

Beekeeping and varroaosis in Czech Republic

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CZECH Republic is a small country in the center of Europe which has a relatively large number of beekeepers – approximately fifty thousand people. Beekeeping here is carried out usually as a hobby, but gradually a small group of beekeepers is starting to emerge. We are one of the few countries in Europe in which production of honey exceeds its consumption.

Varroaosis is a disease that Czech beekeepers have long managed to maintain at a level low enough not to cause significant harm, because the fight against the parasite is well-organized. However, in the exceptional year of 2007, the usual methods of fighting varroaosis appeared to be insufficient for many beekeepers. The number of mites increased significantly, whilst some beekeepers discovered it late. When at the end of the season they wanted to use the relevant drugs in bee hives, bee colonies were weak, or some hives were empty. Then, the weakened bee colonies died out during autumn and winter. Many of these colonies displayed symptoms of viral diseases. Thus, in 2007, beekeepers in the Czech Republic also experienced the colony collapse disorder, CCD. Until then they had only read about it in journals. True, the biggest bee collapses appeared in certain locations, where many villages were left without any bees, a phenomenon which even older beekeepers cannot recollect. Yet it is also true that most farmers did not lose their bees, as they took some timely measures against it. Of 520 000 colonies in summer 2007, about 170 000 were dead by the spring of 2008.

Intensive discussions started after these events in an attempt to figure out where



Many Czech beekeepers now use wire mesh floorboards. Inserts fitted below the mesh allow mite fall to be easily monitored.

the mistake happened and what caused such extensive collapse of bee colonies, just like it had happened in other countries before that. In the next season, ie, in 2008, beekeepers meticulously looked after their bee colonies, yet many of them did not have a clear strategy - they put more drugs in the hives, often more than was needed. They were surprised that this time, the treated colonies contained almost no mites for they had started doubting that the drugs were really effective. Surely the drugs were effective, but the mite reproduced much less than in the previous year.

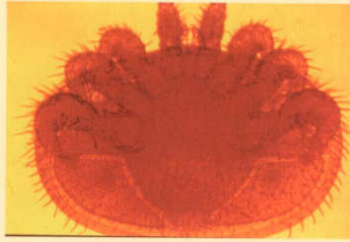
These issues are a subject of active discussions both in Czech beekeeper forums and in the already famous blog

'The Fascinated Beekeeper', <http://ovcspardubice.blog.cz/>. Experienced beekeepers, and mainly those who make their living out of beekeeping, have already understood that they should address the issue of mite control differently than before, applying methods in accordance with the situation, not just by following the standard procedures (inflexible official instructions). Thus, the so-called Varroa Monitoring System (VMS), www.varroamonitoring.eu with web application, was introduced in the Czech Republic in early 2008, when beekeepers were able to continuously keep track of the development of *Varroa destructor* mites during the season. Having registered on the site, they enter on the

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maps their estimated numbers of average mite falls in hives. For this purpose, beekeepers are gradually changing their old hives for new ones, each having a bottom board with a wire mesh screen and a tray under it to easily check the numbers of mites (see picture). Some beekeepers in the Czech Republic use this method to monitor the extent of varroaosis in all their bee colonies from summer till autumn and thus manage to treat only individual bee colonies, those which really need it. All the colonies are then treated in autumn, when they no longer have any brood (Oct – Dec). This helps to save time during a busy season and, most importantly, it prevents the unnecessary entry of chemical substances from drugs into beehives. Amitraz, as well as the pyrethroids fluralanate and acrinathrin are the registered and most extensively applied chemical agents. Czech beekeepers care about the quality of honey therefore they try to minimize the dose of chemicals. Some beekeepers treat their bee colonies with formic acid, which is more suitable from the hygienic point of view.

In the last few years, an advanced group of beekeepers have realized that the use of acaricides does not always have the expected outcome, which has focused their interest on the possibility of breeding varroa-tolerant bees. However, they do realize the complexity of this alternative. The Czech Republic permits the breeding of only the Carniolan race of bees, which excludes the importation of varroa-tolerant strains of bees of other races. Ultimately, there remains only one possibility - to start selecting local



Carniolan varroa-tolerant strains of bees. Queen rearing has a long tradition in the Czech Republic and there are about 100 active queen producers. Nevertheless, they are mostly engaged in producing queens merely for sale to other beekeepers. Only a few top-ranking breeders familiar with the instrumental insemination of queens are engaged in bee breeding. The breeders starting the process of selecting varroa-tolerant bee strains formed their own group at the beginning of 2009 with a new program, with this selection process as their main object. For this, they actively inform each other of their own relevant findings, and pertinent news from abroad, and seek the most effective ways of assessing and breeding varroa-tolerant bees. Apidologist Dr A Pridal from the Mendel Agricultural and Forestry University in Brno has given them significant help in this area. He is also the editor-in-chief of the new journal entitled 'Moderni Včelář' - 'The Modern Beekeeper', which was established a few years ago. By the way, the world-famous abbot, Gregor Mendel, was living and working in Brno in the 19th century when he discovered the principle of heredity, publishing it in 1865.

We do have one Carniolan strain with partial varroa-tolerance, which will serve as a starting point for further breeding. It is the 'Vigor' strain with an excellent cleansing instinct which has been bred from since 1990. These bees are nearly resistant to brood diseases. Despite the fact that we have not yet achieved the results which would totally eliminate the need for treating the bees with chemicals, these bee colonies have, on average, fewer mites reproduced each year than the other strains so it is usually enough to treat the bees only in autumn. We have managed to find and test two parameters of the varroa-tolerance of bees suitable for selection. A beekeeper can do such an assessment without having any complex equipment; for this, he/she uses the data of the number of naturally-fallen mites, calculated by normal methods, and finds the best varroa-tolerant bee colonies. Also, the beekeeper should add to this data the total number of the mites after acaricide treatment in the autumn. Based on these data, one can calculate the percentage of the mites removed from the nest by bee activities. We also know that bees are capable of catching the mites on their bodies and killing them (grooming), as well as from the bee brood, where the mites reproduce – bees take out such pupae before the mites' daughters complete their development. Later, the best genes are combined using technical insemination. We are only at the beginning of the way, but we have already made the first steps.

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Jeremy & Ruth Burbidge, Publishers