

Risk assessment of pesticides and other stressors in bees: principles, data gaps and perspectives from the European Food Safety Authority.

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Risk assessment of pesticides and other stressors in bees: Principles, data gaps and perspectives from the European Food Safety Authority

Agnès Rortais ^a ... Frank Verdonck ^a

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Highlights

• EFSA developed a risk assessment scheme for single/multiple chemicals in bees.

• Research is needed to fill gaps in risk assessments of multiple stressors in bees.

• A toolbox is available to assess honeybee health in field conditions

- â€¢ A toolbox is available to assess honeybee health in field conditions.
- â€¢ A model is designed to assess risk of pesticides and other stressors in honeybees.
- â€¢ EFSA calls for an open-access database for risk assessments in bees.

Abstract

Current approaches to risk assessment in bees do not take into account co-exposures from multiple stressors. The European Food Safety Authority (EFSA) is deploying resources and efforts to move towards a holistic risk assessment approach of multiple stressors in bees. This paper describes the general principles of pesticide risk assessment in bees, including recent developments at EFSA dealing with risk assessment of single and multiple pesticide residues and biological hazards. The EFSA Guidance Document on the risk assessment of plant protection products in bees highlights the need for the inclusion of an uncertainty analysis, other routes of exposures and multiple stressors such as chemical mixtures and biological agents. The EFSA risk assessment on the survival, spread and establishment of the small hive beetle, *Aethina tumida*, an invasive alien species, is provided with potential insights for other bee pests such as the Asian hornet, *Vespa velutina*. Furthermore, data gaps are identified at each step of the risk assessment, and recommendations are made for future research that could be supported under the framework of Horizon 2020. Finally, the recent work conducted at EFSA is presented, under the overarching MUST-B project (â€œEU efforts towards the development of a holistic approach for the risk assessment on Multiple Stressors in Beesâ€) comprising a toolbox for harmonised data collection under field conditions and a mechanistic model to assess effects from pesticides and other stressors such as biological agents and beekeeping management practices, at the colony level and in a spatially complex landscape. Future perspectives at EFSA include the development of a data model to collate high quality data to calibrate and validate the model to be used as a regulatory tool. Finally, the evidence collected within the framework of MUST-B will support EFSA's activities on the development of a holistic approach to the risk assessment of multiple stressors in bees. In conclusion, EFSA calls for collaborative action at the EU level to establish a common and open access database to serve multiple purposes and different stakeholders.

MUST-B: EU efforts towards the development of a holistic approach for the risk assessment of multiple stressors in bees



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Keywords

Multiple stressors; Honeybee colony health; Modelling; Indicator; Data collection; Research needs

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