

2.10 A methodology to assess the effects of plant protection product on the homing flight of honeybee foragers

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Abstract

With the current revision of plant protection product risk assessment on the honeybee by the European agency (EFSA), new methodologies are asked in the evaluation scheme (EFSA, 2013).

Homing experiments are relevant for field assessment because an increased probability of homing failure reveals a mortality phenomenon (Henry et al. 2012). Successful homing flight is contingent to the proper integration of multiple physiological and cognitive functions (navigation, memory, energetic metabolism and muscular flight activity).

We developed and finalised a methodology based on RFID (Radio-Frequency Identification) technology already valued in ecotoxicology (working group of CEB). The standardisation of the method is conducted by the French institute of beekeeping and pollination (ITSAP). We now have the will to validate the method by creating an international ring test group with interested laboratories for a registration in the OECD guidelines.

A homing trial is defined as a group of forager bees released at one given site after receiving an acute oral insecticide or control treatment. To ascertain they had a prior knowledge of the pathway back to the colony, foragers with bright blue pollen loads from a known *Phacelia* field were captured at the entrance of the hive. *Phacelia* was planted in a one-ha field specifically for the need of the experiment, and the colony subsequently placed 1 km away. Bees were each labelled with microchips and orally exposed to a sublethal dose of insecticide or to a control in laboratory. The dose was administered to bees in 20 µl of a 30% sucrose solution. Then, tagged foragers were released from inside the *Phacelia* field. Homing failure is defined as an absence of a RFID record during the 24-h post-release.

References

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Acknowledgment

This work is funded by the European Community program coordinated by the French Ministry of Agriculture (FranceAgriMer).