

Orientating experiments on guttation fluid of seed treated maize (*Zea mays* L.) in relation to the water collecting behaviour of honey bees (*Apis mellifera* L.)

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Abstract

The major task of this study was to examine the honey bee's (*Apis mellifera* L.) water collection behaviour in relation to the process of guttation in a corn plot treated with clothianidin. As shown in experiments 2009 under field conditions, guttation fluid of seed coated maize contains concentrations up to 8000 ng ml⁻¹. Based on these results, further investigations were conducted to examine the honey bee's water collection behaviour in relation to designated water collection stations and varying water quality under tent conditions. In the 'corn tent' a high number of maize seed coated with clothianidin (Poncho and Poncho Pro, Bayer CropScience) was sown to create an extreme situation for the bees. Beside the guttation no alternative water sources were offered. In the 'mesh tent' the soil was covered with texture to exclude natural water sources so defined water sources were placed at varying distances and with varying qualities of water. Pollen and sugar dough were offered on feeding stations. Observations on bees drinking at the water sources, their behaviour and reaction on water quality were induced in both tents.

The instances of death in the experimental bee colonies were regularly noted, and the dead bees collected.

These tent experiments showed, that bees, which collected guttation droplets in seed dressed corn or clothianidin-spiked water at the artificial water source return to the colony and get damaged after a certain time with the known symptoms. Dead bees can be found in the colony as well as in front of the hive. The number of affected bees in the colony is limited but under the chosen conditions the consumption of contaminated water led to a reduced colony development.