



Prebiotic Supplements Hold Promise for Bee Health

With project funding from Growing Forward 2, this researcher found that a product used in cattle could have value for bees as well. With bee populations still on the defensive, this could be a significant breakthrough.

Bees in Alberta have had a rough ride over much of the past decade. Between 2007 and 2011, the province's bee populations declined significantly due to annual winterkill that was far greater than normal. One possible explanation is that poor bee health levels made colonies susceptible to threats such as varroa mite and nosema disease. The same conditions prevailed across North America.

Another issue is the use of the neonicotinoid class of pesticides. While this connection is controversial and hotly disputed, contact between bees and pesticides could be another factor impacting bee health.

Over the past few years, Shelley Hoover, an Apiculture Researcher with Alberta Agriculture and Forestry in Lethbridge, has been closely involved in monitoring these developments.

She's been looking for new tools to improve bee health. Through a colleague, she learned about a prebiotic supplement that's given to cattle to improve gut function, boost immune response and reduce the impact of toxins.

"I started to wonder whether this prebiotic could work for bees," says Hoover. "I wanted to identify a product that could work with honeybees, as well as bumblebees and leafcutter bees."

Proven For Cattle, What About Bees?

In 2014-15, with project funding from *Growing Forward 2*, Hoover conducted a series of trials with the prebiotic to determine its value for bees. In small-scale work in bee cells and caged bee trials, she applied the neonicotinoid pesticide, then added the prebiotic. The bees, she reports, were happy to cooperate.

"They love it," she says, "because we dissolve the prebiotic in sugar syrup. It's nutritional for them, its food. We found that the prebiotic could mitigate the effect of the pesticide. In the cage trials, we saw that it can also increase the longevity of bees."

Why does this happen? The prebiotic, a kind of non-living yeast, appears to do in bees what it has long done for cattle. It encourages the growth of probiotic bacteria in a way that contributes to the well-being of the animal. When toxins are present, the prebiotic seems to bind to them and render the toxins less harmful.



Registration Still Years Away

Based on work to this point, giving bees this prebiotic nutritional supplement appears to be a way to strengthen their intestinal tract and even fight off toxins. Hoover cautions there's still a long way to go. Sugar could be a means of delivering the prebiotic to bees, but some sugars can be toxic to bees. Then there's the question of formulation: would a syrup, a granular shake-on form or some other method work best?

In 2016, Hoover will take this work to the next level by conducting large-scale field trials with the syrup formulation. She'll continue to look at how different prebiotic doses work when pesticides are present, and whether or how this differs by bee species. If all goes well, a bee prebiotic could be registered for commercial use in the next two years.

"It's already registered in Canada for livestock, so it would just be a label extension to approve it for bees," says Hoover. "The question is whether or not the product makes a health claim. That could affect the timeline."

Not long ago, bee populations in Alberta were under serious threat. Since then, they've bounced back. Shelley Hoover's prebiotic supplement could be another tool to help keep the province's bees strong and healthy.

Growing Forward 2 is a federal – provincial – territorial initiative.