

Ben Harden Method of Raising Honey Bee Queen Cells

A method of raising honey bee queen cells that uses a queenright colony and has particular features that are suitable for [Apis mellifera mellifera](#) strains of bee under the weather conditions encountered in Ireland.

Ben Harden's article has been published in several forms, the one that I have taken many portions of text from is the version that was published in [Bee Improvement](#), Issue nine of Spring 2001, using the title "A simple method of raising queen cells". The text has been adjusted for a worldwide readership and the illustrations have been redrawn for this web version, but in essence the information is Ben's. A [separate page](#) has been prepared that covers the design and manufacture of suitable dummies.

Ben runs a [beekeeping equipment](#) supply business in Ireland and is well known, he keeps bees himself and holds the NDB (National Diploma in beekeeping) as well as a raft of other beekeeping qualifications.

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An undeniable pleasure in beekeeping is handling a good colony of bees headed by a queen that you have raised yourself. Some beekeepers, unfortunately are deterred from queen rearing because they consider the procedures too complex. The following is an easy to manage method of getting from a selected larva to a [ripe queen cell](#).

The method is a development from a lecture and demonstration given by Dave Wilkinson, NBU apiary manager. The concept derives from a practice used by French royal jelly producers when employing queen right colonies. Gilles Fert and Harry Laidlaw describe very similar manipulations for royal jelly production and (queen) cell finishing.

The major advantage of this method is that it is a mere incidental manipulation of the colony chosen to start and finish the queen cells - any production colony is suitable for this purpose:-

1. There is no need to create a body of queenless bees which is inherently unstable.
2. The cell raising colony is as free to forage as it was before and its potential honey yield is not significantly affected.
3. If using a ["queen rearing"](#) kit to obtain the royal larvae and things go awry, there is no unnecessary disruption to what was to have been the cell raising colony.
4. The same colony can be used to provide the larvae and then rear them onwards into queen cells if so desired.

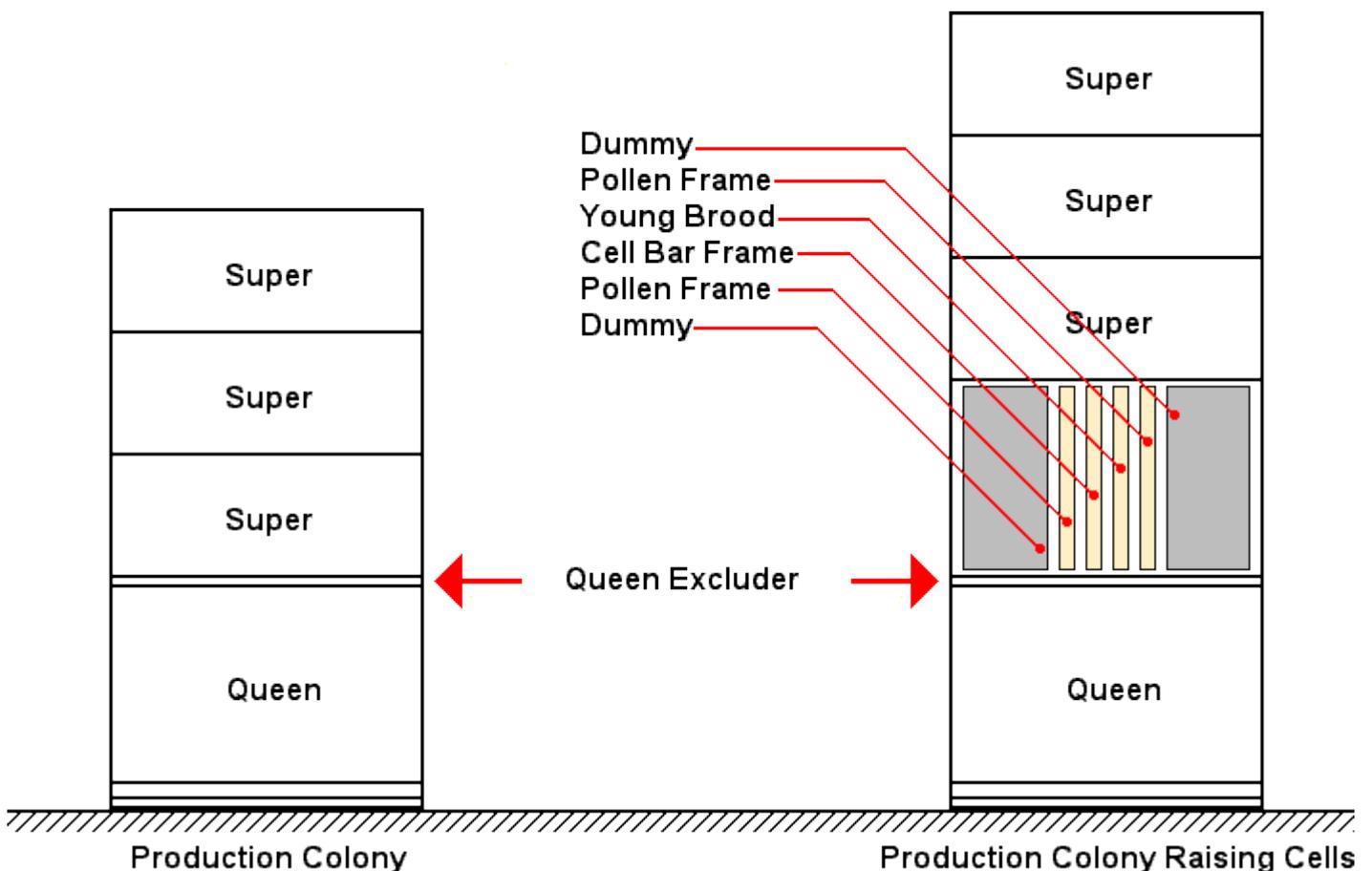
The French royal jelly producers use a double brood chamber with the queen excluder between the two brood chambers and with the queen confined to the lower box. At each routine inspection, frames of sealed brood are taken and placed above the excluder and once the bees have emerged the empty frames are put below again for the queen to lay in. When producing royal jelly the upper box is arranged with a frame feeder against the hive wall followed by a frame with pollen, a frame of young open (unsealed) brood, the frame of queen cells, a frame of open brood and sealed brood frames to fill the rest of the box. The royal jelly is harvested 3 - 3 1/2 days after the "grafts" were introduced.

Most Irish beekeepers use a single brood chamber or a brood and a half, so they could not directly copy the French. Another consideration is that differences in behaviour between bee races appear to be most marked when queen rearing. The use of a feeder when rearing queens is not generally practised with our black bees. [Perhaps it ought to be... Ed.]

The critical factors with this system are having most, if not all of a colony's pollen, young larvae and the "royal" cells altogether above a queen excluder. Two [multi frame dummies](#) are made so as to occupy all of a brood chamber apart from a central space for four frames. (Five if a frame feeder is needed) For ease of manipulation two 9 mm (3/8") short bars can be placed on one side of each dummy so that they match the position of a [Hoffman frame's wings](#). These spacers go against the brood chamber wall to give an all-round bee space.

The function of these dummies is merely to fill up space and as their sojourn in a hive is for a mere 10 to 11 days at a stretch they do not necessarily have to be made to precise dimensions or joiners' standards. It is of course essential that they fit within a brood chamber and once they are in place do not project out!

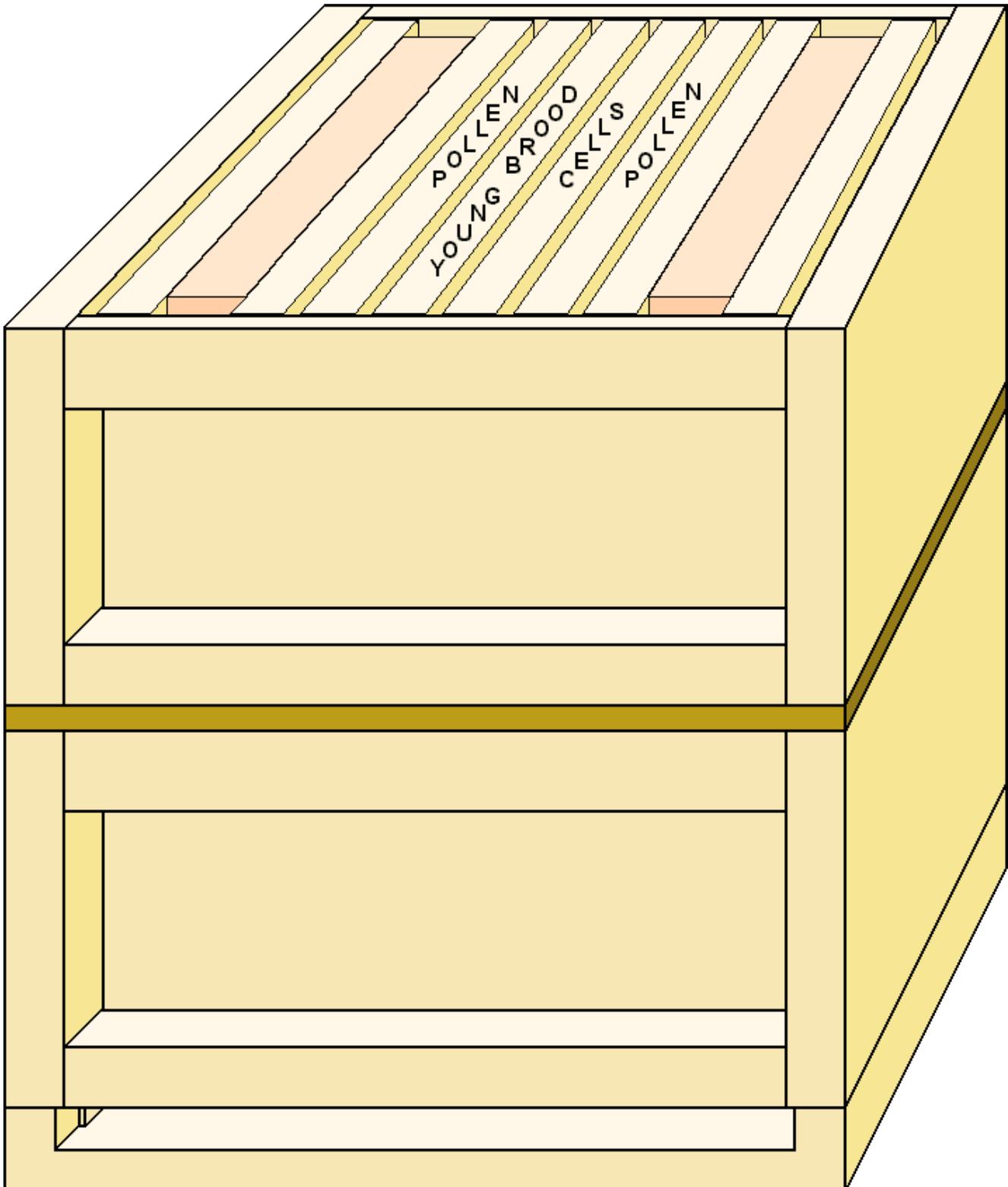
With the black bees of Ireland there is the need to "familiarise" the bees to the components before use so 2 to 24 hrs before the expected introduction of the "royal" larvae, the two multi frame dummies, a spare empty brood chamber, three spare brood frames (preferably of drawn comb) and the cell bar frame are taken to the chosen production colony. Which now becomes the cell raiser. The spare brood chamber is to be placed above the queen excluder and below the supers with the dummies one on each side. The empty "cell bar" frame is put into the four (or five with a feeder) frame space having been painted with syrup.



The bees will clean off the syrup and thereby "familiarise" the frame and cell cups in readiness for use. The three spare frames can either be inserted in the space left for later rearrangement when the royal larvae are introduced or they replace two frames of pollen and one frame of young larvae removed from the lower brood chamber of the rearing colony there and then it is not necessary to find the queen of the production colony. To ensure she is below the excluder merely shake the frames free of bees on removal. Worker bees will quickly come up through the excluder to tend the brood in these frames. The box with the dummies is set up to have a dummy, a frame of pollen, the frame of young larvae, the "cell bar" frame, a frame of pollen and lastly the other dummy. The

cell bar frame should be next to the pollen frame that has the most pollen. This sequence must prevail when the royal larvae are introduced and then queen cells will be drawn.

This illustration shows two wide dummy blocks and four frames in upper brood box.



The raising of queen cells in such a situation is observed in practice. The precise mechanism which permits this is not fully understood. There is some indication that the building of queen cells is inhibited by the secretions of the queen's Amhart glands, which are found in the last tarsal segments, this is called "foot print" pheromone. The queen excluder of course prevents the queen access to the cell bar frame so no foot print pheromone is present there. Once the queen cells are

sealed the raising colony does not swarm. This is also seen in traditional queen right cell finishing colonies. The queen cells are treated in a like manner to supercedure cells although the governing factors may not be identical. My practise is to leave the hive stack arrangement unchanged until the queen cells are ready for transfer to mating nucs eleven days on (fifteen days after the egg was laid). If desired the brood chamber with the queen cells could be placed higher up the stack once the queen cells had been started. Normal routine inspections of the full brood chamber should continue and the three full frames in the "cell rearing" box should be examined in case a queen cell has been raised on an older larva than those provided in the grafted cups. If allowed to hatch such a queen would kill her younger rivals... The ones you actually want and add a complication with a free virgin above and a laying queen below the queen excluder.

The production colony goes on functioning as before. The given cells are in a position where the house bees must pass by and the royal jelly producers come to, in order to get the pollen necessary in their diet. The dummies are a physical presence which concentrates the young bees into the surrounds of the cell bar frame. The net result is a good acceptance and the building of fine queen cells. Doolittle raised his queen cells above an excluder of a queen right colony. Some breeders and /or authors decry queen raising in a queen right colony. Consider however that is how the bees do it!

Little is written about "queen right" cell raising and that might be because it does not suit the large volume queen producers whose methods we tend to emulate. When using a "cell bar" frame carrying 20 grafts my success rate has been better in this queen right configuration as compared with a queenless cell raiser. This method does not have boxes "boiling" with bees as standard texts recommend, it is after all a production colony with ample space provided. Liu showed that it only requires 200 worker bees of the correct age to raise a fully formed queen. Any reasonable production colony would have many such bees, certainly plenty to raise sufficient queen cells for the majority of beekeepers working in Ireland.

To summarise the method... If a production colony's pollen supply, a frame of young brood and a frame of "grafts" are placed above the queen excluder and below the supers the larvae in queen cups will be reared to become queens. When using a single brood chamber, the incorporation of multi frame dummies in a second, temporary, brood chamber above the queen excluder gives the right environment for raising queen cells without any significant extension of the brood chamber and also this configuration does not adversely affect the potential honey yield of the colony concerned.

Ben Harden

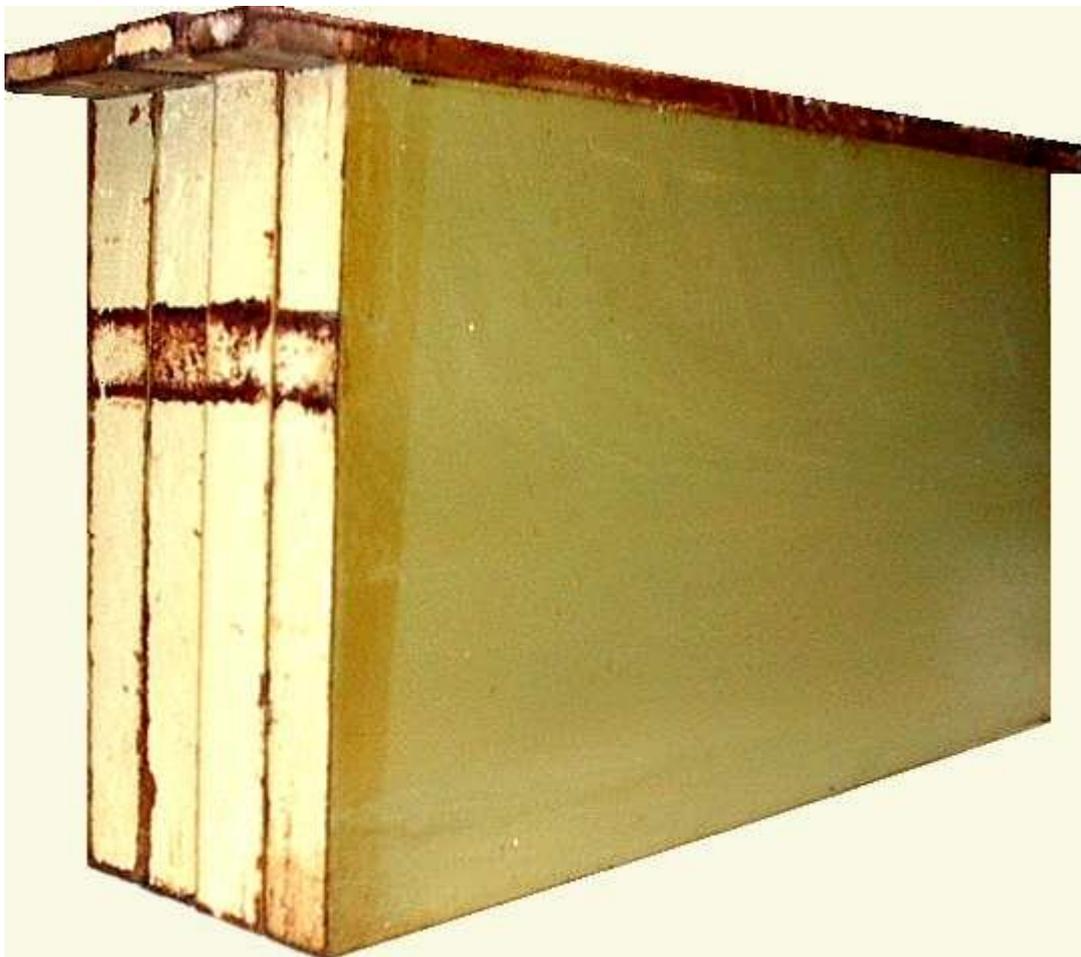
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Dummy Bee Hive Frames

Which Occupy the Space of More Than One Frame

In many cases... If there are several spaces, you can merely use a dummy frame for each space needed. Where more than one dummy goes into a box, I usually arrange the dummies in equal numbers either side of the occupied frames.



I have also filled

large spaces within hives using [division boards](#) made from skinned polyurethane foam, these have been placed in groups of three or four stacked flat together so that there are no gaps between them.

You will notice some propolis staining on the ends of the division boards in the photograph... Normally, as these devices are almost exactly the same size as the inside dimensions of a hive, the bees do not have access to the ends, but I used to have large quantities of [National ekes](#) that could be used in conjunction with an empty [National super](#) to form a box that would accept BS deep frames. Such an arrangement was often used by me to form nucs over the top of a queenright colony in much the same way as Ben uses for queen rearing.

As the super has it's own lug space the arrangement leads to the existence of a gallery at each side of the box that the bees have access to, hence the propolis staining seen in the photograph. the nucs that were formed by this method were usually three, four or five frames and so there were big spaces to fill up. had I not had these skinned polyurethane foam division boards available, I would probably have made block fillers rather like those that Ben uses.

I have made and used frame feeders that occupy the space of two frames, which gives considerably more than double the feed capacity, however I have never seen the need to make dummies of this two frame width or any other multiple of frame widths.

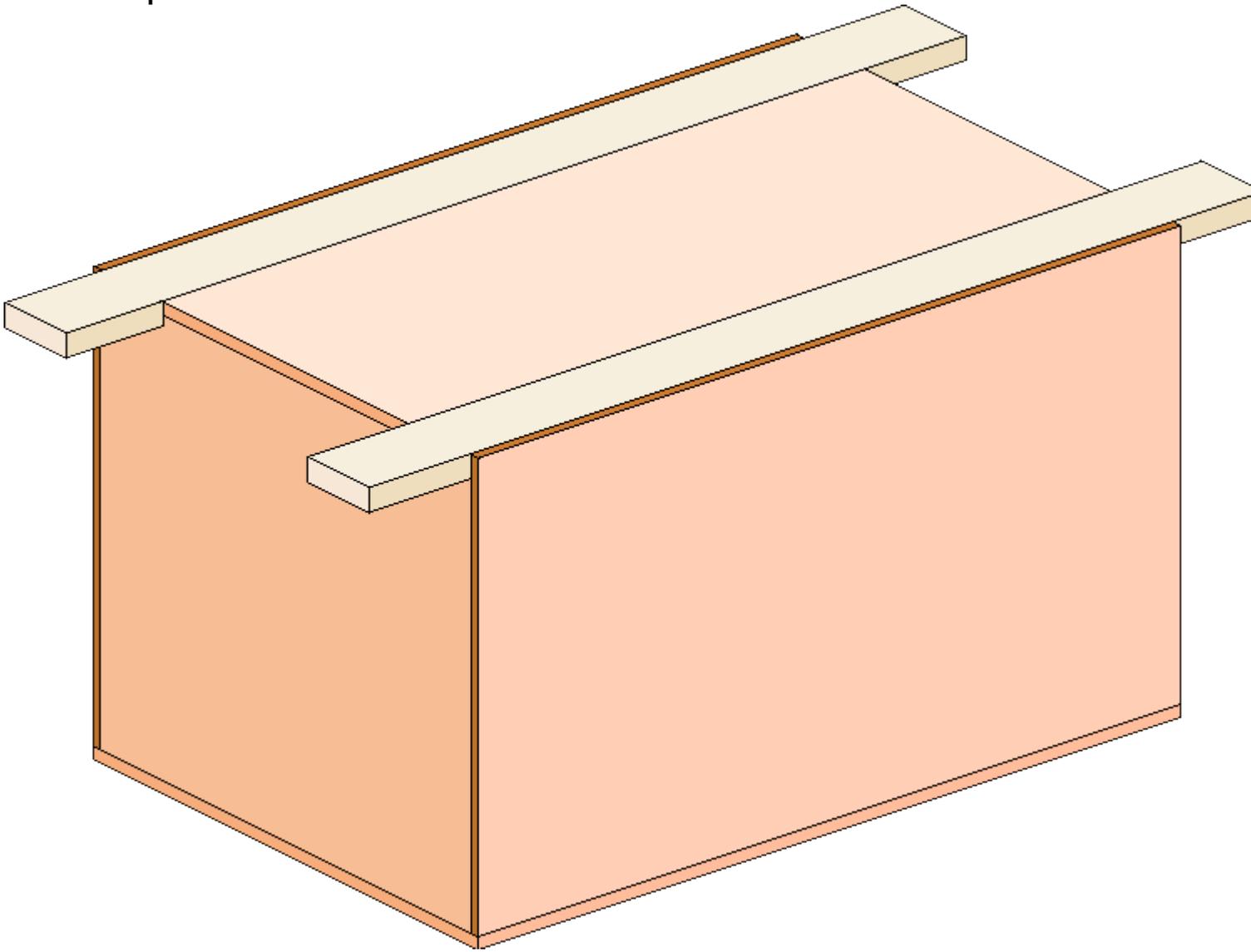
There is a case for using some special multi frame dummies in the method of queen right queen rearing that is practised by Ben Harden in Ireland. Ben himself describes these as items that can be simply made and that the dimensions are not particularly critical as they are only in use within the hive for ten or eleven days at a stretch.

My attitude is that if a piece of kit needs to be made at all it might as well be made to the best possible standards. However with Ben's method there is the possibility that provision of more liquid feed, directly alongside the frames used for the rearing process, may give better results. So I offer here a couple of designs of dummy frames that can be used to occupy unused space within a bee hive, to avoid the bees building wild comb. These have a secondary effect of concentrating the attention of the bees on to a small number of frames. The items shown will suit B.S. National bee hives (Ben himself uses Langstroth). Two versions are given here, the first being totally dumb and designed to fill the space of three and a half BS frames, the second is of similar 3 1/2 frame size, but incorporates a very narrow feeding space on one face.

There are several reasons for this feeder being very narrow and limited in capacity (about one bee space internally)

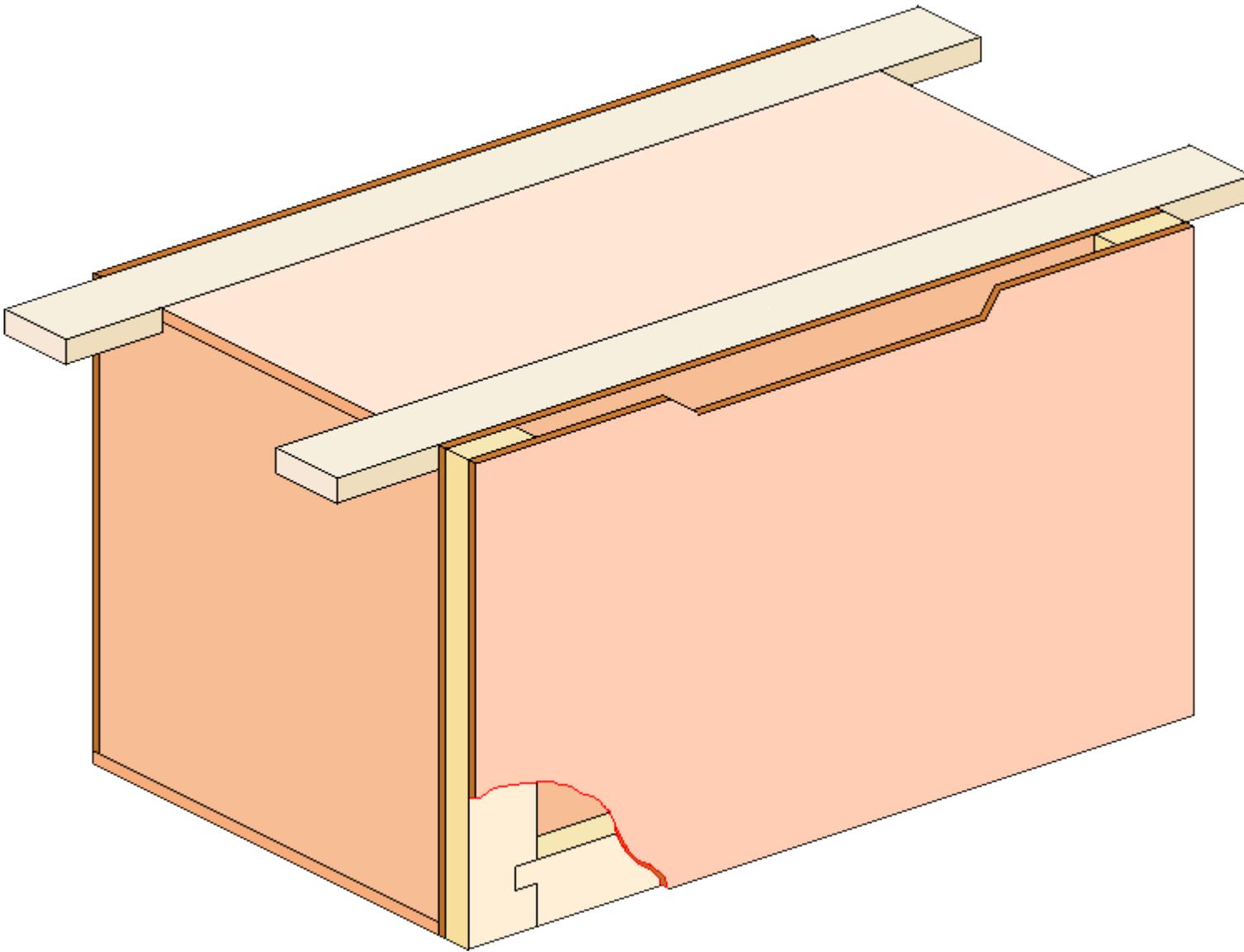
1. When raising queens I have a personal like of feeding honey at a dilution of 50%, and by limiting the amount of feed that can be held, this reduces the risk of fermentation.
2. The small surface area, when compared with the depth, reduces the evaporation of the water content and thus helps to avoid concentration of the feed and consequent crystallisation of sugars.
3. Ben suggests twenty grafted larvae can be raised by the bees, I am not going to differ, but as a 'belt and braces' man I want to have adequate feed available. Certainly in the area where I live the supply of nectar can shut down at the 'drop of a hat' and a bit extra is unlikely to go to waste.
4. Once such a narrow feeder has been emptied, there is no inclination for the bees to build wild comb in it.
5. If the occasion does not warrant feeding, the dummies can be placed with the empty feeder sections towards the outside of the hive, in which position they will be ignored and even if not ignored there is still no inclination for the bees to build wild comb in the narrow space.
6. A very narrow feeder like this does not require a float, as the bees can reach one vertical face or the other very easily.

The simple 'dumb' version



Construction details are left to the individual, as much will depend on materials already to hand. If I were making some I would use 432 mm long strips of hardwood 22 mm wide and 9 mm thick to make the hangers. The box would be formed using softwood strips 18 mm square, then panelled in plywood. The body of the box would have external dimensions 356 mm long x 133 mm wide x 215 mm deep, which would make it suitable for use in a National hive and it would take up the space normally occupied by three and a half frames. There would be a bee space all around, which would keep propolis and burr comb to a minimum, but as they would not be used for very long, any deposits would be small even if the dimensions were not exact.

The feeder version



A portion of the outer skin of the feeder is shown removed, in order that the interlock of the spacing ribs can be shown, such a technique helps to ensure that the feeders do not leak. The strips used would be 22 mm x 9 mm softwood as that material is always available in my workshop.

Construction should be similar to the simple version above, with the same external dimensions (including the feeder), but make the feeder first... Then add softwood strips to the rear face of the feeder to form the starting point for fabricating the box itself.