

Practical Control Method of the Parasitic Bee Mite *Tropilaelaps clareae*

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ABSTRACT

It is considered that *T. clareae* is much more destructive to honey bee colonies than *Varroa jacobsoni* is. Control of that mite is possible without the use of any medicine. The queen should be caged for 3 weeks, or all the brood should be removed from bee colonies. However, some beekeepers consider this impractical: Caging queens for 21 consecutive days leads to decline of the population of bee colonies, and removing all the brood results in decrease of the colony's strength.

To eliminate those inconveniences, the method should be properly applied. Caging of queens should be conducted during honey flow, when a subsequent flow is not expected. This results in some advantages. Restriction of brood rearing releases many worker bees for nectar collection and lower numbers of worker bees after the honey flow will require less food.

Brood removed from bee colonies should not be destroyed. Brood combs, together with all worker bees covering them, should be put in an empty hive box and placed near the maternal bee colony. Three weeks later when all the workers emerge from the combs, the nucleus may be united with the maternal colony, and the bee population will be restored.

The presence of the parasitic bee mite *T. clareae* is presently restricted to southeast Asian countries. Unfortunately, it can be introduced easily to other countries. Beekeepers who intend to attend the XXX Beekeeping Congress in Peking, China should be warned against taking any bees from China, because they may introduce *T. clareae* to their home countries. It is suspected that *T. clareae* will not be established in temperate zone areas (Woyke 1985b). However, it may be established and cause much damage in all areas where a winter break in brood rearing does not occur. It is generally agreed that *T. clareae* is much more destructive to honey bee colonies than *Varroa jacobsoni* is (Woyke 1984). I personally verified that the Ministry of Agriculture in Afghanistan had 3,000 bee colonies. After the *T. clareae* reached Afghanistan, three years later only 150 bee colonies

were left. Several times efforts were undertaken to introduce *A. mellifera* to Thailand. In a short time the colonies collapsed. Prof. R. Morse considered one of the main obstacles was the presence of the mites (personal information). It was not until method of partial control of both mites was elaborated, that *A. mellifera* is now a productive bee in Thailand.

Investigations on the biology of *T. clareae* revealed that the mite reproduces and develops on bee brood in sealed cells, similar to *V. jacobsoni*. *V. jacobsoni* can survive on adult bees, in the absence of bee brood, for several months. However, *T. clareae* can survive on adult bees for 2-3 days only (Woyke 1984). Based on this phenomenon Woyke (1984, 1985a) developed a method to control that mite without the use of any medicine. The queen should be caged for 3 weeks until all the brood emerges; or all the brood should be removed from bee colonies, without caging the queen. In this condition the last mites die within 3 days after removing all of the brood or after emergence all of the bees from the brood combs.

This method was verified in several countries and its efficiency was confirmed by Wongsiri et al. (1987) in Thailand, Shah & Shah (1988) in India, Tangkanasing et al. (1988) in Thailand, Fan and Li (1988) in China, Zmarlicki (1992) in Afghanistan, Xu (1992) in China and Ha et al. (1992) in Vietnam. Dung et al. (1992) reported that due to application of this method, the infestation rate in Vietnam decreased from 46% to 4%. Thus, the honey bee (*Apis mellifera*) was saved in an immense area of the Asian continent.

Nevertheless, some beekeepers have problems with the practice (Ha et al. 1992). – Caging queens for 21 consecutive days leads to decline of the population of bee

colonies.

– Removing all the brood from bee colonies results in decrease of a colony's strength.

The problems presented above may occur when the method is not applied correctly. Therefore, some explanation and recommendations are presented below.

Caging of queens should be conducted during the honey flow when a subsequent flow is not expected. At this time many professional beekeepers restrict egg laying of queens anyway by applying queen excluders. Some beekeepers even kill old queens at this time, and take advantage of

the opportune time to rear and introduce new queens. Restriction of egg laying at this time results in several advantages. The smaller amount of brood to be guarded releases a number of worker bees for nectar collection. After the honey flow, the population of the colony will be lower. This also will be advantageous, because fewer bees after the

honey flow will require less food.

The second method of combating the mite *T. clareae* is to remove all the brood from the colonies. This is also an efficient method.

In colonies without brood the mites die within 2-3 days. The queen does not need to be caged. Investigation conducted by me in 1992 in China revealed that *T. clareae* mites cannot survive on bee larvae up to 3 days old. Brood removed from bee colonies should not be destroyed (Dang et al. 1992). The brood combs should be removed together with all worker bees covering those combs. All of this should be put in an empty hive box or in a nucleus box, and placed near the maternal bee colony. Two covering combs can be added, each on a side of the brood nest. The empty space in the hive can be restricted with a division board. The entrance should be reduced to prevent robbing. If too few workers remain in the nucleus, the maternal colony

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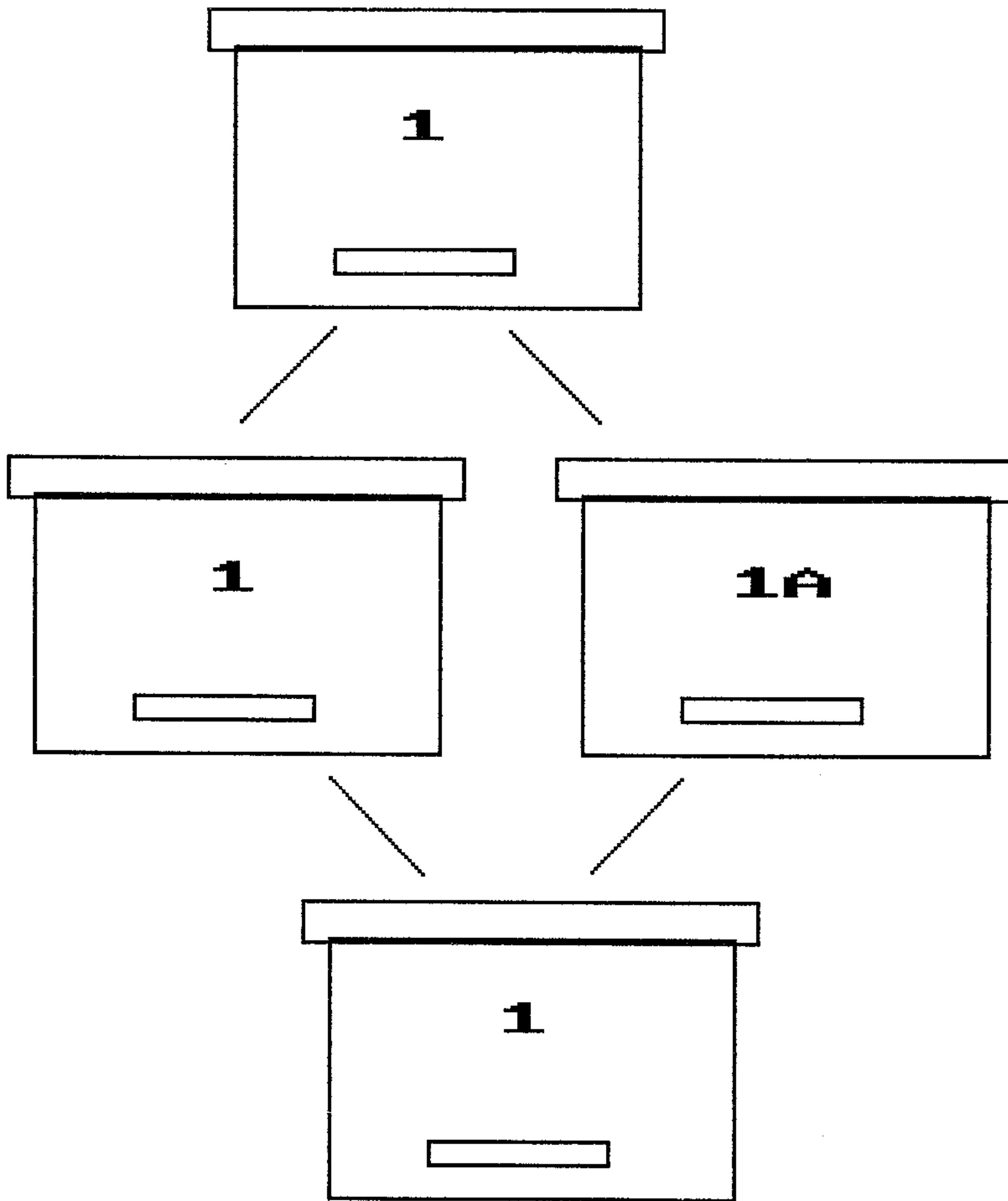


Fig. 1: Control of *Tropilaelaps clareae* by removing all brood combs together with worker bees covering them, from colony No 1. The combs are placed in hive box No 1A, which is located nearby. If too few workers remain in hive No 1A, the mother colony No 1 is shifted a little on a side, and nucleus No 1A is moved to the old location. After all bees emerge from combs in nucleus No 1A, both colonies are united, and the population reestablished.

should be shifted by several centimeters on a side and the nucleus located near it (Fig. 1). Worker bees in the nucleus will construct emergency queen cells, and will rear new queens. The beekeeper may add combs of eggs from a colony with desired characteristics like high honey production, gentleness, etc. He may destroy queen cells on the other combs, and let the bees rear queens from the introduced eggs. He may also add a queen cell. Within 21 days all the workers emerge from the combs. When eggs for drones were present at the time of creating the nucleus, then the last drones will emerge three days later. Three days after emergence of the last bees, the nucleus can be united with the mother colony. Before that, one queen must be eliminated. After unification, the colony population will be restored.

Xu (1992) in China modified that method. Instead of locating the box with removed brood near the mother colony, he put that box above the nest of that colony. The super with brood is separated from the mother colony by a separat-

ing horizontal frame provided with a gauze of such small mesh that the mite cannot pass through it. The frame has a cut in it to form an entrance. Mr. Xu argues that the smell from the mother colony can penetrate through the gauze into the super. As a result, it is later easier to combine those two parts of the colony. I would add that the brood in the super is also heated by the colony in the bottom box. Perhaps this is not so important in tropical areas. I am afraid, however, that many beekeepers will not be able to get gauze of such small mesh, and to construct the separating frame.

Due to drifting, some reinfestation will occur from boxes with brood to colonies deprived of it. To decrease the reinfestation, the beekeeper may move all queenless hives with brood to another locality. If he does not intend to increase the number of colonies, he may unite two or three hives with brood, or he may return the boxes three weeks later to the mother apiary and unite them with the colonies present there.

It is known that *V. jacobsoni* is not a

dangerous pest of *A. mellifera* in tropical areas. However, in areas where it infests bee brood in higher percentages, the method described above may be integrated with control of *V. jacobsoni*. It is known that many fumigants against *V. jacobsoni* are effective only in the absence of the bee brood in the colony. Thus, *V. jacobsoni* should be fumigated in the mother colony only after the brood is removed. In the nucleus, where the brood is located, *V. jacobsoni* should be fumigated after all workers emerge from the combs.

Due to reinfestation, it cannot be expected that *T. clareae* will be eliminated totally in a short time from an infested area. The same occurs when chemicals are used to control other mites. However, it is important to note that by applying the bio-technical method, no resistant *T. clareae* will be bred. The method is simple and does not require the use of any medicine.

According to Dung et al. (1992) systematic and wide use of this control method reduced infestation of bee colonies in Vietnam by *T. clareae* from 46.2% to 4.1%. As a result, honey exportation increased from 0 to 1,100 ton in 1991.

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