

Hazards of pesticides to bees - 14th international symposium of the ICP-PR Bee protection group, October 23 – 25 2019, Bern (Switzerland)

Abstracts: Oral Presentation

Acute treatment with flupyradifurone reduced sensory responses and cognitive performance as well as motor behavior with typical indications of toxification such as walking in circles or falling on the back.

Generally, low concentrations of flupyradifurone had smaller effects on behavior than the hitherto frequently used neonicotinoids. However, we also see a negative impact of this novel insecticide on honeybees, even though it may sometimes only become apparent under stressed situations.

1.9 Dust drift from treated seeds during seed drilling: comparison of residue deposition in soil and plants

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Abstract

Drilling of seeds treated with plant protection products leads to dust drift carrying active substances (a.s.) into adjacent areas. Since these residues potentially pose a risk for bees, standardised field experiments have been conducted between 2009 and 2017 to investigate the deposition pattern of a.s. and the potential bee exposure to a.s. The large resulting data set contains a lot of information that can be used to improve our understanding of how different parameters influence the deposition pattern of dust and a.s. of seed treatments. For the present analysis, residues sampled in different matrices were used, including Petri dishes placed on bare soil and within neighbouring cultures (oil seed rape and mustard) as well as plant material (divided into flowering and non-flowering plant parts). In a nested design, multiple samples were taken at each distance of 0, 1, 3 and 5 m from the field edge within a total of 6 blocks per trial. The a.s. content per sample was determined analytically, using high-performance liquid chromatography coupled to tandem mass spectrometry (HPLC-MS/MS).

By means of generalized linear mixed effect models (GLMM; R package 'lme4') and automated model selection (R package 'MuMIn'), the effects of environmental and drilling parameters, seed treatment quality and sampling matrix were analysed taking into account the information from multiple trials and thus allowing for analysing the effects independently from another. A high amount of variation cannot be explained by the resulting models, probably due to environmental factors not incorporated into the models, such as varying wind speed and direction as well as heterogeneous field characteristics (terrain, crop density). However, the incorporated fixed effects resulted to be relevant in the majority of the selected models. Overall, the dust-borne a.s. emission per hectare (Heubach value expressed as g a.s./ha) has a strong impact on the amount of residues, which decrease markedly within the observed distance of 5 m to the field edge. Comparing different sampling matrices, *i.e.*, flowering plant parts and ground-based Petri dishes, a similar distance-related residue pattern was observed within the neighbouring crops. Based on field realistic data, the presented results will contribute to enabling a more precise risk assessment of seed treatment applications with regard to bees.

1.10 Coumaphos residues in beeswax after a single application of CheckMite® affect larval development *in vitro*

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Abstract

Coumaphos is an organophosphate insecticide used on bees for the control of the parasitic mite *Varroa destructor*. We studied the distribution of coumaphos in beeswax after a single application of CheckMite® and