



Eva Crane Trust

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## Beekeeping techniques

### Living with *Varroa* in Japan

In the past few years *Bee World* has published several articles on the mite *Varroa jacobsoni*, on attempts to control its spread, and on its effect on bees and beekeeping in countries where it has already been spread<sup>1-4, 7, 8</sup>.

At the end of two weeks' visit to Japan in March, I realized that I had heard no mention of *Varroa*. This puzzled me, because *Apis cerana*, the original host of *Varroa*, is still present and kept in traditional hives in various hilly regions of the country. One would therefore expect it to be a continuing focus of infestation and re-infestation of *Apis mellifera* which is used for movable-frame beekeeping. I therefore made enquiries, and learned the following.

*Varroa jacobsoni* was described in Japan in 1909 by Suzuki<sup>11</sup>, although not by that name. It was first photographed in Japan in 1957 on *Apis cerana* by Obata at Tamagawa University, and in the same year it was found on *Apis mellifera* colonies by Kishida. For reasons that have not been fully established, *Varroa* started to increase epidemically on *Apis mellifera* at about that time, and caused much damage to bees in the 1960s<sup>6</sup>. It is still present throughout Japan, and some of the work on the mite and on its control is listed below<sup>5, 6, 9-12</sup>.

Currently, both fumigation and smoke treatments are used. Fumigation is applied from early spring until the start of the honey flow. One acaricide used is Amitraz (3-methyl-1,5-bis(2,4-xylyl)-1,3,5-triazapenta-1,4-diene). A piece of corrugated cardboard 3 × 3 cm or more is soaked in 1 ml of a 50%–100% solution and then inserted into each hive through the entrance. The acaricide vaporizes gradually, and remains effective for two weeks; it is then replaced by a similar strip of impregnated card. Five or six treatments are applied before the honey flow. Amitraz seems not to kill *Varroa* larvae or eggs immediately, but of the adult mites produced in the colony fewer than 2% survive. Treatment by this method is not done in winter, because the vapour would fail to reach many of the clustered bees while others would be injured. It is also not used during the honey flow, in order to prevent contamination of the honey. (Insertion of card impregnated with Amitraz on top of the frames in the hive is not recommended, as the high concentration of the vapour would kill bees near the card.)

Chlordimeform or chlorphenamidine (N'-(4-chloro-o-tolyl)-N-N-dimethyl-formamidine), another acaricide, is used in a similar way. Some beekeepers use chlorobenzilate (ethyl-p,p'-dichlorobenzilate), but this is not effective.

Amitraz can also be applied inside the hive as smoke, although other acaricides are better. Tedion or tetradifon is one, which is sold in Japan as Danikoropa. An 80-g roll of impregnated corrugated cardboard, sufficient for treating 50 hives, contains 0.75 g of 2,4,5,4'-tetrachlorodiphenyl sulphone and 0.25 g of o,o-dimethyl s 1,2-bis(ethoxy-carbonyl) ethyl phosphorodithioate. The roll is ignited from burning charcoal in a smoker. When it starts smoking, the smoke is blown strongly three times through the hive entrance. This is repeated 3 or 4 times at intervals of 5–10 minutes; in practice this gives the beekeeper

time to treat the 50 hives and then return to the first hive for the next round. The treatment should be repeated 2 or 3 times at 5-day intervals.

Phenothiazine (thiodiphenylamine) is used to impregnate corrugated cardboard, which is lit and held by a piece of wire in an empty hive box, used as a smoking-chamber at the bottom of the hive. Smoking continues for 5–20 minutes according to the dimensions of the cardboard, and the smoking-chamber can be removed 10–24 hours later. Certain weather conditions are to be avoided for this treatment: low temperatures (under 12°C), very high temperatures (at mid-day in summer), and rain. If the colony has capped brood, further treatments are given about 1 and 2 weeks later.

I am indebted to the staff at IHS for this information, and especially to Kazuo Takeuchi.

## References

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