

Grafting

"How To"

Things that are needed for successful grafting

- A good breeder colony to graft larva from
- Good lighting and good eyesight (help is available with both)
- A Chinese grafting tool of some sort
- Grafting larva of the proper age.
- A cell bar frame with up to 10 cell cups to transfer larvae into
- A warm, damp cloth and somewhere to sit



1- A good breeder colony

There are essentially two important criteria – the **age** and the genetic **quality** of the selected larvae.

You need to use **larvae** that are as young as possible, **perhaps 12-18 hours after hatching from the egg**.

The easiest way is to choose the **smallest** larvae possible from a frame containing brood in all stages.

Because the queen generally lays in rings you'll usually find the smallest larvae right next to the oldest eggs on the frame. Fresh eggs stand up from the bottom of the cell, older eggs lie horizontally. Look around the cells containing the horizontal eggs. Suitable larvae are the same size as an egg

These **larvae** are so small they haven't yet adopted the fully curved 'c' shape.

2- Good lighting and good eyesight

Suitable larvae are small and you need to be able to see them clearly. You need both hands free, so do not rely on a magnifying glass.

Buy a cheap head set or use strong reading glasses.

3- Grafting tools

There are all sorts of tools available for grafting, ranging from the cheap to the very expensive.

I prefer the cheap Chinese grafting tools.

4- Cell bar frame

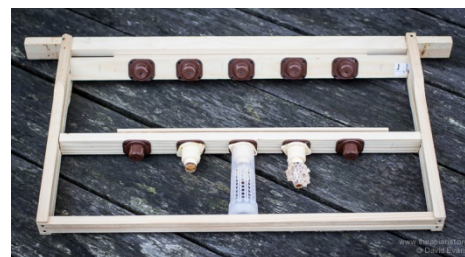
The cell bar frame consists of a standard brood frame with one or two cross-bars to which the cups for grafting are attached. You need to be able to easily access the base of the cups. Therefore either hold the cross bar in place with a single gimp pin at either end (so it rotates), or make the cross bars slot in and out of the side bars. As a hobby beekeeper I usually graft 5-10 larvae in 2 or 3 rows, because I can only have a limited number of queens mated at any one time. On a bigger scale you could easily graft 10-20 larvae in rows of five or ten.



Pick the right larva



Chinese grafting tool



Cell bar frame

5- Are you sitting comfortably ... ?

The goal of grafting is to move good larvae from the cell in which the egg was laid into a new artificial cell, without damaging or chilling the larva.

To do this you need to work quickly, carefully and efficiently. Find somewhere to sit near the donor hive that it is in light shade. Take a stool or folding chair to sit on and a piece of thin wood to lay in your lap on which the cell bar frame and the frame with larvae can be placed. Take off your veil and make sure the things you need are close to hand – a hive tool or scalpel, your grafting tool of choice, glasses and head torch. Lay a damp cloth across the board to keep both the frame with larvae and the grafted larvae in a humid environment

Next: Grafting in practice

How to use the Chinese grafting tool:

Moisten the blade of the tool, Most graftpersons just lick the tool to keep it clean.

Read the instructions below.

Practice on a few larger larvae until you get the hang of it.

You will see that some of the larvae on the frame have been given extra jelly—these are the ones that you want to graft (since they've already been chosen by the bees).

The extra jelly makes grafting really easy.

With a bit of practice, you'll be able to transfer a larva in a couple of seconds.

<p>Step 1: Quickly slide the tool straight down the cell wall so that the blade approaches the larva from the outside of its body curve. Do <i>not</i> push down on the plunger at this time.</p>	<p>Step 2: The blade will follow the curve on the rounded bottom of the cell and scoot under the jelly without disturbing the larva.</p>	<p>Step 3: Now pull the tool straight up. The jelly (and larva) will stick like glue to the blade.</p>	<p>Step 4: Hold a plastic cell cup in the fingers of your other hand. Push the tool down into the center of the cup until the blade is slightly bent. Now you push down on the plunger with your index finger to push the jelly (and undisturbed larva) off into the cell cup. With practice, you'll pull up slightly on the tool at the same time.</p>

Retrieve the acclimatised cell bar frame from the cell raising colony.

Don't bother putting anything in its place – you'll be returning it within 30 minutes or so (but do close the hive up).

Go through the donor hive until you find a frame with eggs and young larvae on it.

Avoid shaking the frame hard, so give it a gentle shake to remove the flying bees, then brush off the adhering nurse bees (again, don't push the frames of the donor hive together, but do close the colony).

Take the frame to the location where you're going to be grafting.

Arrange your glasses and head torch, the wooden 'table', damp cloth and cell bar frame.

Relax! Find a patch of suitable larvae ...

Which Larvae to pick: <https://youtu.be/fBxATFjDIBA>

Grafting video: <https://youtu.be/sM-80-H0rR0>

1. Arrange the donor frame with the top bar towards you – that way the cells also slope towards you making it easier to see larvae in the base.
2. Working calmly and efficiently, pick individual larvae and transfer them to the artificial cell queen cell cups on the bar frame.
3. As shown above slide the lip of the Chinese grafting tool underneath the larva, lift it out, lower it to the base of the new cell cup and release the larva by gently shoving it off the lip.
4. When you're not searching for suitable larvae from the donor frame keep it covered with the damp cloth. This way you minimise the chance of them drying out.
5. If you have trouble transferring a larva, if you end up rolling it around the cell cup, if it sticks to the side wall or if there's any doubt at all about it then flick it away, lick the brush again and choose another.



80% take



It probably takes 30-45 seconds per larva when they're easy to find. You can minimise this time by cutting down the wall of a row of cells and then working your way along the row, grafting each in turn. Don't worry if it takes longer. The more practice you get the more efficient you will become at finding and transferring larvae. An acceptance rate of 80-90% should be expected with a little practice.



Gently return the cell bar frame with the grafted larvae to the cell raising colony. Use no, or minimal smoke ...you want the larvae to be accepted straight away and fed with copious amount of jelly. Remember that the cell cups containing the grafted larvae must be vertical.

Don't forget to return the frame of unused larvae and eggs to the donor colony.

Did they work? – Check 24 hours later!

24 hours, after introducing them to the cell raising colony check whether the grafted larvae have been accepted. Open the colony with the minimum use of smoke, gently raise the cell bar frame and look for a 3-4mm wax 'collar' around the edge of the plastic cell cup. If you look into the cell there will be a good bed of Royal Jelly with the larva floating on top. Grafts that have not been accepted might have a thin trace of wax around the cup edge, but nothing like 3-4mm.

If the overall acceptance level is low consider grafting again straight away. There is no need to reacclimatise the frame, simply pull out the cell cups and replace them with fresh ones. You even know which frames have day old larvae in them ... they're the ones which had horizontal eggs yesterday.