

Hazards of pesticides to bees – 10<sup>th</sup> International Symposium of the ICP-Bee Protection Group

'acceptable' sowing machines, reducing dusts in adjacent fields by 90 %, which will be addressed by the respective authorizations.

However, for the authorization of pesticides for seed treatments new data requirements will be defined on a crop by crop basis to take this path of exposure into due consideration:

- data on free dusts and dusts from abrasion for each crop,
- data on sowing machines used and potential emissions.

For all future authorizations of pesticides used as seed treatments additional conditions for use will be applied for precautionary reasons. These will cover:

- the use of additional stickers, in order to minimise free dusts and dusts from abrasion,
- maximum permissible values for abrasion, where applicable,
- the prohibition of sowing treated seeds at wind speed higher than 5 m/s,
- the obligation to incorporate treated seeds including containing dusts or dusts generated during the sowing process into or directly onto the soil,
- the ban of pneumatic systems (vacuum systems), unless the exhaust air pipe allows for an incorporation of dusts into the soil or directly onto the soil, where applicable.

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### Risks to bees from dusts emitted at sowing of coated seeds: concerns, risk assessment and risk management

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### Abstract

The use of Plant Protection Products (PPP) through seed coating may lead to honey bee exposure mainly in the case of systemic properties, through residues that thus may reach green and flowering parts of growing plants. Incidents occurred in France, Germany and Slovenia. These revealed mortality events in honey bee colonies occurring immediately after sowing of coated seeds which could not be explained by systemic properties. These incidents were related to a loss of active substance from the outflow air fan of pneumatic sowing machines and possible pollution of vegetation in nearby fields.

Investigations were undertaken in France in order to identify the factors responsible of these incidents<sup>1</sup>. A low coating quality was demonstrated, which led to the emission of higher level of dusts compared to usual coating. Higher levels of residues could also be observed in the dusts generated by the low quality coating compared to a normal one. Further research was performed in Italy, on outflow air from pneumatic seed drills<sup>2</sup>, which demonstrated a pollution of plants in the vicinity of sowed areas, at levels directly dependant on the length of sowing duration. This observation leads to recommend a quality control of the dust level at the seed treatment plant.

Specific equipments exist, which may reduce the risks by limiting dust emission during sowing operations. Outflow fans may for example be oriented towards the soil so that dust drift is limited. In addition, deflecting devices may redirect dust to the soil and avoid turbulence and further drift. An efficacy assessment of these devices compared to 'conventional' equipment may be a preliminary requirement to their generalized implementation on seed drills.

Prior to an adaptation of sowing material, the question of the risks posed by sowing dusts to honey bees remains. In France, a dedicated risk assessment has recently been performed for two PPPs to be used as seed coating<sup>3</sup>. Exposure of bees was assessed from dedicated experimental data on dust emission from the coated seeds according to high quality standard. The amount of active substance emitted was determined and used as an application rate estimate in a hazard quotient calculation, further compared to Directive 91/414/EEC trigger and by comparing the drift dose rate on dusts to acceptable exposure levels in tunnel testing. Due to the nature of the risks related to a sowing event, contact toxicity value was preferred. This risk assessment lead to conclude to acceptable acute risks for the products evaluated. Nevertheless, such an assessment may probably be improved and remains a precondition to routinely implemented controls of coating quality, through e.g. dust emission/abrasion tests.

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<sup>1</sup> Commission d'étude de la toxicité, des produits antiparasitaires et supports de culture, procès verbal de février 2004 (<http://agriculture.gouv.fr/IMG/pdf/avisctweb200401.pdf>)

<sup>2</sup> Greatti M., Barbattini R., Stravisi A., Sabatini A. G. and Rossi S., 2006. Presence of the a.i. imidacloprid on vegetation near corn fields sown with Gaucho dressed seeds. *Bulletin of insectology* 59 (2): 99-103.

<sup>3</sup> AVIS du CES relatif à une demande d'autorisation de mise sur le marché de la préparation Cruiser à base de thiaméthoxam, de la société Syngenta Agro SAS, dans le cadre d'une procédure de reconnaissance mutuelle.

AVIS du CES relatif à une demande d'autorisation de mise sur le marché de la préparation Poncho Maïs à base de clothianidine, de la société Bayer CropScience France, dans le cadre d'une procédure de reconnaissance mutuelle (<http://www.afssa.fr>).

## **An effective risk management approach to prevent bee damage due to the emission of abraded seed treatment particles during sowing of seeds treated with bee toxic insecticides**

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### **Abstract**

In spring of 2008, a bee incident occurred in the Upper Rhine Valley (Germany) during drilling of corn: bees were exposed to dust from abraded particles of the seed-coating containing the insecticide clothianidin. An inspection of drilled seed batches for resistance to abrasion and a geographical correlation analysis between specified seed batches and reported bee damages revealed that the incident was caused by improperly dressed batches of corn seeds with excessive abrasion of seed treatment particles which were subsequently emitted via the outlet air stream of the pneumatic drilling machines. Concerns raised by local beekeepers regarding effects on bees from foraging in seed-treated corn fields during bloom could be dispelled by a large-scale survey of clothianidin residues in pollen from the treated crop and an accompanying monitoring of bee hives exposed to flowering corn fields. In order to ensure the bee safety of seed-dressing products, technical improvements of seed treatment quality and drilling technology were developed resulting in a minimization of formation and emission of dust from abraded seed treatment particles. The efficacy of these improvements was proven in field trials.

Keywords: seed treatment, drilling machines, corn, clothianidin, dust, honey bees

### **Introduction**

In late April and early May of 2008, numerous cases of increased bee mortalities were recorded in the Upper Rhine Valley (SW Germany). Typically, the affected bees showed symptoms of acute intoxication, in most cases these effects were seen in adult bees only. Approximately 11,500 bee hives were affected. The investigation of the incident was started by regional and Federal authorities immediately after the first records of conspicuous mortality. From the beginning, there were indications which linked the increased