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Spider Venom Against Varroa?

A new research program supported by Queensland Government, Australia, is focused to examine the efficacy of spider venom against varroa mite. We have interviewed the project's coordinator.

By Matteo Giusti

Can a spider help in the varroa control? Maybe yes. Among the research programs supported by Queensland Government, Australia, one project will focus on the potential efficacy of venom from a Tasmanian spider against these mites.



Dr. Volker Herzig with a tarantula (photo by Janelle Kirkland)

We interviewed Volker Herzig, from the University of the Sunshine Coast's Centre for Bioinnovation, who is coordinating the project.

Dr. Herzig, among the possible active ingredients, why did choose a spider venom, and why this particular spider?

"We already knew that arthropod (i.e. spider, scorpion, and insect) venoms contain many components (toxins) that affect other arthropods, since they prey on each other. Also, some spider toxins were known to target ticks, which are somewhat related to mites. We therefore performed a screen of 50 spider and scorpion venoms against the varroa mites and then narrowed our search down to the 2 most potent venoms from the Tasmanian cave spider and the Giant Japanese funnel-web spider (not related to the Australian funnel-web spiders). From these venoms, we then isolated the 2 active varroacidal toxins, which we named Ht1a and Gg1a, respectively. So we did not select these spiders, it was based on the activity of the assay that we performed against the varroa mites."



Gigathele gigas (the Giant Japanese funnel web spider, photo made by Bastian Rast)

What are you working on at the moment?

“In our initial studies, we have tested both peptide toxins separately against varroa mites and honeybees, and our experiments showed that the toxins killed the mites, but did not affect the bees. In the next phase of the project, which is supported by the Community Bee Innovation Fund (CBIF), we will be treating the mites and the bees together rather than separately. Provided these experiments show promising results, we will then move towards testing out spider venom peptides in varroa infested honeybee hives.”



Hickmania troglodytes (the Tasmanian cave spider, photo made by Eivind Undheim)



What about the safety for honey bees and human beings?

“In our experiments we applied the spider venom peptides as small drops to the surface of the varroa mites or the bees and they were safe for the bees, while killing the mites. We also tested both Ht1a and Gg1a against a number of crucial human ion channel and found no significant unwanted effects. However, in vivo experiments on mammals (e.g. rodents) will be required to further examine the safety profile of our two lead peptides

How could this product be administrated in the hive?

“Our idea for delivery was by spraying the hive. However, this has not yet been tested, as we are not yet at the field-testing stage.”

Is it possible to development anew veterinary medicine quickly?

“Unfortunately, research takes time, because we need to ensure the safety of any product ending up on the shelves of the honeybee supply stores. So even if our upcoming experiments will be successful, it might still take a few years and continuous funding before we have a final commercial product”.