

A Versatile Queen Rearing and Banking System

Part II-Conclusion: Use of the "Cloake Board" for Banking Purposes

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"Banking" refers to incubator or nursery colonies used to hold and maintain caged queens or maturing queen cells. The practice of banking allows efficient use of cell builders and flexibility in scheduling the queening of colonies. Banks are also used to hold virgin queens and drones for instrumental insemination.

Successful queen banking systems are generally queenless, though should contain brood. Support colonies are required to provide a continuous supply of young nurse bees and brood. Queens held in banks without brood tend to have higher injury and mortality levels. The presence of brood, especially developing larvae that require feeding, attracts nurse bees to care for the caged queens. Open brood will also inhibit the development of laying workers, which can occur in broodless banks.

A similar management scheme, as used for queen rearing, should be applied to banking. The Cloake board, described last month, can also be used to establish flexible and self-sufficient banking systems. Banks are often used for temporary storage. Use of the Cloake board allows colonies to be quickly converted into banks or placed back into production, as needed.

INCUBATING QUEEN CELLS

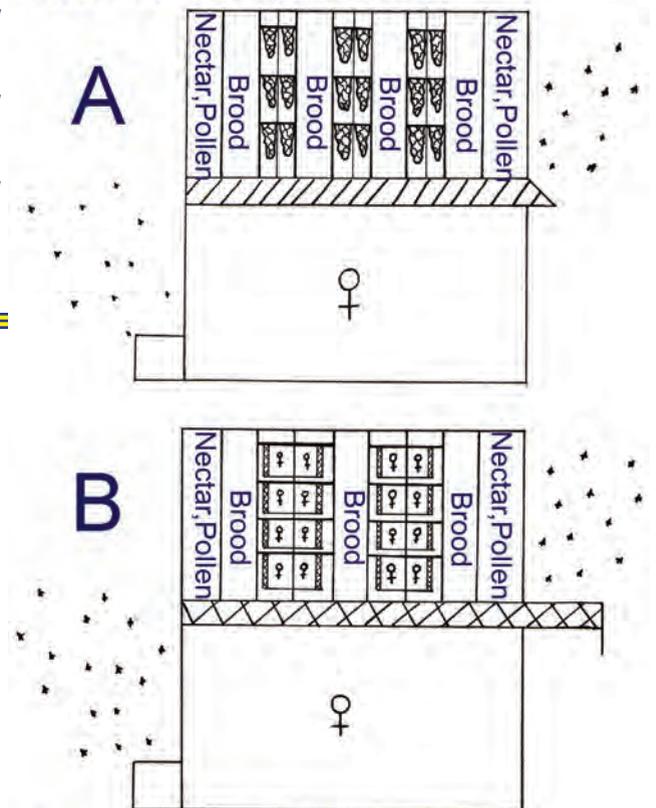
To use cell builders efficiently, capped queen cells are moved to an incubator colony to mature. A cell builder can support a new graft of queen cells every 4 days. As soon as the developing queen cells are capped, these are moved and another graft of cells started. Needing only warmth to mature, capped cells are held in nursery colonies until they are ready for introduction into mating nuclei.

Removing capped queen cells helps maintain a high acceptance level in the cell builder. When an older graft is already present in the cell builder, acceptance of a second, younger graft is often reduced. Maintaining the high feeding demand of open queen cells also helps to keep the brood food glands of nurse bees in production.

Several hundred capped queen cells can be held in an incubator colony, if this is kept strong. Colony strength, weather conditions and seasonal considerations will determine the number of cells that can be incubated. Early in the season, developing cells should be protected against cold nights. Provide wind blocks and reduce the top entrance to maintain heat. A heater can be placed beneath the colony if necessary.

Capped, maturing queen cells can simply be held in a queen-right colony above an excluder. The slide insert is not necessary,

Queen Cell Nursery, No Slide



Queen Bank, Slide In

Fig. A: Banking Capped Queen Cells In a Nursery Colony: The Cloake board with an excluder is used to confine a laying queen to the bottom box. Workers have free movement between boxes.

Fig. B: Banking Caged Queens In a Nursery Colony. A laying queen is excluded to the bottom box and the Cloake slide is kept in place to create a queenless condition. Young brood is rotated up.

Drawing by Juan Castro

as free movement of workers through the excluder is desirable in this situation. Use of the Cloake board eliminates the confinement of drones by providing an upper entrance for bee traffic. However, if located near a large mating yard, the risk of a virgin moving into the bank is possible.

To provide warmth and attention from nurse bees, brood should be placed next to the queen cells. Rotate frames of brood up into the top nursery box and empty comb down to provide space for the queen to lay. If young open brood is moved up, routinely check these frames for development of rogue queen cells. Be sure to remove the frame of queen cells before they are due to emerge. An emerged virgin queen can destroy many cells.

Developing queen cells are fragile and easily injured by shaking, rough handling and temperature extremes. This is more critical in the earlier stages of development. Take care to brush bees off the queen cell frames, rather than shake these. Provide warmth, such as a hot water bottle, for transport.

Nurse bees are very attentive to capped maturing queen cells and continuously work the wax. They will tear down injured, diseased and non-viable cells. When the cells are close to emergence, the bees chew the wax cap of the cell leaving only the cocoon. This is an indication the virgins will emerge soon. For these reasons the care of queen cells in a nursery colony is preferred over the use of an electric incubator.

BANKING VIRGINS AND MATED QUEENS

The banking of queens can be of value in certain situations. A new batch of queens arriving during bad weather, or to be placed in distant apiaries, can be temporarily banked. Older queens from de-queened colonies can be held in waiting until the arrival and/or acceptance of new queens is assured.

Caged queens should always be banked in a state of queenlessness. Worker bees will be aggressive toward the caged queens in the presence of a laying queen, including one that is restricted or placed below an excluder. This often results in injury and high mortality of the caged queens.

To establish a self sufficient "queenless" banking system using the Cloake board, the slide insert is kept in position. A state of queenlessness is maintained in the top box. The presence of a laying queen in the bottom box, separated by the slide, provides a source of young bees and brood.

Frames of eggs and young brood are rotated up, eliminating or minimizing the need for support colonies. It is essential to maintain a high population of young nurse bees around the caged queens to ensure these are well fed and receive proper care. Older bees are aggressive toward caged queens and their brood food glands are atrophied.

Nursery colonies should be fed syrup and pollen to assure food resources are plentiful. Capped honey should be removed and replaced with open nectar and foundation. A sheet of wax foundation will prevent webbing, stimulate wax builders and provide a place to store nectar. Queen cages can also be supplied with bee candy.

A key factor in the success of banking is to maintain a high population ratio of young nurse bees. Using the Cloake board, the colony can be pivoted, to either boost the population or reduce the number of older bees in the top box, depending upon need. When using this technique, be sure adequate bee strength is maintained in the top nursery chamber.

BANK QUEENS OF UNIFORM AGE AND RACE TOGETHER

Bees recognize and discriminate age, reproductive status and the degree of relatedness among themselves. Resident bees in the

nursery colony will preferentially care for queens more closely related to themselves. They will also favor mated queen over virgins. Queen pheromone levels are more developed in mated queens.

For these reasons, do not bank queens of different reproductive status or of different ages in the same colony. Make a separate bank for virgins, a separate bank for newly mated queens and a separate bank for older queens. Mixing these is often fatal to one group of queens.

Queens of unrelated stocks or different racial backgrounds should not be banked together. The bees in colonies used for banking should also be of similar genetic background. For example, do not bank Carniolan queens in a colony of Italian bees. Preferential treatment occurs and will influence the quality of care provided. The aggressive behavior by resident bees can cause severe injuries and high mortality of caged queens.

MINIMIZE THE DURATION OF BANKING

The banking of caged queens, while offering advantages and providing convenience, is a practice that should be limited to a brief period of time. Queen confinement is an unnatural situation and worker bees are often aggressive towards multiple, caged queens.

Injuries to queens can result in chewed tarsal pads, missing legs and wing parts. These injuries may reduce acceptance and cause

premature supersedeure. Queens with injured arolium (tarsal pads), tend to fall off the comb when removed from the colony and examined by the beekeeper. The insufficient production of queen footprint pheromone, which functions to inhibit the construction of queen cells, may contribute to supersedeure.

There are many types of queen cages and some designs offer more protection in preventing injuries. Use of cages with a tight weave screen and a covered area inaccessible to worker bees may help prevent injuries, though the reduced access to worker bees restricts feeding. It is advisable to provision queen cages with bee candy.

Queens held in cages tend to lose weight and may receive an insufficient diet. Queens can survive for many months in a banking situation, though this is not advisable. Queen performance is often reduced after long-term banking, and may negatively affect fertility.

The common practice of banking queens for an instrumental insemination program has been shown to have detrimental effects. Much of the unfounded reputation for poor performance of instrumentally inseminated queens is due to this practice. Queens confined after insemination store less sperm and are subject to injury.

Banking is a practice that should not be routine, but rather used as an emergency measure. For good results banks must be maintained much like cell builders, with lots of nurse bees and ample food stores. The quality of the bank and length of confinement will determine the care given.

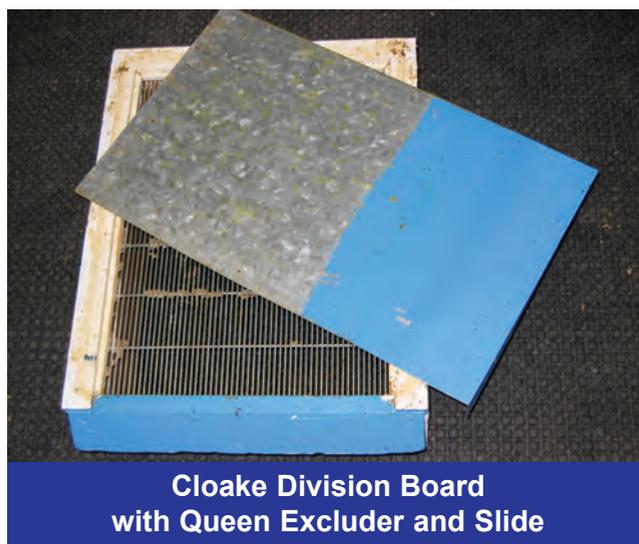
ACKNOWLEDGMENT

I thank Juan Castro for drawing the diagram.

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Cloake Division Board with Queen Excluder and Slide