Protecting honey bees from deadly American foulbrood threat with new faster, cheaper test

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American foulbrood (AFB) is an infectious disease of honey bee larvae that can have severe detrimental impacts on bee populations, including the destruction of hives, if unmanaged.

Professor Travis Beddoe, head of the Agricultural BioSolutions Laboratory at La Trobe University, said the test could have implications both in Australia and around the world.

"The test we've developed is much cheaper and faster than those currently available, which could lead to much earlier detection," Professor Beddoe said.

"Early detection of AFB allows beekeepers to quarantine hives early, and destroy them, therefore preventing infection into other hives.

"The detection method we have developed is sustainable, and can reduce both the incidence of AFB outbreaks, and the continued transmission risk at a large scale," Professor Beddoe said.

"Serious infectious diseases like this one put at risk not just honey production, but a whole range of other food crops, which rely on bees as pollinators."

AFB is a very hard-to-treat disease caused by spore-forming bacterium Paenibacillus larvae, which, due to the bacterial spores being resistant to freezing and very high temperatures, can stay dormant for 50+ years. When it infects honeybee colonies, as it has done in Australia, those colonies and equipment need to be destroyed.

Currently, if a hive is suspected of harboring AFB, a sample of honey is sent to an accredited lab for testing, with each test costing around $50. The test involves early detection of subclinical prevalence—catching the disease before it can spread to other hives.

The new test involves extracting DNA from honey bees or larva by bead-beating in buffer and then placing aliquot into a reaction mixture for 30 minutes. A positive result can be detected by increased fluorescence due

to dye binding to amplified DNA.

The research was conducted as part of Australia's premier bioscience facility, AgriBio—a facility located at La Trobe's Bundoora campus, supporting the agricultural sector to improve productivity, be climate resilient and fight disease.

Provided by La Trobe University

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