## PP-412 [Bee Biology]
## Knocking on a honeybee hive: quantitative analysis of a colony's reaction to an artificial vibrational knock

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In the past many beekeepers have been simply knocking on their hives, with their hand, to check and listen for a positive buzzing response, indicating the liveliness of the colony.

In this work we aim to provide a quantitative method allowing the probing of the physiological status of honeybee colonies by providing them with a gentle, short, external artificial vibrational shockwave, and recording their response.

The knock is provided by an external electromagnetic shaker attached to the outer wall of a hive, driven by a computer with a 0.1 s long, monochromatic vibration at 340Hz set to an amplitude that occasionally yields a mild response from the bees, recorded by an accelerometer placed in the middle of the central frame of the colony.

To avoid habituation, the stimulus is supplied at randomised times, approximately every hour. The method is pioneered with a pilot study on a single colony hosted indoors, then extended onto eight outdoors colonies.

The results show that we can quantitatively sense the colony's overall mobility, independently from another physiological aspect, which is phenomenologically explored. Using this, a colony that is queenless is easily discriminated from the others.

The method is presently deployed on a collection of colonies in Europe, including Holland, Norway and Romania, with the aim of discriminating survivor from failing colonies, in apiaries where honeybees are not treated for varroa infestation. When the method's specific diagnostic strengths are fully clarified, it will provide beekeepers with a quantitative startle response measurement tool, providing colony status assessment without having to open the hive.