Researchers search for viruses to save honeybees

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In an effort to save the dwindling honeybee population researchers at the University of Nevada, Las Vegas are looking to viruses to help treat one of the most destructive and widespread bee brood diseases in the United States. They report their findings today at the 2012 General Meeting of the American Society for Microbiology.

"Our food supply depends on the actions of millions of insects such as the common honeybee. Due to the importance of honeybees a pollinators in the agriculture of the United States and therefore the current and future food supply, honeybee health is of great concern," says Diane Yost, a researcher on the study.

American Foulbrood Disease (AFD) is the most widespread and destructive brood disease affecting honeybees. It is caused by a bacterial pathogen, Paenibacillus larvae. Young honeybee larvae become infected when they ingest the bacterial spores in their food. Infected larvae normally die after their cells are sealed. The bacteria eventually die as well but not before producing millions of spores.

While there are some chemical treatments that can be used to hold AFD in check they must be continued indefinitely. Once the treatment is suspended the American foulbrood spores germinate successfully again leading to a disease outbreak. Because the spores can survive up to 40 years, many states require diseased hives to be burned completely.

Yost and her colleagues are researching an alternative treatment for

AFD. They are focusing on using bacteriophages, viruses that infect and kill specific bacteria, to target the bacteria responsible for AFD and eventually treat the disease.

"If an effective remedy for the disease could be developed, hives that are infected with the pathogen could be treated rather than burned, which is currently the only effective treatment," says Yost.

The researchers conducted an extensive search for phage from environmental sources including samples from desert and garden soils, beehives, flowers, compost and cosmetics containing beeswax. Nearly 100 samples were tested for the presence of phages. A total of 31 phages were isolated and each were subsequently tested against 8 different strains of the AFD pathogen. The researchers identified 3 phages that had activity against all 8 strains of the bacteria.

"These results demonstrate that bacteriophages capable of infecting P. larvae are present in the natural environment, and these phages may represent the first step in developing a potential treatment for AFD," says Yost.

More information: This research was presented as part of the 2012 General Meeting of the American Society for Microbiology held June 16-19, 2012 in San Francisco, California.

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