



Honey Bee Insemination: Drone Banking Cages

This article describes the specifications of a cage for banking drones for use in instrumental insemination of honey bee queens.



Drones in a banking cage

Instrumental insemination of honey bee queens requires the collection of semen from drones. In an effort to make the process of semen collection efficient, drones are often collected as they return from flights late in the afternoon. They are captured in drone banking cages and then placed in drone banks for a day or two to be cared for by the workers. The cages containing drones are then brought indoors for the semen collection process.

Drone banking cages (Image 1), while necessary, do not have to be anything special. The main idea is to trap the drones while allowing workers to care for them. Material found around the shop can be used, but a small amount of planning can make life a little easier.



Image 1. Two drone banking cages. Note that the cage on the left has the queen excluder material stapled onto the frame and the cage on the right has the material screwed onto the frame.

First, drone cage size. Using 1"x1" material, a cage width of about 6¼" wide is fairly ideal (image 2). Do you have pieces that are only 6"? Or are they 6¾", but you don't want to cut them down? Don't sweat it; this is an approximate measurement; anything in the vicinity will work just fine.



Image 2. Drone banking cage showing the width measurement.

The height of the cage is important (Image 3). If you plan on transporting or banking drone cages in a normal deep frame, you'll want the height to fit snugly into the frame. Because frame manufacturers vary in bottom bar and top bar thickness,

check the frames you are going to use, or typically use, to get that measurement. About 1/16" to 1/8" less than the inside-to-inside measurement of your frame is perfect. As long as it fits and drones can't escape, it's perfect.



Image 3. Drone banking cage showing the height measurement.

Note: At this point, you have both measurements for your queen excluder material. Plastic material is ideal as it's cheap, and most experienced beekeepers have some plastic excluders lying around that they don't use anymore. They can be cut with a utility knife, table saw, band saw, or scissors. Metal queen excluder material would also work, but it is more expensive and more difficult to cut.

For this project, 1"x1" wood was used. A 1" piece of soft wood can take a screw or nail pretty well (Image 4).



Image 4. Drone banking cage showing the depth measurement.

A couple of things to note:

Notice how the cork and hole are in the middle of the cage? It would be ergonomically better to put it closer to the outside. This will allow you to more easily hold the cage and put your index finger in the hole while collecting drones.

Drill a 3/4" hole (Image 5); big enough to put 2-3 drones through at once but small enough that a finger easily prevents those drones from escaping



Image 5. Drone banking cage showing the size of the hole.

Commercially available corks vary (image 6). A cork that is 5/8" at the bottom and 7/8" at the top will be 3/4" at the center, so the cork goes in enough to plug the hole but leaves enough sticking out to pull it out.

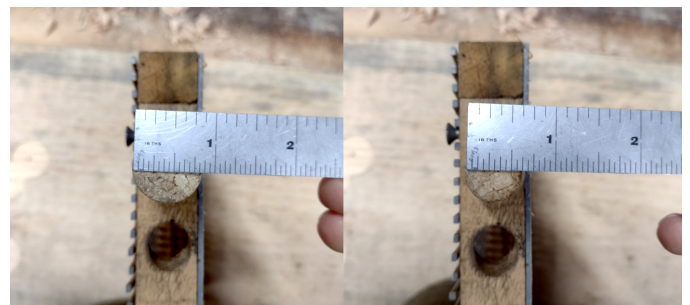


Image 6. Drone banking cages showing the measurements of various corks.

The cages should be made to fit securely into an empty frame (with the cork removed). You can secure the cages with rubber bands (Image 7).



Image 7. Drone banking cages affixed within a frame with rubber bands.

Alternatively, you can secure the cages with wires (Image 8). Prepare the frame by adding permanent wires on one side.

Then, wires can be added to the second side that can be used temporarily when banking cages are in place.



Image 8. A frame that is wired and ready to receive drone banking cages.

Use one wire on each banking cage's insert/removal side to make insertion and removal easy (Image 9).

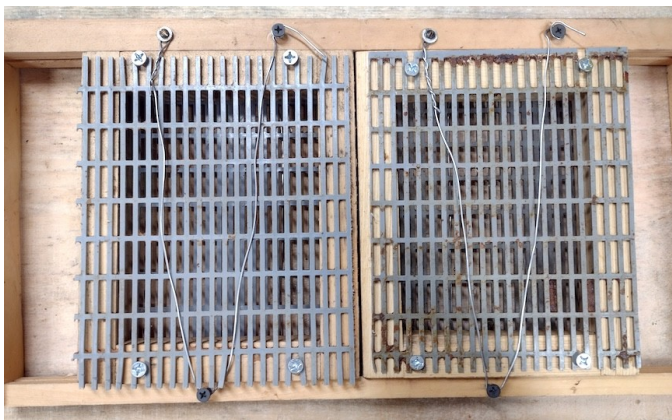


Image 9. Drone banking cages affixed within a frame with wires.

Once the cages are filled with 100–150 drones, they should be banked with workers who will care for them. Make up a portable bank by filling a five-frame nucleus box with two frames of honey and the adhering bees, one frame of open brood and the adhering bees, two banking frames with drone cages full of drones, and additional nurse bees shaken from brood frames. Note that a queen is not part of this recipe.



Image 10. A portable drone bank.

This method results in healthy and very active drones the following day. Be sure to add all of the elements noted here, or the banked drones will perish overnight. They require a lot of care.

Drones are captured, caged, and banked so their sperm can be collected for instrumental insemination. When you are ready to collect semen, remove a cage of drones, replace the cork, and bring the cage inside. Put the cage into a butterfly cage with a damp paper towel and some honey. Release the drones (Image 11).



Image 11. A butterfly cage containing drones for instrumental insemination work.

If you made a banking cage by stapling the queen excluder material onto the wood, the drones will have to be shaken out of the cage through the small hole. If, however, you secured the material using screws (Image 12), you will be able to open the entire side of the cage to release the drones. This is preferred.

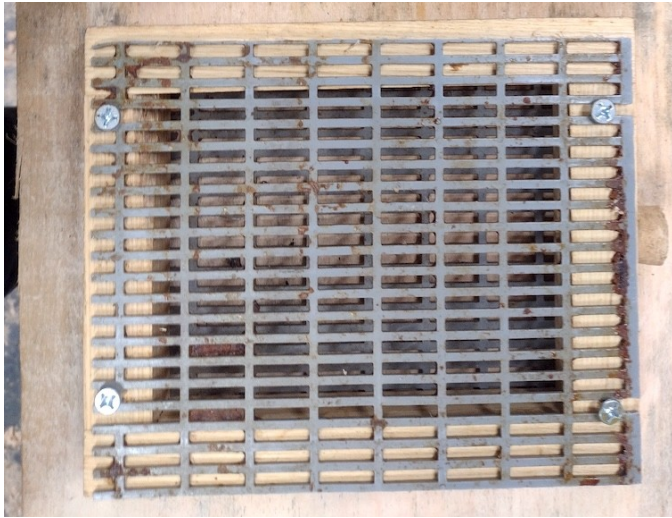


Image 12. Drone banking cage with one side that is removable for ease of release into the butterfly cage.

After you are finished using the nuc (nucleus colony) for drone banking, it makes the perfect booster for a cell builder or queen bank. As usual, be sure to put the brood frame in an accessible and identifiable location for subsequent queen cell culling.

PS: A few tips

- 1 Add a very small amount of honey to a paper towel and place it in the butterfly cage with the drones. Ensure the honey is folded into a damp paper towel; this gives the drones a drink of water and prevents them from getting stuck in the honey.
- 2 When you harvest your drone cages from your drone bank, make sure to carry a bee brush with you and give the workers sufficient time to escape. Flipping the cage and giving it a few light taps with the brush speeds it up. Workers should not be present within the butterfly cages.

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