

Disrupting one gene could be first step toward treating honey bee parasite nosema ceranae

June 20 2019, by Kim Kaplan

Agricultural Research Service (ARS) scientists have taken the first step towards a weapon against the major honey bee parasite *Nosema ceranae*.

There is currently no treatment for this parasite.

The scientists found that feeding [honey](#) bees a small amount of an interfering RNA compound (RNAi) could disrupt the reproduction of *N. ceranae* by as much as 90 percent in the [laboratory study](#), according to a study recently published in *Insect Molecular Biology*.

This RNAi compound targets a single *N. ceranae* gene called Dicer, explained Jay Evans, research leader of the ARS Bee Research Laboratory in Beltsville, Maryland, who headed the study.

"Dicer is a critical part of *Nosema ceranae*'s machinery for defeating honey bees' immune responses to infestation by these [parasites](#). It also encodes an essential protein in *N. ceranae*'s reproduction. So, it could be a double-barreled, practical route for attacking *N. ceranae*. Even better, RNAi against Dicer is specific to the parasite and will not interfere with the health of the honey bees," Evans said.

In earlier studies, the lab had looked at attacking *N. ceranae* genes that encode for proteins that make *N. ceranae* a better parasite such as a polar tube protein that is important in the invasion of bee cells by the

parasite.

"But by striking at a [single gene](#) that affects *N. ceranae* reproduction and the ability of this parasite to counter honey bee immunity, I think we may have found an even better—an excellent avenue of attack," Evans added.

But this is just the first step toward a possible treatment. The researchers need to prove the concept in the field and beekeepers' apiaries.

Nosema ceranae is widespread problem of honey bees, although the impacts on colony health remain unclear. The best measure of the damage of *Nosema* comes from Europe where this parasite has been linked to long-term colony declines in Spain.

A chemical treatment had been available, but it was taken off the market due to production challenges.

More information: Q. Huang et al. Dicer regulates *Nosema ceranae* proliferation in honeybees, *Insect Molecular Biology* (2018). [DOI: 10.1111/imb.12534](#)

Provided by Agricultural Research Service

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