

# Honeybee pheromones safely repel elephants, study finds

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Elephants at the Jejane waterhole at Greater Kruger National Park in South Africa on Dec. 8, 2017. Credit: Mark Wright, University of Hawaii at Mānoa.

An organic formulation containing honeybee pheromones has been found to safely repel elephants, offering promise for a new strategy to

prevent the world's largest land animals from destroying crops or causing other damage in areas where humans conflict with elephants, according to a study published July 23, 2018 in *Current Biology*.

The study was conducted at Greater Kruger National Park in South Africa between December 2017 and February 2018.

The scientists placed a blend of pheromones that bees release when they perceive danger in a specialized slow-release matrix at locations around water holes frequented by African bush elephants, *Loxodonta africana*. The researchers observed that most of the elephants that came near the formulation showed typical signs of increased alertness, signs of uncertainty, and finally calmly moved away, while those approaching control treatments were eager to investigate the foreign object in their environment. The pheromones were dispensed in white socks weighed with rocks hanging from broken tree branches no more than a meter off the ground.

At the park's Jejane waterhole, 25 of 29 elephants that approached the [pheromone](#)-laden socks moved away after getting close enough to smell the formulation. In the same timeframe, control experiments found that all elephants ignored similar looking suspended socks that did not contain the pheromone mix, or they would approach the controls and pick them up, and even try to taste them in some cases.

"Our results complement previous studies that have demonstrated that active bee hives can deter elephants from crops for example but may be difficult to implement on a large scale. We hope to expand this work to develop additional tools for sustainable passive management of elephant movements, to augment the current approaches used.," said Mark G. Wright, the lead author of the study and a professor of entomology at the Department of Plant and Environmental Protection Sciences at the University of Hawaii at Mānoa.

This study was a collaboration between scientists at the University of Hawaii at Mānoa, the Balule Nature Reserve in South Africa, University of South Africa, Elephants Alive in South Africa, and ISCA Technologies, a Riverside, Calif., a biotech company that prepared the pheromone formulation in a slow release matrix called SPLAT .

This study stemmed from ISCA's two decades of research, development, and commercialization of products that use pheromones and other naturally-occurring compounds that manipulate animal behavior to control insects that destroy crops or spread diseases without a need for area-wide spraying of toxic pesticides. This study, however, breaks new ground by showing that synthetic pheromones also may have the potential to be used to safely manage a large mammal species.

The need for safe elephant management strategies has become more pressing as human populations have grown in Africa and Asia creating larger areas where elephants conflict with humans by trampling crops or causing other damage. These conflicts are often tragic. People have been trampled to death, and their crops are destroyed. And elephants deemed to be destructive are often killed.

In this study, the scientists exploited the chemical clues that occur in nature. When a mammal appears to threaten a beehive, bees that perceive the threat release from their bodies "alarm" pheromones to marshal other bees to defend the hive. A swarm of bees then attack and sting the mammal.

Elephants hate to be stung, Wright said. The soft tissues in their eyes and inside their trunks are particularly vulnerable to painful bee stings. So, over the eons, it is believed, elephants learned to recognize the odor of bee alarm pheromones and to back off when they come across them.

In fact, some farmers in Africa place commercial bee hives along their

fence lines to protect crops from elephants. Yet, the use of manufactured pheromones in a slow-release matrix could be far less costly, more flexible, and easier to deploy to facilitate safer coexistences between [elephants](#) and humans in habitat interface areas.

Provided by ISCA Technologies Inc.

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