Can bees eavesdrop on biosecurity targets?

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Surveillance of unwanted organisms without lures is one of the greatest challenges in biosecurity. Previous work in the USA has shown that honey bees (*Apis mellifera)* can be trained to detect land mines. Based on this successfully proven method, the possibility of detecting key species of agricultural and biosecurity interest in a field environment was examined. Application examples presented here include detection of a weed in a crop, such as rosemary *(Rosmarinus officinalis*) in wheat, and detection of the Argentine ant (*Linepithema humile)* in a field. Bees were trained at the colony level on the specific odours of each target, and their ability to locate these odours in the field was measured with video cameras. Bees were able to detect rosemary hidden in a wheat crop and the cluster of four plants attracted significantly more bees than the positive and negative controls. Similarly, bees were shown to learn to detect the Argentine ant (*Linepithema humile)* trail pheromone, z-9-hexadecenal, and their response ranged down to parts-per-trillion (ppt, 10^{-12}). However, there was a clear preference for higher concentrations that may be associated with higher expected rewards. Detection thresholds and the sensitivity of bees are discussed.

In vitro evaluation of fungicides and biocontrol agents for efficacy against *Neofusicoccum* spp. that cause dieback of blueberries

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Several botryosphaeriaceous species have been reported to cause stem canker, twig blight and dieback of blueberries, with different *Botryosphaeria* species reported in different parts of the world. This research evaluated nine fungicides for their ability to reduce mycelial growth, conidial germination and germ tube elongation of four common and pathogenic botryosphaeriaceous species recovered from New Zealand blueberries. Furthermore two biocontrol agents were tested against the same species using dual plate assays. Fludioxonil, carbendazim, flusilazole and tebuconazole were the most effective for inhibition of mycelial growth of three isolates each of *Neofusicoccum australe*, *N. luteum*, *N. parvum* and *N. ribis*. EC_{50} values for these fungicides were less than 0.1 mg ai/litre. Carbendazim and iprodione (both EC_{50} = 0.04 mg/litre) were the most effective for reduction of conidial germination of all four species. In addition, these two fungicides were effective for inhibition of germ tube elongation with mean EC_{50} values of 0.04 and 0.1 mg/litre, respectively. The biocontrol agents *Trichoderma atroviride* and *Bacillus subtilis* reduced mycelial growth of all species tested, with a range of macroscopic interactions. This study has indicated the most promising fungicides and biocontrol agents for further investigations to protect pruning wounds in blueberries.