

## Original paper

## Hives jacked up to encase Japanese honeybee (*Apis cerana japonica*) open space nests

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ニホンミツバチ開放巣群の取り込みにおける自動車用ジャッキの利用

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**Abstract:** To capture Japanese honeybee (*Apis cerana japonica* [Hymenoptera: Apidae]) open space nest colonies in trees, we devised an easy-to-make apparatus to minimize damage to the nest and agitation of the bees. With this, likely also applicable to other honeybee species, we succeeded in two cases as reported here. The main work was done in less than an hour during the daytime, but we waited until sundown to move the captured colony to the apiary, as follows. (1) Under the nest was placed a box hive, with the top cover removed, and mounted on the tabletop of the apparatus comprising a manually handled screw car jack. (2) The hive was jacked up to enclose the nest to be fixated with skewers pierced through the hive walls. (3) The nest was cut off at its top. The hive was slowly lowered, and the top cover was replaced. (4) The remnant bees left uncaptured and balling under the tree branch were scooped and released at the hive entrance. They entered it, indicating successful capture of the queen in the hive. (5) We kept the entrance open until sundown when the worker bees returned from outside activities. In the dark we closed the entrance, and moved the hive to the apiary.

**Keywords:** Japanese honeybee, *Apis cerana japonica*, open space nest, capture, box hive, device, apparatus

The Japanese honeybee (*Apis cerana japonica*) usually nests in closed space, e.g. the tree hollow. Today in suburban as well as urban areas in Japan, where large trees with hollows are scarce, they sometimes nest in open space. In Hirakata City, Osaka, for example, about 10% or 25 out of 249 nests removed as unwanted were in open space (Sugahara 2005). Such colonies are mostly terminated with insecticides, although it is desirable to capture and move them to appropriate apiaries. Even in rescue operations, however, the procedures often greatly damage the nest, as the vertical combs are cut, held in human hands, and moved into the hive one by one, while the bees are sometimes captured even using vacuum cleaners. The often prolonged and rough handling agitates the bees. Consequently, unlike the domesticated Western honeybee (*A. mellifera*), they frequently abscond from the hive and leave the apiary. In other words, minimum damage to the nest and least agitation of the bees would be the key to

successful capture. Here we report a method, of which main work takes less than an hour, using a simple and easy-to-make apparatus.

In the first case, the honeybee colony (Fig. 1) nested about 2.5 m above ground level under a side branch about 5 cm in diameter of a longleaf podocarpus (*Podocarpus macrophyllus*) tree about 5 m in height planted in a house yard in a residential suburb of Kagoshima City, southern Kyushu, Japan. When the house residents found the colony in May 2011, the nest had already been built. The bees' settlement there is likely to have been in the swarming season, April-May 2011. The colony was captured on 3 June 2011. In the second case, the nest was similarly built in the autumn in 2011 at a lower height about 1.8 m above ground in a wax myrtle (*Myrica rubra*) tree in another residential suburb in the same city. The colony was captured on 28 October 2011. In both cases we used the same apparatus and method.

Artificial rearing of *A. c. japonica* in Japan

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started as early as in the 7th century, and there are various types of hives (Fujiwara and Murakami 2000, Yoshida 2000, Hisasi 2011). Besides the “jubako” type multistory box hive (similar to Warré’s [1948] hive except for the absence of top bars and the presence of skewers supporting combs instead; see Hisashi 2010) the key device used in the present method was the screw car jack with a tabletop (Figs. 2-4; designed and prepared by Y. Takasaki). It, handled manually, enabled us to lift the hive up and down slowly and smoothly, while minimizing damage to the nest and agitation of the bees.

The procedures were as follows. (1) About 70 cm below the nest we prepared a horizontal platform with planks and a sheet of plywood on which to set the jack holding the tabletop to mount the hive. (2) The hive with the top cover (ceiling and roof) removed to keep its top open, was mounted on the tabletop of the apparatus set on the platform (Fig. 3). The hive was then jacked up carefully not to agitate the bees (Fig. 4). The nest, now enclosed by the hive walls, were fixated with bamboo barbecue skewers (available at one-coin shops, supermarkets, or home centers) (Fig. 5). (3) When the colony calmed down, the nest was cut off with a knife at its top from the tree branch. The hive was lowered a little, and the top cover was replaced on the hive to encase the nest. The hive was further lifted down to the lowest stable position; and the jack with the tabletop was removed from the platform, on which the hive was left to stand. (4) Several minutes later, the bees left uncaptured began to ball under the remnant comb pieces on the branch. They were scooped with a wire-framed plastic bag, and were released in front of the entrance at the lower part of the hive. They spontaneously entered it through the entrance, indicating the colony queen had been successfully captured in the hive in the preceding steps (2)-(3) (Fig. 6). Steps (2)-(4) took less than half an hour. (5) The hive entrance was kept open until sundown when the worker bees returned from outside activities. In the dark the entrance was closed, and the hive was moved to the apiary located farther than 2.2 km (recorded maximum distance of daily travel from the hive in *A. c. japonica* [Hisasi 2010]) away from the original nest site.

The above operations were performed successfully in June and October 2011, with resumption of pollen collection by the workers confirmed within a few days. The first captured colony became a strong one allowing collection of honey in early September 2011.

In the age of global biodiversity threatened, it is imperative to save as many honeybee colonies as possible, as they are pollinators indispensable



Fig. 1. The honeybee nest made under a branch of a house yard tree, Kagoshima City, Japan, with brooding combs already developed in May 2011 (Photo by K. Kanai).

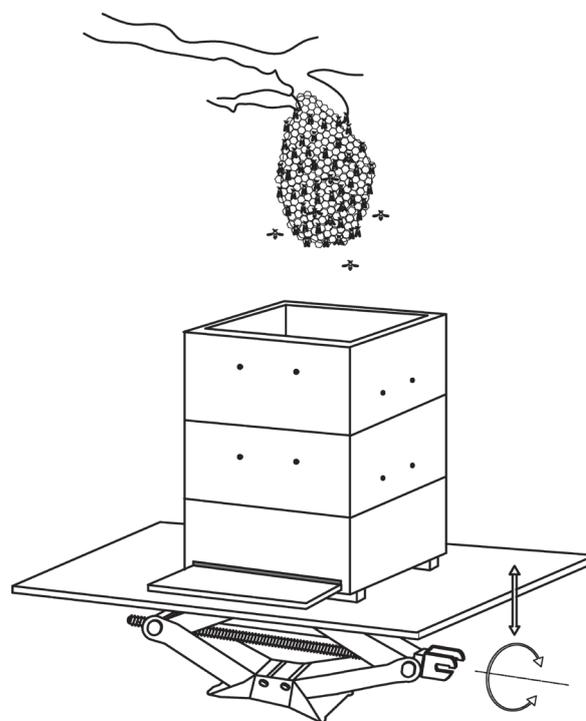


Fig. 2. The “jubako” type multistory box hive (with top cover removed) mounted on the tabletop of the apparatus of which main part is the screw car jack at the bottom

The hive boxes (each about 10 cm deep, and about 24.5×24.5 cm [inner measurement] square in horizontal cross section) are added, if necessary, according to the vertical length of the nest. Bamboo barbecue skewers (3 or 3.8 mm in diameter and about 30 cm long), 8 per box, are pierced through the holes (● in the illustration) large enough for them bored beforehand on the box walls. As the material for the box, the soft falcata (*Albizia falcata*) wood is used to hold firmly the pointed ends of the skewers thrust into the walls, and hence to immobilize them supporting the nest within the hive. (Illustration by Y. Takasaki).



Fig. 3. The hive mounted on the tabletop of the apparatus set on the platform (Video-snapshot by K. Kanai) .

to numerous flowering plant species. The present method will be applicable to many other honeybee nests in similar situations as well as some other honeybee species or subspecies which, like *A. c. japonica*, usually nest in closed space but occasionally also in open space.

In some regions in Asia, apiculture with the Western honeybee (*A. mellifera*) is impractical, as the species suffers from indigenous diseases and natural enemies. In such regions, there are non-*mellifera* wild honeybee species and their subspecies (Yoshida 2000, Bradbear 2009, Hisashi 2010). They are likely to share with *A. c. japonica* some resistance against the ectoparasitic *Varroa* mites (Peng et al. 1987) and the predatory *Vespa* hornets (Ono et al. 1987). In addition to direct capture of swarms or waiting for their spontaneous habitation in trap hives (Bradbear 2009), the present method will provide another effective means of capturing starting colonies of such species and subspecies for backyard beekeeping.

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Fig. 4. The hive jacked up carefully not to agitate the bees (Video-snapshot by K. Kanai).



Fig. 5. The nest within the hive (with the top cover replaced) fixated with bamboo barbecue skewers through small holes bored on the hive walls (Video-snapshot by K. Kanai) .



Fig. 6. The remnant bees, scooped with a wire-framed plastic bag and released at the hive entrance, spontaneously enter it (Video-snapshot by K. Kanai) .

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### 高崎義弘・金井賢一・高崎浩幸：ニホンミツバチ開放巣群の取り込みにおける自動車用ジャッキの利用

#### 要約

住宅地の庭木に自然営巣したニホンミツバチの開放巣を捕獲するにあたり、取り込み時の巣の破壊と蜂群への刺激を低減する簡便な工夫を試み、成功したので報告する。本手法は他のミツバチ種にも応用可能と期待される。最初の例は鹿児島市内で2011年6月3日に(この巣箱は同年9月9日には蜜の採取ができるほどの強群の住処となった)、2例目は同市内で同年10月28日に行なった。2例とも主たる作業(1時間以内)は昼間に終了したが、作業完了は日暮れ後を待った。まず巣の下に、巣箱を載せて作業する水平の台を用意する。台の上で上蓋部を開いた重箱型の巣箱を今回の装置の上に置き、装置の主たる構成部である自動車用の手動ネジ式ジャッキを用いて巣箱全体をゆっくりと垂直に上昇させ、ミツバチに覆われた巣を箱の中に囲い込んだ後、箱の横壁に事前に開けておいた小孔に竹串を通して巣を固定した。群れが落ち着いた頃を見計らって巣の上部を庭木の枝から切り離し、巣の入った箱をジャッキでゆっくりと垂直に降ろして上蓋部をかぶせた。さらに時間を置いて枝に残ったミツバチを針金の網枠を付けたポリ袋ですくって巣門の前に放し、巣箱に自発的に入るのを見とどけて女王の取り込みに成功したことを確認した。巣門を開いたまま外勤蜂が帰還する日暮れを待ち、暗くなってから巣門を閉じて巣箱を蜂場に移動した。

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