

---

## Sektion 10 - Umweltverhalten von Pflanzenschutzmitteln und -verfahren I

---

### 10-2 - Joachimsmeier, I.; Pistorius, J.; Schenke, D.; Heimbach, U.

Julius Kühn-Institut, Bundesforschungsinstitut für Kulturpflanzen

#### Details on occurrence and frequency of guttation in different crops in Germany

*Auftreten von Guttation bei verschiedenen in Deutschland relevanten Kulturpflanzen*

Even though the general occurrence of guttation has been well described in literature, no data are available which compare the occurrence, frequency and intensity (size/number of guttation drops, number of guttating plants) of guttation between crops of economic relevance in Germany. To address this question several greenhouse and field trials were conducted by the Julius Kühn-Institut, Bundesforschungsinstitut für Kulturpflanzen, in cooperation with research partners (DWD, IfZ, BDP and UFOP) from 2009 to 2012.

A total of eleven important widely-grown crops (e.g. oilseed rape, maize, sugar beet) and twenty-one common weeds like e.g. *Poa annua* were examined in greenhouse or field trials. The frequency and intensity of guttation of different crops and weeds in greenhouse trials were compared under the same climatic conditions. In field situation, several areas within the field border (covered with weedy plants) adjacent to the crop field or in neighboring field crops (preferably cereals) were investigated and compared to the observed field in parallel. The observations started at early plant emergence and ended at the growth stage when guttation ceased. In the glasshouse daily assessments were conducted. Assessments of guttation frequency and intensity in the field trials were carried out daily or in some cases only under climatic conditions suitable for guttation on pre-selected days (e.g. high air humidity, low wind speed, occurrence of dew). At each assessment the climatic conditions (relative air humidity, air and soil temperature), the growth stage of the crop plants using the BBCH scale and the presence of guttation or dew drops were recorded. However, in the field trials, additional climatic information like sky cover, soil humidity was assessed. The size of guttation drops was determined only in glasshouse trials. For this the guttation drops of each plant were counted and balanced on a filter paper.

Based on the data obtained it seems a valid prognosis of the climatic conditions triggering guttation of a specific widely-grown crop is not possible yet. Even under climatic conditions suitable for guttation, guttation was only observed on 50 % of preselected observation days in investigated fields. However, during most of the year guttation occurs frequently in several crops or weeds and then usually also in many individual plants in parallel. The frequency of guttation is however particularly high in early growth stages of the crops and some plants show guttation more frequently than others. In general, monocotyledonous crops such as maize and cereals showed a higher guttation frequency than dicotyledonous crops such as sugar beets. However, some dicotyledonous crops such as oilseed rape and potato guttate more frequently. Similar results were recorded for some weeds.

### 10-3 - Pistorius, J.<sup>1)</sup>; Joachimsmeier, I.<sup>1)</sup>; Heimbach, U.<sup>1)</sup>; Schenke, D.<sup>1)</sup>; Frommberger, M.<sup>2)</sup>; Wallner, K.<sup>2)</sup>

<sup>1)</sup> Julius Kühn-Institut, Bundesforschungsinstitut für Kulturpflanzen

<sup>2)</sup> Universität Hohenheim

#### Risk assessment: state of art on the risk for honey bees from residues in guttation droplets

*Risikobewertung: aktueller Kenntnisstand zum Risiko für Bienen durch Pflanzenschutzmittelrückstände in Guttationstropfen*

Measurements of high residue levels of some highly bee toxic and systemic insecticides detected in guttation droplets triggered concern on the potential risk for water collecting honey bees and bee colonies. Guttation is a possible route of exposure for water-collecting bees to systemic pesticides, in particular via soil applications (e.g. seed treatment, granular or drench applications). Concern was particularly raised for systemic insecticides with high toxicity for adult bees and/or bee larvae, especially for highly toxic systemic neonicotinoids.

For the purpose of risk assessment, the potential exposure to residues in guttation droplets is comparably easy to measure but it is more difficult to assess the potential risk for bees in field conditions. Compared to nectar and pollen, which are both highly attractive for bees and which attract bees over larger distances, usually several water sources are available in the surrounding of a colony and bees will not need to fly large distances to collect water. Water sources nearby the colony will be preferred due to energetic reasons. Guttation droplets are usually only one out of several possible water sources in the surrounding of a colony and are usually only available at a