A New Method of Queen Rearing without Grafting Larvae

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As is well known, a mated queen lays 1000 to 2000 eggs per day, and most of them will develop into workers. The cycle of duties an emerging worker passes through is predictable and regular. However, when the mated queen gets older, her fecundity drops sharply, and the worker population will dwindle. Thus, some beekeepers replace each colony's queen every year.

How can a beekeeper raise queens? For a long time, queen rearing has relied largely on grafting larvae by hand, using grafting needles to remove small larvae which are 1 day old from a nest to a cell bar (with queen cells on it). Then, the cell bar is placed in a cell frame and put into a cell builder hive. Before the virgin queen emerges, beekeepers take out the queen cells and put them into a mating nucleus hive or a queen-storing cage, where the queens emerge. This procedure costs much time and effort. It is not only labor intensive, but is also restricted by the availability of larvae and the eyesight of the technician. Therefore, it is imperative to invent a new method of queen rearing without grafting larvae.

To solve this problem, we have designed a set of devices to raise queens without grafting larvae based on the biological characteristics of honey bees.

The brief procedure is as follows:

1. A special plastic comb foundation with a vertically raised piece of plastic along with the edge of each equal hexagon on it (Figs. 1 and 2 show the front and back, respectively, of this foundation), a single queen cell with a round opening at its base (Fig. 3), and a supporting larva device matched in size to the aforementioned queen cell should be manufactured. The front side of the comb foundation has evenly aligned cell bases which are either solid, or have round openings (are hollow), and these solid and hollow cell bases are arranged in alternate lines. The round opening at the queen cell's base is the same size as that of the cell base of the plastic comb foundation. The underpart of the supporting larva device is cylindrical, the size of which is the same as the round opening at the base of each queen cell and the round opening of the cell bases on the comb foundation. The supporting larva device can be perfectly matched with the hollow cell base on the comb foundation or the single queen cell with a round opening at its base. Each pair of these objects (except for the hollow cell base and the single queen cell) can be assembled together without gaps.

2. Each cylindrical object of a single supporting egg/larva device should be inserted into the round openings on the back of the plastic comb foundation (Fig. 2), and then a layer of beewax should be applied to the cell bases on the front side of the comb foundation (Fig. 1). We then put this comb foundation into a colony, allowing bees to secrete wax to build the comb.

3. The built-up comb from the

Fig 1. The front of the special plastic comb foundation (A: The hollow cell base B: The solid cell base)

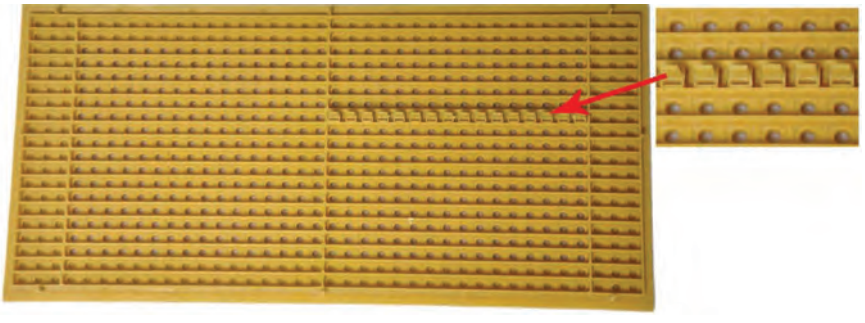

Fig 2. The back of the special plastic comb foundation (The hollow cell base on the back of the comb foundation can be match with the supporting larva device)

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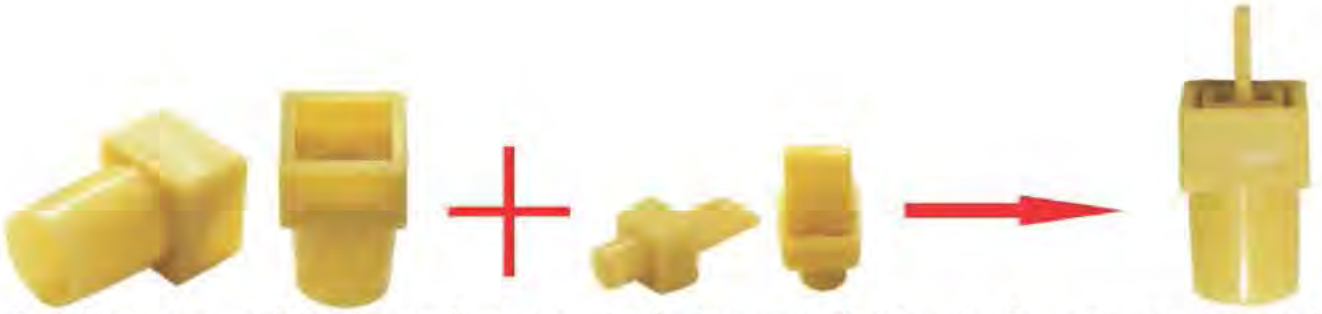

Fig 3. The queen cell (The queen cell consists of a single queen cell with a round opening at its base and a supporting larva device matched in size to the aforementioned queen cell while the supporting larva device also can be perfectly matched with the hollow cell base on the comb foundation, just as Fig 2).

aforementioned comb foundation is then put into a colony. A queen is then restricted to laying eggs in this comb, and is removed after 24 hours. After the eggs in the comb hatch into larvae, we pull out the supporting larva devices which now have a larva on each of them, and then insert each of them into the round opening of each single queen cell. This makes up a new queen cell, each of which can be wedged in a queen-cell-bar with several equidistant notches on its side (Fig. 4). Subsequently, the fully filled queen-cell-bar is wedged in a queen rearing frame which is then put into the colony to be further looked after by nurses (Fig. 5).

4. 1-2 days before the emergence of queens, we disassemble each cell cup from the queen-cell-bar, and put each of them into each mating colony. Or alternatively, we put three queen larvae loaded queen-cell-bars into a queen storing cage for the emergence of queens.

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Fig 4. Queen-cell-bar

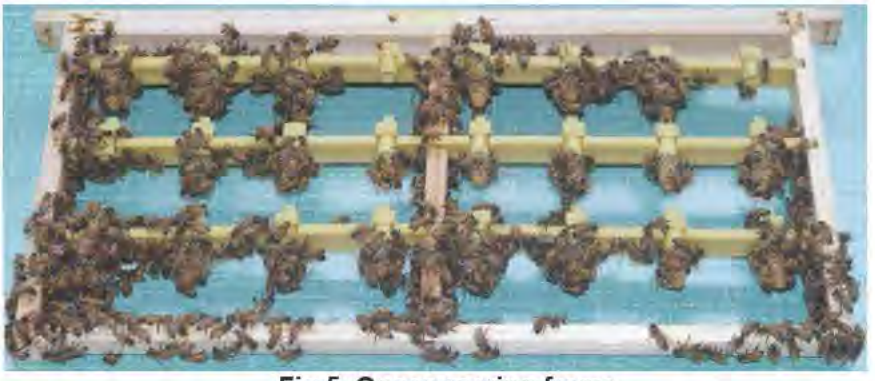

Fig 5. Queen rearing frame