

Detecting queenless hives

The CRC for Honey Bee Products has identified changes in molecules inside honey bee hives that are queenless and raising a new queen.

Healthy honey bees are pivotal to a flourishing and economically sustainable honey bee industry. Healthy hives are free from disease, have good nutrition and a healthy queen. Queenless honey bee hives are less productive and eventually die.

Beekeepers spend considerable time searching their beehives for the queen bee. Bees themselves can identify and communicate the presence or absence of a queen bee with their hive mates in minutes.

Fast detection of queenless hives is essential for quality control of hives, especially for hives used for pollination services. To better understand how bees signal queenlessness, CRC researchers investigated the pheromones and volatile organic compounds (VOCs) bees use to communicate.

Researchers identified biomarkers that distinguish hives that have become queenless, hives that are raising a new queen and hives with a virgin queen. These markers could be used to develop monitoring devices.

Researchers found that queenlessness increases hive aggression, and VOCs that correlate with this characteristic were detected in significantly higher concentrations in the air of queenless hives.

Compounds that increase in abundance are of particular interest as they can provide the basis for sensor development to help hive monitoring.

Monitoring hive health can improve the productivity of honey bees for pollination services and honey production. Monitoring for queenlessness can accelerate management response.

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Honey bee queen surrounded by worker bees in what is called the 'Royal Court'



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CRC Masters student Ben Fleay measures a queenless hive

