



## Is mite fall counting the route to control?

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Regular counting of varroa mites on the varroa tray of the bee hive is a way to learn something about the infestation of the bee colony with varroa. Mite fall counting has been propagandized for many years with the aim to obtain grip on varroa and its control. Even many of the hive types present in Europe received a varroa mite tray as a standard element of their design. But what does the result of the counting effort really tell us about the infestation of our colonies? And what else do we have to take into account? An example from the recent practice at Bees@wur.

To measure is to know! Full stop! This quote (Lord Kelvin) has been imprinted to all of us with repetition, and indeed it is pretty clear that knowledge is not easily gathered without measuring or estimating. The other way around: without measurement our knowledge is without foundation and it can easily be blown away. But does this also mean that the proverb is true? To measure IS to know? Or might there be more than 'IS' between measurement and knowledge?

### **How to define 'to know'?**

Last month I wanted to do a few small tests about the counting of mite fall on the bottom boards. To increase the certainty with which I could catch all mites, I used special sticky boards for mite collection. Fallen mites then cannot remount a bee nor can they climb upon a dead bee nearby, because they are stuck to the board. Also an advantage is that when you are counting the mites are not taken by the wind, and you can even do the counting afterwards in the lab, in the meantime listening to an audiobook.

### **A sticky board sticks**

I wanted to know first how quickly the sticky boards needed to be replaced by new ones, as well because of the number of mites collected as concerning the amount of litter (pollen etcetera). I placed a few sticky boards underneath colonies that were expected to be seriously infested with mites, because these colonies had not been treated against varroa since last winter. After one day, mites: no; pollen and litter: yes. Hey colleague, the infestation of your colonies is not too bad even without controlling; do you have varroa-resistant bees? The next days: again no mites on the sticky boards. But a few very mobile black ants were present, foraging on the sticky boards! So the next question: were no mites present in the colonies, or were only no mites left on the sticky boards?

My colleague Chula Hok Ahin was asked to provide a sticky board with 100 mites, nicely

arranged on a grid for easy recapture. There is no scarcity for mites this year, since Chula checks many samples of bees for mites, and the infestations often appear heavy. We placed the sticky boards with the 100 mites on the bottom board underneath the colony. After two days: zero mites left, but again two ants present, looking for more!

In search for a better alternative than the sticky boards for mite control, we tested the sticky traps that are used in greenhouses to collect flying insects, both for diagnosis as well as for control. Again we put a range of mite numbers in a grid on the plates, and checked the next few days. Now 100% of the mites could be recaptured, with sometimes even a few extra (the colonies did show infestation), and only two ants. But this time not freely dancing over the plates, but stuck to it. It appears that ants do learn quickly, or maybe even communicate the danger of getting stuck, therefore only two victims made that mistake.

#### **To measure is.....**

If you check for mites on the varroa tray, but do not find one. The knowing is: no mites present in my colonies, hurray! Or, alternatively: there are ants and maybe also earwigs, gratefully appreciating the laid cloth.

You do count a few mites on the tray. The knowing is: happily, low infestation. Or: low numbers, maybe I have too few ants to finish the breakfast fully...Or.....

You find many mites. Oops, heavy infestation. Or: I have so few ants, they cannot eat a big piece of the cake. So therefore the mite fall gives an over estimation.

Do you find mites on the tray, together with ants. The knowing is: mite fall was not that high, but could have been higher had there been no ants. So I should be warned. Or, alternatively: there are a few mites, there are a few ants. So, my ants are vegetarians fortunately.

#### **Conclusion**

Without measurement no knowledge. However, to measure is only the first step towards to know. The obtained data have to be analysed and interpreted; what might they indicate. The next step is to eliminate as many of the options as possible, sometimes by doing additional experiments (placing mites on the boards, using alternative sticky boards). No knowing without measuring (of ant numbers).

The significance for daily practice: estimating the numbers of mites falling on the bottom board can be very informative and useful. However, it needs to be done with great care and very precise. And for sure only with precautions against ants. Otherwise you could easily think to have a low mite infestation in your colonies, and nevertheless lose your hives over winter due to varroa!

Precautions against the ants could also be the use of sticky boards, but it should at least be sticky boards that function properly and that are sticky enough to prevent the ants to harvest mites. Another approach is to cover the bottom board with a thick layer of petroleum jelly (Vaseline) each time before putting it in place: ants avoid walking over petroleum jelly (but are clever enough to walk over the pollen that has fallen on it).

