

## **Do residues of imidacloprid in surface water cause honeybee colony losses?**

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### **Abstract**

Honeybee colony mortality is a problem at a world wide scale. Insecticides in agriculture and horticulture might contribute, especially the neonicotinoid imidacloprid, which is a commonly used systemic insecticide that might induce several effects at sublethal concentrations. Furthermore it is very persistent in soil and water. At several locations in the Netherlands imidacloprid was found in the surface water in relatively high concentrations. The exceeding of the acceptable levels was suggested to be causally related to honeybee colony losses, and several groups in society are concerned.

The aim of this study is to determine whether concentrations of imidacloprid in surface water influence honeybee mortality in the Netherlands. Therefore monitoring data of honeybee mortality from 2005, 2006, 2007 and 2009 and several covariates are used. Data of honeybee mortality are linked to maximum values of imidacloprid concentrations in surface water. For a realistic risk valuation, three foraging distances are used, i.e. 1000 meters, 3000 meters and 7500 meters.

Peak concentrations of imidacloprid within a radius of 7500 meters around the colonies appeared negatively correlated with honeybee mortality. However, imidacloprid was aliased with the factor beekeeper, so the earlier shown correlation is possibly a disguised beekeepers effect. A negative effect of imidacloprid in surface water on honeybee colony survival in the Netherlands is therefore not shown in this study.

Although it can not be proven that imidacloprid has no influence on honeybee mortality, it seems unlikely that imidacloprid in surface water as a single factor is relevant to the current problem. Possible interactions between imidacloprid and factors that undermine the vitality of colonies are not taken into account in this study.

### **Reference**

The full report of this study is available (in Dutch):

<http://documents.plant.wur.nl/pri/bijen/imidaclopridresiduen.pdf>.