

### 3.8 New field application method to assess the effects on honeybees (*Apis mellifera* L.) using a purpose-built dust applicator in flowering crops

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Drift of abraded dust of insecticidal seed treatments resulted in bee poisoning incidents in the past. For risk assessment purposes, tests with realistic applications of defined amounts of dust are needed, e.g. to determine NOEC or LOEC values. However, tests with dusts are much more difficult than tests with liquid substances. Due to solid state and the varying particle size it is challenging to develop standard ways of applying dust in situ and in vitro. In the field it is even more problematic to apply the low rates required in a practical way over a larger area. As only small amounts of contaminated dust containing e.g. insecticides are emitted during sowing operations, only very small amounts of these dusts have to be applied homogeneously. For this purpose staff of Eurofins developed a method to apply defined amounts of dusts together with a dilution material in the field, to determine the effects of exposure on honeybees (*Apis mellifera* L.) to dust from sowing of clothianidin-coated maize seeds. In a collaborative trial between JKI and Eurofins, dust was applied with a purpose-built dust applicator once during bee-flight to flowering *Phacelia tanacetifolia* in a field study in Germany.

The study consisted of three treatment groups; two test item treatment groups T1 and T2 and an untreated control C. The application rate of clothianidin was 0.25 g a.i./ha for the application in the treatment group T1 and 1 g a.i./ha for the application in the treatment group T2. Commercial honey bee colonies were placed at the edge of the test fields five days before the planned application. Mortality, foraging activity and behaviour of the bees were assessed over four days before and over seven days after the application. The condition of the colonies and the brood development of the colonies were checked once before and four times after application. Bumble bee colonies were set up in the field, brood and colony development assessed before and after application.

The results are in line with test results of other semi-field studies of the JKI with a manual application of dusts. The new technology for application of dusts in field trials has proven to be an effective tool to create a uniform exposure in field trials. Nevertheless, it remains a challenging discussion at which application rates such tests should be conducted to reflect a realistic worst-case scenario.

The full paper has been accepted as a peer-reviewed publication: Pistorius J., Wehner A., Kriszan M., Bargaen H., Knäbe S., Klein O., Frommberger M., Stähler M., Heimbach U., 2015. Application of predefined doses of neonicotinoid containing dusts in field trials and acute effects on honey bees. *Bulletin of Insectology* 68 (2): 161-172.