

OR052

Exploiting honeybee learning and foraging behavior for biosecurity

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Honeybee social organization and communication enables rapid recruitment to exploit floral resources. This behavior presents unique opportunities to employ honeybees for detection and localization of emergent biosecurity risks. Prior research has shown conclusively that bees have the capability to detect several components in military explosives. A series of carefully designed experiments performed under varying conditions at geographically widespread locations has shown in every instance that whole colonies of bees can be trained to search for and find isolated targets emitting selected volatiles in small quantities and vapor concentrations at low parts per trillion. In the course of proving honeybees' potential, standard procedures for behavioral conditioning and tracking, and mapping forager density patterns were developed that can be implemented for a variety of volatile compounds. Tested compounds include a variety of illicit drugs, decomposition products, and more recently plant volatiles. With the continued pressure of biological invaders in natural and primary ecosystems, the ability to rapidly train honeybees to odors associated with infestation by introduced animals or plants and monitor their position on the landscape, offers potential for efficient targeted surveillance of rare pests on the landscape. We will discuss the training of bees to signature and whole organism odors and how current technology can make use of bees' ability to rapidly seek out and find these odor sources