Bees

Study confirms beekeeper's fears

The European study links neonicotinoids to reduced immunity in honeybees

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An Italian study, recently published in the prestigious Proceedings of the National Academy of Sciences (PNAS) journal, has linked neonicotinoid insecticides to compromised immunity in honeybees.

The finding doesn't surprise Ontario beekeepers like Jim Coneybeare.

"This confirms what we have suspected," the Fergus-area honey producer said.

"We have never confronted an insecticide that works like this. Not only does it kill the bees but it also affect the bees on a continual basis through other factors like nosema etc."

Neonicotinoid clothianidin adversely affects insect immunity and promotes reproduction of a viral pathogen in honey bees, said the scientists representing universities in Napoli, Bologna and Udine. It appeared in an October edition of the journal.

The study explored the impact of clothianidin and imidacloprid on bee immunity to deformed wing virus (DWV) at a wide range of exposure levels, including exposure levels as small as one thousandth of LD 50. LD 50 is the exposure rate at which a toxin will kill half the members of a tested population.

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For comparative purposes, exposure to the organophosphate insecticide chlorpyrithos was also part of the experiment. Newly emerged bees, divided into groups of 30 were used. The study was conducted under laboratory conditions.

DWV is a common virus affecting honey bees. It's associated with the parasitic mite, Varroa destructor, which can easily spread the virus within colonies. Infected larvae typically have deformed wings when they emerge as adults and soon die.

The varroa/DWV disease complex has often been described as the number one challenge for honeybee producers.

The study's authors found that the two neonicotinoids appear to compromise the immune response of bees to DWV – their ability to fight off the virus – adding another layer of stress to colonies.

"Collectively, our data demonstrate that two neonicotinoids insecticides, each representing one of two alternative structure types in the group of nitroguanidines, actively promote DWV replication," the paper states.

The there was no significant immune change for bees exposed to chlorpyrithos.

In addition, the researchers suspect the neonicotinoid-related immunity alternations may also affect gut microbial pathogens in bees, further affecting bee health.

"Indeed, pathogen proliferation induced by insecticides can cause additional mortality, even at sublethal doses, and may contribute to the observed negative influence of some insecticides, or their mixtures, on bee longevity and colony stability.

The results we report clearly indicate the need for longer-term toxicity tests, aiming at assessing how the pathogen progression in honey bees is influenced by insecticide residues and by their cumulative effects, both on adults and larvae," the paper states.

Dr. Ernesto Guzman, head of the Honey Bee Research Centre at the University of Guelph, expressed confidence in the research, given the stature of the journal and its editor, entomologist and bee genomics specialist Dr. Gene E. Robinson of the University of Illinois.

"The content of the abstract makes absolute sense to me and they followed a novel approach to show a cause-effect type of reaction," Guzman said.