A NEW METHOD OF ROYAL JELLY HARVESTING WITHOUT GRAFTING LARVAE[1]

Xiao-Bo Wu,[2] Fei Zhang,[2] Cui Guan,[2] Qi-Zhong Pan,[2] Lin-Bin Zhou,[2] Wei-Yu Yan,[2] and Zhi-Jiang Zeng[2]

ABSTRACT: Royal jelly (RJ) is an important bee product and one of the major income sources for beekeepers. For a long time, harvesting royal jelly has largely relied on manually grafting larvae by using grafting needles to remove young (~1 day old) larvae from a colony to a cell cup. Then, frames of cell cups with the removed brood are placed in productive colonies in a timely manner. Grafting larvae is the first and most difficult step in the process of harvesting RJ. Moreover, the process is time-consuming and labor-intensive. It needs not only effort, but is also restricted by the availability of larvae and the eyesight of the technician. Low efficiency strongly limits the development of royal jelly production. To improve the hardest step in harvesting RJ, we have invented a new method of harvesting royal jelly without grafting larvae. Our results show that the method is feasible and improves the production of royal jelly.

KEYWORDS: honeybee, royal jelly, without grafting larvae

Royal jelly (RJ) is an ivory-white or flaxen-colored mixed secretion of the hypopharyngeal and mandibular-gland of nurse honeybees. RJ is a highly nutritious food for queen bees and larvae of all castes of honeybees.

Royal jelly is also utilized as a preventive or supplementary medicine against some diseases. However, the output of RJ in many countries is very low, as procedures for harvesting royal jelly are very complex and include grafting larvae, cutting down the protruding part of a queen cell, handling brood, etc. (Zeng, 2009). This complexity discourages beekeepers from harvesting royal jelly, and an improved method for RJ harvesting will solve this problem.

We have invented a non-grafting technique in beekeeping and have successfully applied it in rearing queens (Zeng et al., 2011; Pan et al., 2013). Now we can also use it to harvest RJ without grafting larvae based on the biological characteristics of honey bees. The brief procedure is as follows:

1. A special plastic comb foundation, supporting larva devices and plastic cell cups with a round opening at each base is manufactured. The special plastic comb foundation has been reported by Pan (Pan et al., 2013), Figs. 1 and 2 show the front and back of this foundation, respectively. The supporting larva device with 16 under-parts can be matched in size to the round openings of the special plastic comb foundation (Fig. 2 and Fig. 3). The round opening in each cell cup's base is the same size as that of each cell base of the plastic comb foundation. So, supporting larva devices can also be perfectly matched with round openings of cell cups (Fig. 4).

[1] Received on March 31, 2014. Accepted on July 8, 2014.

[2] Honeybee Research Institute, Jiangxi Agricultural University, Nanchang 330045, P.R. China. Corresponding author E-mail (ZJZ): bees1965@sina.com.

Mailed on February 5, 2015

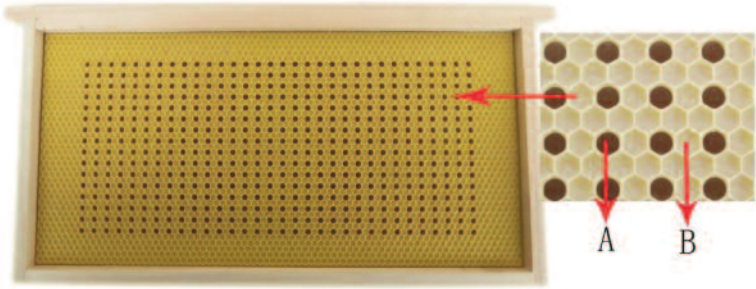

Fig. 1 – The front of the special plastic comb foundation (A: The hollow cell base, B: The solid cell base)

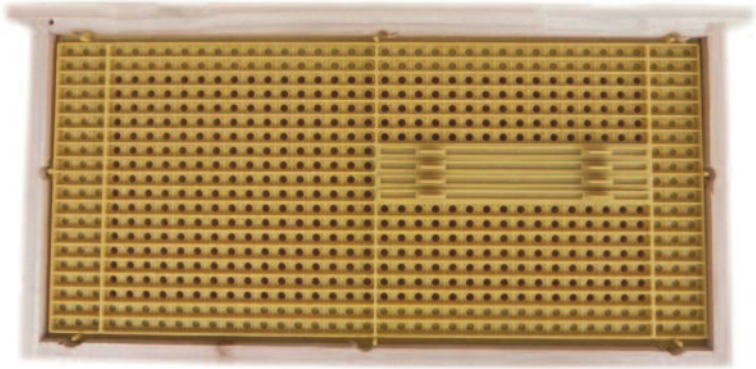

Fig. 2 – The back of the special plastic comb foundation (The hollow cell base on the back of the comb foundation can be matched with the supporting larva device)

Fig. 3 – The supporting larva device (The supporting larva device with 16 underparts can be matched in size to round openings of queen-cell cups and the hollow cell bases on the back of comb foundation, just as in Fig. 2 and Fig. 4 C)

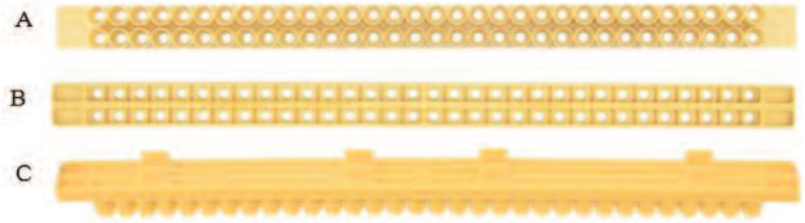

Fig. 4 – The plastic cell cups (A: The front of the plastic cell cups. B: The back of the plastic cell cups. C: the plastic cell cups with supporting larva devices)

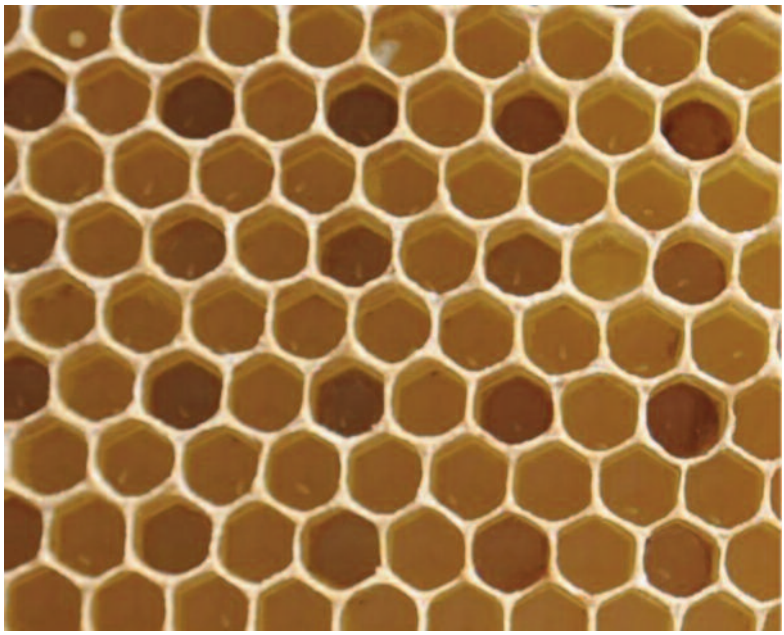

Fig. 5 – The comb with the special plastic comb foundation

2. The supporting larva devices are inserted into the round openings on the back of the plastic comb foundation (Fig. 2), and then a layer of bee-wax is applied to the cell bases on the front side of the comb foundation (Fig. 1). Then we put this comb foundation into a colony, allowing bees to secrete wax to build the comb, so a queen can lay eggs in cells (Fig. 5).

3. The built-up comb from the aforementioned comb foundation is then put into a colony. A queen is then allowed to lay eggs in this comb for 3 days. Once most nests have an egg or larva (Fig. 6), we pull out the supporting larva devices and remove the eggs. The supporting larva devices without eggs are inserted into the comb again and a queen allowed to lay eggs in this comb for 1 day. After the eggs on the supporting larva devices develop into larvae, we pull out the supporting larva devices which now have a larva on each underpart, and then insert them into the round opening of the plastic cell cups. Subsequently, the frames of plastic cell cups with larvae are placed within the productive colony to extract RJ (Fig. 7). At the same time, new supporting larvae devices are again inserted into the comb and these can continue to provide harvesting royal jelly every 3 days.

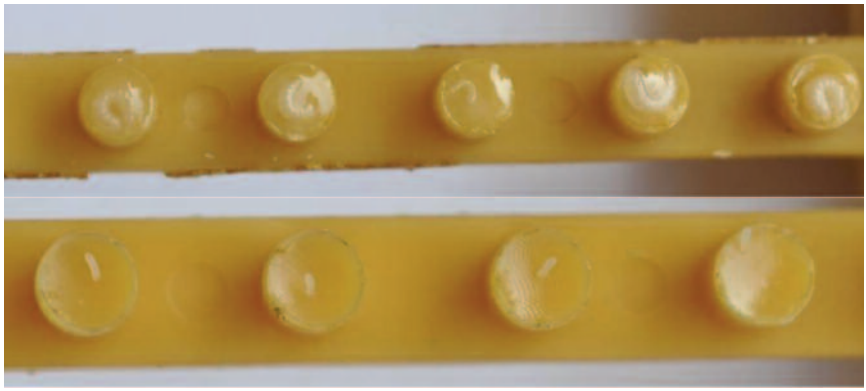

Fig. 6 – The eggs and larvae on the underparts of the supporting larva device

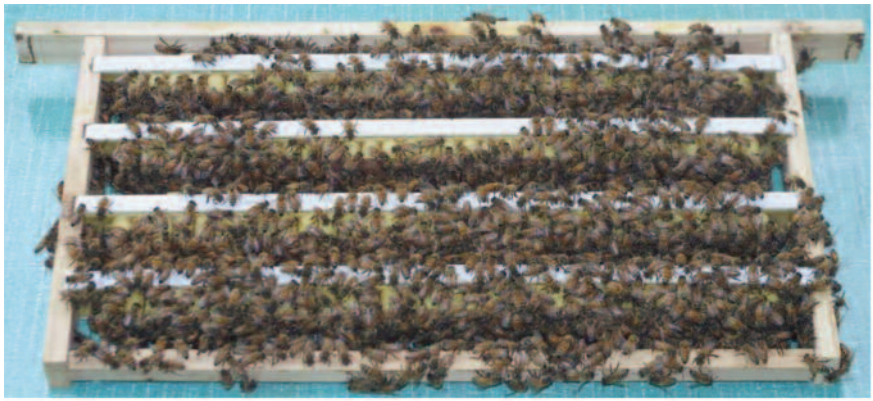

Fig. 7 – The frame of queen-cells with larvae brooded by nurses

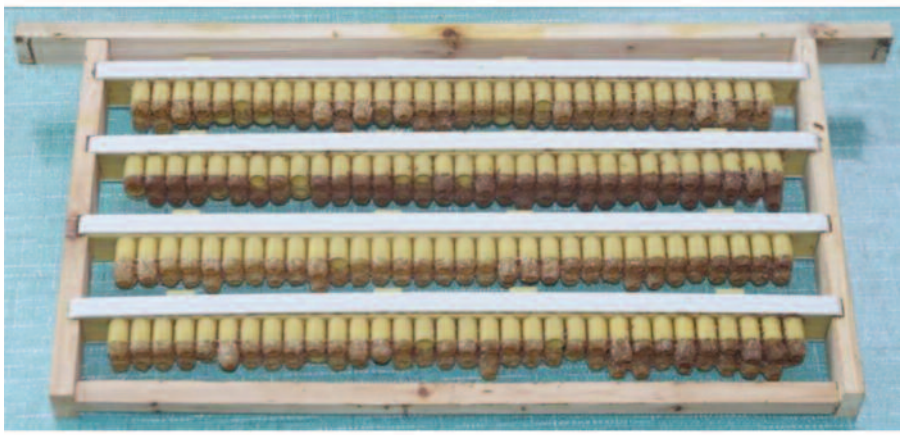

Fig. 8 – The queen-cells accepted by nurses

4. RJ can be extracted 68-72 hours after the frames of plastic cell cups are put into the productive colonies (Fig. 8). Our results show that most cell cups with larvae would be accepted by nurse bees, which indicates the success of this method.

ACKNOWLEDGMENTS

This work was supported by the earmarked fund for China agriculture research system (No. CARS-45-KXJ12), the 555 talents project of GanPo of Jiangxi Province and the Science and Technology Support Program of Jiangxi province (No. 20141BBF60033).

LITERATURE CITED

Pan, Q. Z., X. B. Wu, C. Guan, and Z. J. Zeng. 2013. A new method of queen rearing without grafting larvae. American Bee Journal 12: 1279-1280.

Zeng, Z. J. 2009. Apiculture. Chinese Agriculture House.

Zeng, Z. J., X. B. Wu, Z. L. Wang, F. Zhang, and W. Y. Yan. 2011. A bionic apparatus for royal jelly production that requires no larvae grafting. Applied Patents, China. Patent # ZL 20112046 7304.0