Stress a key factor in causing bee colonies to fail

October 7 2013

Extended periods of stress can cause bee colony failures, according to new research from Royal Holloway University. Credit: Nigel E. Raine

Scientists from Royal Holloway University have found that when bees are exposed to low levels of neonicotinoid pesticides - which do not directly kill bees - their behaviour changes and they stop working properly for their colonies.

The results showed that exposure to pesticides at levels bees encounter in the field, has subtle impacts on individual bees, and can eventually make colonies fail.

This discovery provides an important breakthrough in identifying the reasons for the recent global decline of bees, a trend that has baffled many experts worldwide.

"One in three mouthfuls of our food depend on bee pollination," said lead author, Dr John Bryden from the School of Biological Sciences at Royal Holloway. "By understanding the complex way in which colonies fail and die, we've made a crucial step in being able to link bee declines to pesticides and other factors, such as habitat loss and disease which can all contribute to colony failure."

"Exposing bees to pesticides is a bit like adding more and more weight on someone's shoulders. A person can keep walking normally under a bit of weight, but when it gets too much – they collapse. Similarly, bee colonies can keep growing when bees aren't too stressed, but if stress levels get too high the colony will eventually fail," added Dr Bryden.

"Our research provides important insights to the biology of pollinators," said co-author Professor Vincent Jansen. "It is intriguing that the way in which bees work together is the key to their success, but could also contribute to their decline and colony failure."

The research was funded as part of the £10 million 'Insect Pollinators Initiative,' set-up to understand the causes of pollinator declines and safeguard future pollination services.

"Pesticides can have a detrimental effect on bees at levels used in the field," said co-author Dr Nigel Raine. "Our research will provide important evidence for policymakers. The way we test pesticides, the

way we assess their impact on bees, and the way we manage pesticides can all be improved."

Provided by Royal Holloway, University of London