the hive is to be over-wintered) we recommend the exterior of the Kieler mating hive is painted. Exterior smooth masonry paint is the best, as recommended for our hives. This water-based acrylic paint is easy to use and long lasting. The only problem with masonry paint is it comes in large and thus expensive tins. It is possible to buy acrylic paint in smaller amounts from shops selling artists' materials and the retailer Games Workshop also sells acrylic paint in a wide range of outlandish colours. The paint can be thinned 25% with water and two coats applied. This will be easier and more economical if the paint is quite thick. Alternatively, any gloss or matt paint which requires white spirit to clean the brushes will work. Do not use the sort of paint designed for cars as the thinners in it will melt the plastic. Avoid painting the joint between the roof and the hive body otherwise the two will stick together even after the paint is dry. If this happens apply petroleum jelly to the surfaces. Some beekeepers paint their mating hives different colours and add patterns to aid the bees and especially the newly mated queens find their way back home but mating hives should also be placed facing in different directions and ideally have a distinctive feature such as a bush nearby to act as a landmark. Avoid placing the hives in a neat row all facing the same direction. The white metal disc should be fixed on the front of the hive after painting using the supplied stainless steel screw.

Top Bar Preparation

There is a short video on our website showing one method of putting a starter strip on the top bars using a small soldering iron to form a bead of wax but the strip can also be secured using a small paint brush dipped in molten wax. It is important to ensure the starter strips are well secured because if they fall out unnoticed when the bees are introduced the bees are very likely to build comb in all the wrong places. Such creativity is to be discouraged. The strips should be about 10 to 15mm wide although this is not critical and some beekeepers, instead of using a starter strip, simply melt wax into the groove in the top bar. Starter strips are more reliable and are recommended for beginners. Four top bars should be prepared for each mating hive.

Mating Hive Preparation

The 4 top bars should be placed in the hive and the food compartment filled with a suitable fondant. We recommend Neopoll as it contains pollen but other fondants can also be used. A sheet of polythene should be placed under the roof. Thin "freezer bag" polythene should be avoided as the bees will chew their way through it after a few weeks and then get trapped between the roof and the sheet. The waterproof membrane used by builders to go under concrete foundations is excellent but it needs to be cut to accurately fit over the hive as it is too thick to fold at the corners. A thick sheet can also have a small flap cut in it which aligns with the gap between two top bars. The flap can be square in shape with a cut made on 3 sides of the square and is used for the introduction of queen cells or virgin queens. The polythene sheet makes it much easier to remove the roof with minimal disturbance to the bees and also replenishment of the fondant can be done without exposing the bees if the sheet is gently folded back at the food compartment end only. The slide

underneath the hive should then be fully opened and the hive placed upside down ready to be stocked with bees. The entrance disk should be turned so that the sector with small holes is over the entrance. This will confine the bees and allow some ventilation.

Selecting and Introducing Bees

It is important to stock the mating hive with young nurse bees, excluding drones. There are a number of techniques for doing this selection but we will describe one method which has worked successfully for us. On a warm day put the brood box to one side on an upturned roof having found and caged the queen with some attendants to ensure she is safe. Place an empty brood box on the floor and then go through the old brood box and shake and brush all the bees into the empty brood box, replacing the empty frames back into the old brood box. Spraying the bees with water will help confine them in the new empty brood box but they will still try and escape so work quickly. If the hive has supers go through these as well and shake the bees on the super combs into the empty brood box as well. Place a queen excluder over the empty brood box, now full of bees, and then place the old brood box on top of the queen excluder. Replace the roof and any supers and leave the bees for about 2 to 4 hours, during which time the nurse bees will return to the brood through the queen excluder . Any drones will remain trapped below the queen excluder. A variation of this method is to ignore the bees in the supers and simply place the supers on the empty brood box under the queen excluder. The disadvantage of this method is drones will get into the supers unless a second queen excluder is used, although they can be shaken out later. The advantage of this method is you are less likely to harvest older foragers.

When the nurse bees have returned to the brood after a few hours they can be harvested for the mating hives. The bees will return to the brood quickly but a delay helps them settle. An empty box with a smooth interior is required and a cardboard box can be used but the interior joints should be sealed with tape. An alternative would be a large cool box.

Lift out each frame in turn and give each side a spray with water then shake and brush the bees on the comb into the box. Spray the bees in the box as necessary to stop them flying. Work quickly through the combs and harvest as many bees as are required. This will take experience but generally a single hive should yield enough bees for 4 or 5 mating hives. You can take nearly all the nurse bees from a colony and it will recover but the less you remove the less impact on the colony. If you have several colonies you may wish to consider stripping one or two and then uniting the stripped colonies with strong colonies. These augmented hives can be subsequently dismantled to make up full sized nucs using selected queens from the Kielers.

We have found 250ml of bees is sufficient for each mating hive and a light plastic cup or beaker of the right size is ideal. If you use too few bees the hive will struggle to keep warm enough for brood rearing. The technique is to use the cup to scoop up the bees and then quickly transfer them to the waiting hive through the opening in the floor which is then closed. Use the water spray in the box to keep the bees bunched together and prevent flying. Some beekeepers spray the bees with weak sugar syrup but we have not found this necessary. As the number of bees in the box reduces pick up the box and shake or bang it gently on the ground so the bees form a clump at one end into which the cup can be scooped. Nurse bees are docile so if at all possible avoid wearing thick gloves as it is important to maintain a good sense of feel so the minimum of harm is done to the bees. You do not want to be filling the mating hives with damaged and dying bees.

When closing the lower door do not push it fully home but leave it protruding so the front edge is level with the front face of the hive. In this position one of the slots in the door will be visible. This technique reduces the chances of the bees trying to chew their way out through the lower entrance which can happen if the door is completely closed. This is because the queen excluder slots in the door are very close to the lower entrance when the door is fully closed and the bees sense a way out through them and sometimes they form an escape committee to start tunneling.

Adding the Queen Cell

Some beekeepers add the queen cell straight after filling the mating hives and then leave them in a dark cool place for 4 days before taking them to the mating site, timing things so the queen will have emerged about 24 hours before the hives are moved. The technique we use is to add the queen cell after the bees have been in the hive for 3 days and then take them to the mating site the next day. The advantage of this is the queen cell will be more robust when it is handled

although it does require accurate timing as the queens are left until they are almost about to emerge. We use hair roller cages around the queen cells to ensure no early emerging queen kills the others.

When introducing the queen cell the aim is to lose as few bees as possible. A flap cut in the plastic sheet under the roof is a good idea but the method we use is to introduce the queen cell in the dark using a red light, which the bees cannot see.

The mating hives are kept in the dark for 4 days, during which time they should periodically be sprayed with a little water through the mesh in the floor. The bees will roar in panic when first confined but will calm down except when disturbed again for spraying. After the queen emerges the bees are usually noticeably quieter.

Mating

The mating hives should be opened at dusk about 24 hours after the queen emerges. Turn the disc so the largest hole is over the entrance. As mentioned earlier arrange the mating hives randomly around the apiary and ideally away from establish colonies, even if they are only the other side of the hedge from the main apiary. The hives should not be placed directly on the ground but should be placed on a smooth surface, such as a paving slab or piece of wood. A white plastic sheet, similar to the sort of thing used for varroa trays is very useful under the hive as it allows the beekeeper to check the debris falling from the hive. The roof will not blow off the hive but in exposed locations a weight may need to be placed on the hive to stop it all blowing away in gales – but this should be avoided as such a site is unlikely to be successful for queen mating.

In good weather you can expect to find eggs after about 10 days and the hive should not be touched before this period. When you first inspect do so only at dusk or early in the morning in case the queen is on a mating flight. Once the queen is laying the hive can be inspected during the day as normal. Mating can of course take longer in poor weather but if the queen is not laying after about a month she can be discarded.

Once the queen is laying the entrance disk should be turned so the two narrow slots are used. These look small but workers can use them readily and they prevent the queen leaving with a swarm. The lower entrance in the floor is not normally used but it can be tried if robbing or wasps are a problem.

Keep the food compartment topped up with fondant as the small colony will rapidly starve if poor weather confines them for a few days. When doing inspections always keep the combs in order and especially the one nearest the entrance as it is shorter than the others and other combs will not fit in this position.

The queen can be removed once she is laying and there is sufficient sealed brood to allow the beekeeper to check for a good laying pattern and the presence of any disease. Chalk brood is genetic and if found would indicate the queen should not be used. The appeal of the Kieler over smaller mating hives is the queen can be left for at least 6 weeks and if the upper body is used the small colony can be kept for even longer. As the queen cannot escape from the hive she could in theory be left in there indefinitely but we do not recommend this although we have not done any experiments to find out the upper limit of confinement. We would welcome feedback on the experience of others on this aspect.

Kieler colonies can be united using the upper body section but drawn comb will need to be trimmed down - a large pair of scissors is ideal for this. We have always united using a small sheet of newspaper with a few perforations, exactly as done for a full sized hive but it may be possible to unite if the bees are all sprayed with something like sugar syrup first although we have not done this ourselves.

Another advantage of the Kieler is the larger size makes it easier to find and catch the queen, something which can be very difficult with smaller mating hives as most adults have hands too large to fits inside the smaller mini-nucs. Young queens are generally very active and catching them can be fun. Practice catching and marking drones if you are not experienced and you may also wish to delay marking or clipping the queen until she has been in a full sized hive for a while during which time she will normally slow down a little and be less lively when caught. Never mark and clip queens in your car – there are too many places for them to hide if dropped.

Using the Queens

If you are raising queens to make increase we would recommend putting the selected queens into full sized nucleus hives in order for their performance to be further assessed and the colony gain strength prior to moving to full sized hives. We can recommend the Vince Cook method of making up nucs in which a double brood hive is split into several nucs which are arranged in a circle around the old hive site, facing inwards. The double brood colony can be created by uniting it with the colony which was stripped of nurse bees, as mentioned earlier.

Re-using the Colony

The Kieler mating hive can be used for a succession of queens. Once a queen is removed we would introduce a new queen cell at once, otherwise the bees will quickly start to raise their own queen. With established colonies it is more usual to introduce an already emerged virgin queen which can be introduced about 4 hours after the first queen has been removed. Most beekeepers simply run her into the hive but if you are concerned she may be rejected she can be confined in a queen cage which is pinned to the outside of the food compartment – using the face next to the last comb. The cage is plugged with a lump of soft fondant or queen candy (honey and icing sugar) and the piece of plastic broken off so the workers can rescue her.

If no queen is available the colony can simply be left to raise their own replacement assuming they have eggs or very young larva. We have found this a very successful way of maintaining the mating colony until it is needed again. The queens raised should not be used for breeding but will be adequate to sustain the mating hive.

Overwintering

Queens have been successfully overwintered in Kieler mating hives but the addition of an upper body, ideally filled with drawn comb improves the success rate. The bees can be fed for the winter with fondant or granulated sugar. Overwintered colonies will be ready for early queen rearing the following season but it may be necessary to manage expansion in the spring by cutting out comb and getting the bees to remake it. This will hold the colony in check.

Varroa Treatment

Bees in mating hives are not immune from varroa and a watch should be kept on the hive debris for mites. The initial colony should have a very low varroa count and in theory the colony could be treated with oxalic acid shortly after being made up in order to reduce the count still further but in our view the bees will be stressed enough at that stage. We recommend a thymol treatment but the volume of the hive is so small that it is very easy to overdose the colony – which is easily recognised as the bees will pour out of the hive and hang outside the entrance in a beard.

If using Apiguard smear about a level teaspoon on a bit of card and place it on the top bars. Api Life Var is easier to use in these little hives and about an eighth of one tablet placed in a corner will be sufficient. Over wintering colonies should be treated with oxalic acid and about 1ml of a 3.2% solution per frame gap should be sufficient. Any excess will fall to the bottom of the hive so overdosing with oxalic acid is unlikely.

Feeding with Syrup

Some beekeepers prefer to feed small mating hives with sugar syrup as they feel it encourages the bees to draw out the comb faster. However, we have never had a problem using fondant and the combs have always been drawn out in time for when the queen starts laying. The problem with syrup in the Kieler is the food compartment is tapered so a simple float will not work. We do not recommend syrup is used but if you do wish to try it we strongly recommend some sort of queen excluder is fitted to avoid the queen drowning. A slip of old zinc queen excluder can be cut to fit into the opening and pressed into the plastic to hold it in place. If anyone does crack the problem of feeding syrup in a Kieler please let us know how you did it! Suggestions have included a raft of floating vermiculite although we have not tried this.