Male bees protect female bees from sexually transmitted diseases

January 20 2016

A team of researchers from The University of Western Australia's Centre for Integrative Bee Research (CIBER) have discovered that the seminal fluid of male bees kills the widespread sexually transmitted fungus Nosema apis, offering queen bees protection from the parasite which can be passed on during bee sex.

The research is good news for honey bees in helping scientists look at new ways of addressing the world-wide decline of the bee population.

CIBER Director Professor Boris Baer said the study found that male honey bee semen produced protein molecules that cause the Nosema apis fungus spores to prematurely germinate, killing them because they

cannot survive outside of their hosts' cells.

Another smaller molecule in the bee's semen was able to quickly kill the fungus spores directly.

"We also found that these immune molecules in the bee semen were specifically active against the fungus but had no effect on other microorganisms," Professor Baer said.

"This finding was surprising, because insect immune systems are often believed to be primitive and not very complex or specific."

Professor Baer said the spread of parasites and pathogens globally are known culprits contributing to the alarming losses of millions of bees every year.

"This is problematic, given our dependence on honey bees, as they pollinate more than 80 crops of agricultural interest or about a third of what we eat," he said.

"However this new finding, which confirms honey bees are remarkably capable of defending themselves against parasites, will provide exciting new ways to breed bees that cope with diseases by themselves.

"Suppressing parasites with chemicals has become a major issue, because of contaminations of honey with residuals, as well as bee parasites having become more resistant against available treatments."

More information: Seminal fluid of honeybees contains multiple mechanisms to combat infections of the sexually transmitted pathogen Nosema apis. DOI: 10.1098/rspb.2015.1785