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Abstracts: Oral Presentation

1.2 The homing flight method to assess the effect of sublethal doses of plant protection products on the honey bee in field conditions: results of the ring tests and proposal of a new OECD TG

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Abstract

The evaluation of the potential effects of plants protection products on honeybee behavior is considered as part of the risk assessment according to Regulation (EC) No 1107/2009 and the EFSA Guidance document (EFSA 2013). But no standardized and validated method is still available. With current revisions of plant protection product risk assessment on the honeybee, a European ring test is conducted since 2015 with 11 voluntary laboratories to test a methodology assessing the effects of sublethal doses of a plant protection product administered in controlled conditions on the homing capacity of forager bees in the field. Homing success is measured by monitoring free-ranging honey bees with radio-frequency identification (RFID) tagging technology.

Main experimental steps are:

-The capture at the hive entrance of foragers coming from a known site located at 1 km (+/- 100 m) away from the experimental colony, to ensure that the foragers have a prior knowledge of the pathway back to the colony.

-The oral exposure of RFID-tagged bees to 3 sublethal dosing solutions of the reference item thiamethoxam, or to a control in laboratory. To do so, the dosing solutions are collectively administered to the honeybees with 20 µl per bee of a 30% sucrose solution (w/v).

-The release of the RFID-tagged foragers on the known site and the record of the homing success at the hive entrance with RFID system for 24 hours after release.

In the first ring test year (2015), already 7 laboratories out of 10 conducted the test and found a common No-Observed Effect Dose (NOED) on the homing success of 0.33 ng per bee, as a test endpoint. The test protocol evolved over time, taking into account methodological adjustments that increased labs test performance. For all control and exposed groups of bees, mortality before release decreased as a whole to ≤ 15 %. A dose with effect of 1 to 1.5 ng per bee was found for a majority of labs from 2015 to 2019. The factors due to the protocol and context (e.g., temperature, varroa infestation) that could modulate homing performances, especially in exposed bees, were considered.

The results showed as a whole the sensitivity of the method to detect the effects of low doses on homing success of foragers. This year (2019) is the last ring test year before documents submission to OECD. The validity criterion corresponding to the minimum and acceptable homing success in control bees will be definitely set in accordance with the ring test results and expertise.

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